Blackline Masters
MATHPOWER™ *Eight*

Eileen Collins, B.A., M.Ed.

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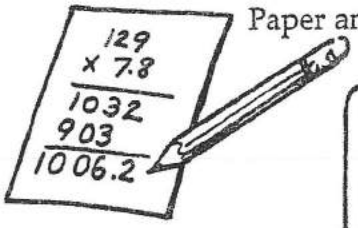
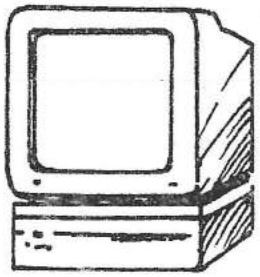
1.1 Choosing a Calculation Method

MATHPOWER™ *Eight*, pp. 6–7

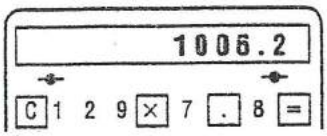


Paper and Pencil



Computer

Estimate
$130 \times 10 = 1300$



Calculator

Mental Math

State whether you would need an exact answer or an approximate answer.

1. You are a park warden. How many campers stayed in the park last weekend?

2. You are the caterer for a wedding reception. How many guests will be attending?

3. You are going to pick strawberries this summer. How many strawberries do you expect to pick?

4. You are reading a mystery novel. When do you expect to be finished?

5. On what date was Canada's Confederation?

Choose a calculation method for each of the following situations.

6. You are having lunch with a friend at a restaurant. You want to split the bill with your friend.

7. You want to paint the walls of your bedroom. How much paint will you need?

8. You are keeping score at a softball game.

9. You are responsible for ticket sales at a local theatre. Ticket prices vary, depending on seat location. The theatre owners want to know the total sales and how many seats of each price are still available.

Choose a calculation method. Then, evaluate each expression.

10. $150 \div 3$

11. 18.7×2.3

12. $808 - 202$

13. $12\,433 + 15\,644$

14. The costs for theatre tickets are: \$4.50 per child and \$9.25 per adult. The ticket sales for a 6-day period one week were as follows.

Day	Number of Children	Number of Adults
Mon.	42	30
Tues.	67	55
Wed.	42	54
Thurs.	34	42
Fri.	75	70
Sat.	88	94

a) Write one question that requires an approximate answer and one that requires an exact answer.

b) Answer your questions.

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1.2 Place Value and Ordering

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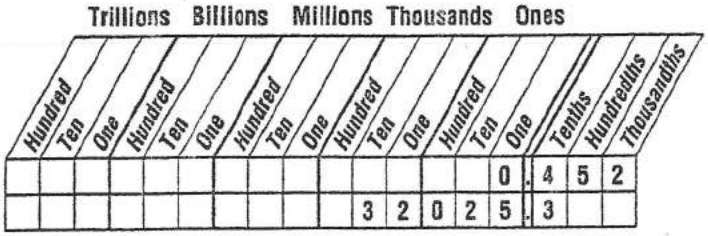
A place value table can help you read and write numbers.



Read decimal numbers by naming the place value of the final digit.

0.452 → four hundred fifty-two thousandths

Read "and" for the decimal point.

32 025.3 → thirty-two thousand twenty-five and three tenths

Write each number in words.

1. 16 042 631 _____

2. 14.32 _____

3. 0.439 _____

4. 65 324.783 _____

Write the total value of the underlined digit in each number.

5. 3<u>2</u> 645 _____

6. 173 309.2<u>4</u>7 _____

7. <u>8</u>2 445 923.4 _____

Write in standard form.

8. eight hundred thousand forty-two

_____

9. seventy-four million three hundred sixty-three and four tenths

_____

10. four thousand thirty-two and forty-five hundredths

_____

Write in standard form.

11. 1 000 000 + 200 000 + 3000 + 400 + 30 + 1

_____

12. $4 \times 1000 + 8 \times 10 + 2 \times 1 + 6 \times 0.01 + 8 \times 0.001$

_____

13. $2 \times 0.01 + 3 \times 0.0001$

_____

Write each number in expanded form.

14. 67.073 _____

_____

15. 12 379 002 _____

_____

16. 0.246 _____

_____

Insert < or > to make each statement true.

17. 16.32 ☐ 16.33

18. 231 ☐ 213

19. 7.023 ☐ 7.23

20. 104.4 ☐ 104.04

21. 36.207, 36.027, 36.720, 36.072, 36.270, 36.702

List the numbers in order from least to greatest.

_____

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1.3 Rounding Numbers: Mental Math

MATHPOWER™ *Eight*, pp. 10–11

If the **key digit** is less than 5, round down. $386.4\underline{5}2 \rightarrow 386.45$

If the **key digit** is 5 or more, round up. $3\underline{8}6.452 \rightarrow 390$

Round the number 74 283.629 to these place values.

1. to the nearest hundredth _____
2. to the nearest tenth _____
3. to the nearest one _____
4. to the nearest ten _____
5. to the nearest hundred _____
6. to the nearest thousand _____
7. to the nearest ten thousand _____

Circle the key digit in each number, then round to the indicated place value.

8. 17 423; nearest thousand _____
9. 73.86; nearest one _____
10. 0.846; nearest hundredth _____
11. 205 481; nearest ten _____
12. 439.551; nearest tenth _____
13. 2.3987; nearest thousandth _____

State the place value to which each decimal has been rounded.

14. $86.37 \rightarrow 86$ _____
15. $4259 \rightarrow 4000$ _____
16. $5.098 \rightarrow 5.1$ _____
17. $0.1045 \rightarrow 0.105$ _____
18. $2554 \rightarrow 2550$ _____

What digits can you insert so that

19. 5☐6 rounds to 500? _____
20. 2.3☐1 rounds to 2.4? _____
21. 35.☐9 rounds to 36? _____
22. 0.53☐ rounds to 0.53? _____

Round to the stated place value.

23. The area of British Columbia is 948 596 km^2. (nearest hundred thousand)

_____

24. The length of the Peace River is 1923 km. (nearest ten)

_____

25. The High Level Bridge in Lethbridge, Alberta, rises 314.96 m above the river valley below it. (nearest tenth)

_____

26. Mt. Robson is the highest point in the Canadian Rockies. Its elevation is 3953.9 m. (nearest one)

_____

27. A typical human hair grows about 0.033 cm per day. (nearest hundredth)

_____

28. The longest street in the world is Yonge Street. It stretches from Toronto, Ontario, to Rainy River, Ontario, a distance of 1896.2 km. (nearest thousand)

_____

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1.4 Problem Solving: Look for a Pattern

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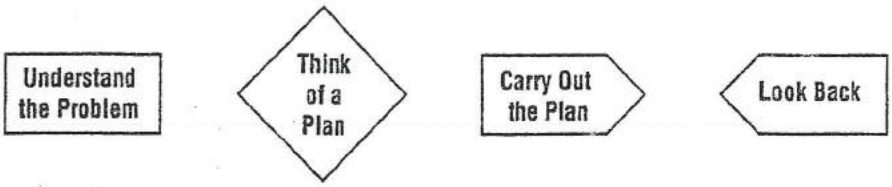


Write the next three terms in each sequence.

1. 4, 8, 12, 16, ____, ____, ____

2. 128, 64, 32, 16, ____, ____, ____

3. z, x, v, t, ____, ____, ____

4. a, z, b, y, ____, ____, ____

Determine a pattern and complete each table.

5.

46	37
43	34
37	28
32	
25	
17	

6.

2	3
4	6
6	9
8	
10	
12	

7.

1	1
2	3
3	5
4	
5	
6	

8.

1	2
2	5
3	10
4	
5	
6	

9. Two letters can be arranged in 2 different ways: ab or ba.

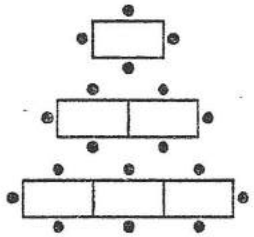
a) List all the ways 3 letters can be arranged.

b) In how many different ways can 4 letters be arranged?

c) Predict, then count, the number of ways that 5 letters can be arranged.

d) Describe the pattern you used to predict your answer.

10. When chairs are arranged around a card table, 4 people can be seated. When 2 tables are put together, 6 people can be seated. When 3 tables are put together, 8 people can be seated.



How many people can be seated around

a) 6 tables? b) 10 tables? c) 15 tables?

11. Describe the pattern in these products.

$11 \times 11 = 121$ $11 \times 21 = 231$
$11 \times 12 = 132$ $11 \times 22 = 242$
$11 \times 13 = 143$ $11 \times 33 = 363$
$11 \times 14 = 154$ $11 \times 44 = 484$

12. Use the pattern in question 11 to predict the answer to each of the following. Check your predictions by multiplying.

a) $11 \times 51 =$ ____ b) $11 \times 36 =$ ____

c) $11 \times 63 =$ ____ d) $11 \times 72 =$ ____

e) $11 \times 27 =$ ____ f) $11 \times 81 =$ ____

13. Describe how this pattern applies to these multiplication statements.

$11 \times 29 = 319$ $11 \times 48 = 528$

14. Use the pattern above to complete each of the following.

a) $11 \times 76 =$ ____ b) $11 \times 87 =$ ____

c) $11 \times 95 =$ ____ d) $11 \times 58 =$ ____

e) $11 \times 47 =$ ____ f) $11 \times 64 =$ ____

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1.5 Estimating Sums and Differences: Mental Math

MATHPOWER™ *Eight*, pp. 14–15

You can use various methods to estimate.

Rounding

175.6 → 200
202.4 → 200
132.8 → 100
187.2 → 200
700

Compatible Numbers

175.6 → about 175 + 125 or 300
202.4
132.8
187.2 → about 200 + 200 or 400
300 + 400 = 700

Front-End Estimation

175.6 → 100
202.4 → 200
132.8 → 100
187.2 → 100
500

Clustering

175.6 → 200 × 3
202.4 = 600
132.8 → 125
187.2
600 + 125 = 725

---

1. Estimate 232 + 178 + 267 + 283 using the method indicated.

Rounding _____

Compatible Numbers _____

Front-End Estimation _____

Clustering _____

Write each question using rounded numbers, then find an estimated answer.

2.
721
155
362
+ 198

3.
84
− 489

4.
62.9
− 21.4

5.
78.25
12.13
+ 7.62

6.
32.49
− 0.73

7.
4.02
+ 76.78

Estimate using compatible numbers.

8. 24 + 82 + 21 + 76 _____

9. 638 + 804 + 364 + 189 _____

10. $7.88 + $1.87 + $0.78 + $3.21 + $1.98 _____

Estimate using clustering.

11. 21 + 29 + 18 + 32 _____

12. $18.21 + $26.34 + $23.23 + $19.79 + $21.85 _____

13. 532 + 485 + 319 + 509 + 289 _____

Estimate using front-end estimation.

14. 728 + 639 + 402 + 821 _____

15. 69.32 − 33.41 _____

16. 87.2 + 68.4 + 98.1 + 12.2 _____

State whether each sum is greater than 300. Find only those sums greater than 300.

17. 38.6 + 178.9 + 32.4 _____

18. 232 + 178 _____

19. 158.7 + 142.8 _____

State whether each difference is less than 300. Find only those differences less than 300.

20. 542 − 480 _____

21. 721.65 − 432.06 _____

22. 576 − 266 _____

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1.6 Adding and Subtracting

MATHPOWER™ *Eight*, pp. 16–17

When adding or subtracting be sure to align decimal points.

Estimate to check for reasonableness.

32.17	32.17 → 30	72.86	72.86 → 70
85.24	85.24 → 90	−48.39	−48.39 → −50
+28.13	+28.13 → +30	24.47	20
145.54	150		

Estimate, then add.

1. 35 642 + 48 139

2. 6.28 + 13.79 + 8.43

3. 884.6 + 643 + 4.84

4. 48 + 32 + 55 + 18

Estimate, then subtract.

5. 63 784 − 28 169

6. 1042 − 608

7. 43.67 − 18.94

8. 72.7 − 8.19

Calculate.

9. 3576 + 43 276 + 85 671 + 6719

_____

10. 2318.521 − 875.746

_____

11. 38 152 − 16 753 + 12 301

_____

12. 18.24 + 7.85 − 0.94

_____

13. 600 − 23.75 − 101.2

_____

14. Complete the calculation grid.

Number	Number	Sum	Difference
106 249	83 976		
47.053	137.65		
1262.06	951.38		
401.028	579.803		
8.0619	12.198		

Find the missing numbers.

15. 6874 + □ = 12 162

16. 56 382 − □ = 37 537

17. 29.842 + □ = 87.601

18. 189.34 − □ = 22.78

19. Sir John A. Macdonald, the first prime minister of Canada, took office in 1867. In 1993, Kim Campbell became the first woman prime minister. How many years separate these events?

_____

20. In one year, 864 096 passenger cars were manufactured in Canada. In the same year, 815 668 trucks and vans were manufactured in Canada.

a) What was the total number of vehicles manufactured that year?

_____

b) What was the difference between the number of passenger cars manufactured and the number of trucks and vans manufactured?

_____

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1.7 Multiplying and Dividing by Powers of Ten: Mental Math

MATHPOWER™ *Eight*, pp. 20–21

When multiplying by powers of 10 greater than 1, the decimal point moves to the right as many places as there are zeros in the power. $17.6 \times 100 = 1760$

When multiplying by powers of 10 less than 1, the decimal point moves to the left as many places as there are decimal places in the power. $17.6 \times 0.01 = 0.176$

When dividing by powers of 10 greater than 1, the decimal point moves to the left as many decimal places as there are zeros in the power. $345 \div 1000 = 0.345$

When dividing by powers of 10 less than 1, the decimal point moves to the right as many places as there are decimal places in the power. $345 \div 0.001 = 345\,000$

Multiply by 10.

1. 32.71 _____ 2. 0.241 _____

Multiply by 100.

3. 6.342 _____ 4. 400 _____

Multiply by 1000.

5. 2700 _____ 6. 2.0251 _____

Multiply by 0.1.

7. 10 452 _____ 8. 0.623 _____

Multiply by 0.01.

9. 622.45 _____ 10. 329 _____

Multiply by 0.001.

11. 12 087.3 _____ 12. 700 _____

Divide by 10.

13. 241.67 _____ 14. 342 _____

Divide by 100.

15. 4401 _____ 16. 3.0263 _____

Divide by 1000.

17. 69 333 _____ 18. 2.3 _____

Divide by 0.1.

19. 3.59 _____ 20. 0.064 _____

Divide by 0.01.

21. 1.332 _____ 22. 4.3 _____

Divide by 0.001.

23. 34.29 _____ 24. 0.4 _____

Calculate.

25. 287×1000 _____

26. $13.204 \div 0.1$ _____

27. $823 \div 1000$ _____

28. 9203.132×0.001 _____

29. 3.628×100 _____

30. $728 \div 0.01$ _____

31. $64.55 \div 0.001$ _____

32. 62.09×0.1 _____

Express each length in centimetres.

33. 2.3 m _____ 34. 0.34 m _____

Express each length in kilometres.

35. 4870 m _____ 36. 4.62 m _____

37. What operation would you use to convert centimetres to kilometres?

_____

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1.8 Estimating Products and Quotients: Mental Math

MATHPOWER™ *Eight*, pp. 22–23

To estimate products and quotients, use either rounded or compatible numbers.

30.29×12.6
$= 30 \times 10$
$= 300$

$95.7 \div 8.9$
$= 90 \div 9$
$= 10$

Estimate each product.

1. 38×89 _____
2. 14.2×9 _____
3. 18×41 _____
4. 78.3×54.5 _____
5. 2.934×158.76 _____
6. 1994×0.52 _____
7. 674×0.989 _____
8. 278×0.48 _____

Use compatible numbers to estimate each quotient.

9. $\frac{38.7}{5}$ _____
10. $\frac{26.8}{4}$ _____
11. $\frac{134.3}{12}$ _____
12. $\frac{43.1}{6}$ _____
13. $228.2 \div 15$ _____
14. $812.6 \div 9$ _____

Estimate each quotient.

15. $\frac{2.89}{0.943}$ _____
16. $\frac{6.41}{3.02}$ _____
17. $\frac{419}{68}$ _____
18. $\frac{122.32}{11.03}$ _____
19. $54.342 \div 8.99$ _____
20. $226.8 \div 5.23$ _____

Estimate the number of whole dollars needed to make each of the following purchases.

21. 8 pens at $0.28 each _____
22. 2.3 kg bananas at $0.68/kg _____
23. 6 chairs at $24.95 each _____

Estimate the cost of 1 kg of each product, given the following prices.

24. 4.8 kg of cheese cost $43.68 _____
25. 1.6 kg of mushrooms cost $4.89 _____
26. 2.1 kg of peaches cost $3.98 _____

The answer to each calculation is written without the decimal point. Estimate each answer, then write the exact answer, including the decimal point.

27. 6.21×7.9 49059 _____
28. 148.6×0.85 12631 _____
29. $524.52 \div 12.4$ 423 _____
30. $9.12 \div 0.08$ 114 _____
31. 3.066×75 22995 _____

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1.9 Multiplying Numbers

MATHPOWER™ *Eight*, pp. 24–25

When decimals are multiplied, the number of decimal places in the product is the same as the number in the factors.

$$\begin{array}{rl} 37.24 & \leftarrow \text{2 decimal places} \\ \times\ 2.1 & \leftarrow \text{1 decimal place} \\ \hline 3724 & \\ 7448 & \\ \hline 78.204 & \leftarrow \text{3 decimal places} \end{array}$$

Check by estimating.
$40 \times 2 = 80$

Estimate, then multiply.

1. 48×2
2. 33×9
3. 78×0.9
4. 186×0.4
5. 6.9×7
6. 7.03×8
7. 3.5×0.7
8. 5.42×0.3
9. 8.01×0.8

Estimate, then multiply.

10. 53×37
11. 6.2×74
12. 8.3×2.9
13. 0.45×6.7
14. 93×0.59
15. 27.24×1.3

Multiply.

16. 425×32
17. 811×2.5
18. 43.4×64
19. 37.9×8.2
20. 720×0.5
21. 0.027×1.8

Multiply.

22. 5013×804
23. 3125×423
24. 1428×8.2
25. 328.4×6.2
26. 34.51×0.86
27. 401.3×5.43

Find the value of each $\square$.

28.
$$\begin{array}{r} \square\,4\,8 \\ \times\ \square\,3 \\ \hline 1\,9\,4\,\square \\ 3\,8\,\square\,8 \\ \hline \square\square\square\square \end{array}$$

29.
$$\begin{array}{r} 7\,\square \\ \times\ 3\,7 \\ \hline 5\,\square\,3 \\ 2\,3\,7 \\ \hline \square\square\square \end{array}$$

30. Michael works in a plant store during the summer. He earns \$8.60/h for the first 24 h each week and 1.5 times this rate for any additional hours. How much does Michael earn for each of the following?

a) 24 h _____

b) 40 h _____

c) 36 h _____

d) 15 h _____

31. The product of 2 numbers is 18.75. One number is 3 times greater than the other number. What are the 2 numbers?

_____

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1.10 Dividing Numbers

MATHPOWER™ *Eight*, pp. 26–27

To divide by a decimal, multiply the divisor by a power of 10 to make it a whole number. Multiply the dividend by the same power of 10. Then, divide.

$$\begin{aligned} 8.52 \div 0.6 &= (8.52 \times 10) \div (0.6 \times 10) \\ &= 85.2 \div 6 \\ &= 14.2 \end{aligned}$$

Rewrite each question so that the divisor is a whole number. Divide.

1. $\frac{4.8}{0.3}$

2. $\frac{0.95}{0.5}$

3. $\frac{0.224}{0.04}$

4. $\frac{0.763}{0.7}$

5. $0.02\overline{)36.8}$

6. $3.9 \div 0.3$

7. $0.008\overline{)0.11}$

8. $0.06\overline{)252}$

Estimate, then calculate.

9. $882 \div 49$

10. $8.64 \div 2.4$

11. $76 \div 2.5$

12. $7.5\overline{)34.8}$

13. $6.2\overline{)1.55}$

14. $0.48\overline{)11.52}$

Estimate, then calculate. Round each answer to the nearest tenth.

15. $369 \div 43$

16. $95.2 \div 29$

17. $3.1\overline{)14.7}$

18. $0.46\overline{)8.6}$

19. $3.15\overline{)724}$

20. $46\overline{)76\ 025}$

21. The Canterra Building in Calgary is 166 m tall and has 45 storeys. If the storeys are all the same height, what is the height of each storey? Round your answer to the nearest tenth.

_____

22. a) In one year, 4 032 396 people visited Banff National Park. That same year, 6400 people visited Wood Buffalo National Park. To the nearest whole number, how many times more people visited Banff?

_____

b) The area of Wood Buffalo National Park is 44 804 km^2. The area of Banff National Park is 6641 km^2. To the nearest tenth, how many times larger is Wood Buffalo?

_____

23. The province of New Brunswick includes 72 090 km^2 of land and 1350 km^2 of fresh water. To the nearest tenth, how many times greater is the area of land than the area of fresh water?

_____

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1.12 Order of Operations

MATHPOWER™ *Eight*, pp. 30–31

Use the acronym **BEDMAS** to help you remember the order.

B	E	DM	AS
Brackets	Exponents	Divide and multiply in order from left to right.	Add and subtract in order from left to right.

Calculate.

1. $16 + 9 - 4$ _____

2. $14 \div 7 \times 9$ _____

3. $8 \times 7 - 4$ _____

4. $7 + 18 \div 3$ _____

5. $1.6 + 2.4 \div 2$ _____

6. $8.5 - 2.2 \times 3$ _____

Calculate.

7. $8^2 - 6 \times 4$ _____

8. $9 + 6 \times 2^3$ _____

9. $(1.2 + 1.8)^2$ _____

10. $8^2 \div (6.8 - 2.8)$ _____

11. $8.2 \div 4.1 \times 0.2$ _____

12. $144 \div 3^2 - 11$ _____

Replace of with ×. Evaluate.

13. $\frac{1}{3}$ of 18 _____

14. $\frac{1}{4}$ of $(11 + 5)$ _____

15. $15.6 - \frac{1}{2}$ of 12 _____

16. $\frac{1}{5}$ of $35 - 5$ _____

Simplify.

17. $6.4 + 5.2 \times 0.2 - 2.03$ _____

18. $(6.1 \times 4) \div (16 \div 8)$ _____

19. $8.5 - 3.7 + 2^3 - 0.3 \times 5$ _____

20. $9.6 \div (4.2 - 1) + (3 + 2)^2$ _____

Replace the ☐ with >, <, or = to make each statement true.

21. $2^6 - 11 \square 7^2 + 6$

22. $21 \div 7 \times 3 \square 21 \times 3 \div 7$

23. $7^2 - 3^2 \square (7 - 3)^2$

24. $4 \times 4^2 \div 8 \square (4 \times 4)^2 \div 8$

Insert a pair of brackets to make each statement true.

25. $8 + 7 \times 3 + 9 = 54$

26. $8 + 7 \times 3 + 9 = 92$

27. $6.2 - 1.5 \times 0.6 + 2.4 = 2.9$

28. $6.2 - 1.5 \times 0.6 + 2.4 = 1.7$

29. $7 \times 8 \div 14.2 - 4.2 = 5.6$

30. $4 \times 8 + 3 \div 11 = 4$

31. Sally's basketball team played 6 games. They scored 76 points in the first game, 88 points in each of the next two games, and 92 points in each of the following two games. The team scored 515 points altogether. Write an expression and calculate the number of points they scored in the last game.

_____

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1.13 Problem Solving: Sequence the Operations

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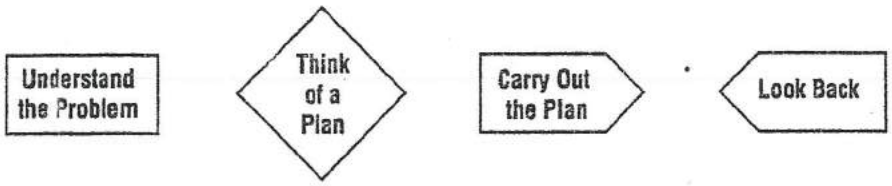

1. Briarwood School Student Council wants to purchase an electronic piano to use at assemblies. They negotiated a total cost of $1375 with a local merchant. The students raised $367.50 with a pizza lunch, $86.75 at 2 popcorn sales, and $278.40 at a car wash. How much more do they have to raise before they can purchase the piano?

2. In thousands of square kilometres, the areas of the 5 largest countries in South America are Brazil at 8512, Argentina at 2767, Colombia at 1139, Bolivia at 1099, and Venezuela at 912. The total area of South America is 17 870 thousand square kilometres. What is the area of the other countries that make up the continent?

3. Rashid's new bicycle cost $480.70 including accessories and taxes. His mother offered to help him pay for it by matching his payments of $25.00 each month. For how many months did Rashid and his mother have to make payments on the bike? How much did they each pay for the final payment?

4. There are 16 classes in an elementary school. Four of the classes are kindergarten, with 22 students in each class. Five of the remaining classes have 28 students each, three have 25 students, one has 30 students, and the rest have 26 students. What is the total student population of the school?

5. Margo bought 5 CDs for $24.95 each. For each one she bought, she received a coupon allowing her to purchase one more CD at half price. If the full price of each CD she chose to buy with her coupons was also $24.95, how much did Margo spend altogether, not including taxes, for her 10 CDs?

6. The McDonald family drove from Halifax to Montreal on a summer vacation. On the way there, they travelled approximately 240 km each day, stopping overnight in many different resorts. They stayed in Montreal for 6 days. On the way back, they drove about twice as far each day before stopping. The total trip was about 2880 km. How many days did the vacation last?

7. Paul used bricks and wood to make a shelf unit for under the window in his bedroom. He bought 4 lengths of wood for $7.35 each and 16 decorative bricks for $1.98 each. The store was having a "No Taxes" sale. How much change did Paul receive if he gave the cashier four $20.00 bills?

8. Monika's car travels 7 km on 1 L of gas. She filled her gas tank with 52 L of gas for $28.60. Approximately how much does it cost Monika to drive 1 km?

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Test One CHAPTER 1: Number Connections

MATHPOWER™ *Eight*, pp. 1–39

Write each number in words.

1. 542.67 _____

_____

2. 0.428 _____

_____

Write in standard form.

3. $8 \times 1000 + 2 \times 100 + 3 \times 10 + 9 \times 1$

_____

4. $3 \times 100 + 2 \times 0.1 + 8 \times 0.001$

_____

5. sixty-two million three thousand forty-two and twenty-eight hundredths

_____

Write each number in expanded form.

6. 789 402 _____

_____

7. 38.681 _____

_____

Round to the stated place value.

8. 62 392; nearest hundred _____

9. 48.62; nearest tenth _____

10. 345.5; nearest one _____

11. 0.6187; nearest thousandth _____

Estimate.

12. 23 + 89 + 76 + 9 _____

13. 689 − 241 _____

14. 180 + 195 + 178 + 302 _____

Evaluate mentally.

15. 28.62×10 _____

16. 0.349×1000 _____

17. 481.6×0.01 _____

18. 18765.4×0.001 _____

19. $1.621 \div 100$ _____

20. $87.34 \div 10$ _____

21. $4.2 \div 0.1$ _____

22. $642 \div 0.001$ _____

Calculate.

23.
$$\begin{array}{r} 608 \\ 69 \\ +\ 123 \\ \hline \end{array}$$

24.
$$\begin{array}{r} 3206.45 \\ -\ 455.68 \\ \hline \end{array}$$

25. 32.49 + 48.56 + 62.85 _____

26. 180.2 − 73.4 _____

27.
$$\begin{array}{r} 64 \\ \times\ 35 \\ \hline \end{array}$$

28.
$$\begin{array}{r} 29.2 \\ \times\ 0.64 \\ \hline \end{array}$$

29. $0.52\overline{)3.8064}$

30. $1.2\overline{)54.432}$

Simplify.

31. $\frac{1}{4}$ of $(80 \div 4) + 15 \div 3 + \frac{1}{2}$ of 12 _____

32. $4.8 \div 6 + (4 + 9) \times 2 - 7.6$ _____

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Name _____

Test Two CHAPTER 1: Number Connections

MATHPOWER™ *Eight*, pp. 1–39

Write the total value of each indicated digit.

1. 1<u>2</u>4 742 _____ 2. 48.63<u>5</u>7 _____

3. <u>4</u>842.5 _____ 4. 6.<u>7</u>9 _____

Write each number in words.

5. 1087.2 _____

_____

6. 2.465 _____

_____

Write in standard form.

7. eight hundred forty-eight and thirty-three thousandths

_____

8. $2 \times 1000 + 3 \times 1 + 4 \times 0.1 + 6 \times 0.001$

_____

9. $3 \times 0.1 + 8 \times 0.01 + 9 \times 0.001$

_____

Write each number in expanded form.

10. 43 620.32 _____

_____

11. 12.006 _____

_____

Round to the stated place value.

12. 106 849; nearest ten thousand

_____

13. 487.52; nearest ten _____

14. 81.632; nearest tenth _____

15. 0.0829; nearest thousandth _____

Estimate.

16. 811 + 212 + 87 + 19 _____

17. 532 − 297 _____

18. 418 + 149 + 161 + 155 _____

Calculate.

19. 13.49 ÷ 10 _____

20. 800.06 × 0.01 _____

21. 748.2 × 100 _____

22. 0.63 ÷ 0.001 _____

23. 1.2 × 1000 _____

24. 2.1 ÷ 100 _____

Calculate.

25.
$$\begin{array}{r} 489 \\ 123 \\ +\ 365 \\ \hline \end{array}$$

26.
$$\begin{array}{r} 98.62 \\ -\ 79.75 \\ \hline \end{array}$$

27. 42.6 + 6.32 + 75.8 _____

28. 12 648 − 789 _____

29.
$$\begin{array}{r} 149 \\ \times\ 12 \\ \hline \end{array}$$

30.
$$\begin{array}{r} 75.4 \\ \times\ 2.3 \\ \hline \end{array}$$

31. $12\overline{)1656}$

32. $0.25\overline{)12.075}$

Simplify.

33. $4^3 - 32 \div (6 - 2 + 4) \times 12$ _____

34. $(0.6 \times 55 + 4.5) \div 5$ _____

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Extension CHAPTER 1: Number Connections

MATHPOWER™ *Eight*, pp. 1–39

1. Write in standard form.

a) six thousand eight hundred twenty-nine and thirteen thousandths

_____

b) five hundred thirty-seven thousand fourteen

_____

c) five million three hundred sixty-one and four tenths

_____

d) ninety-eight thousand two hundred and fifty-two hundredths

_____

e) one million six hundred forty-three thousand seventy-five

_____

2. Using the numbers from question 1, calculate each of the following.

a) the sum of the 5 numbers

_____

b) the difference between parts d) and a)

_____

c) the difference between the largest number and the smallest number

_____

d) the sum of the numbers that are greater than 500 000

_____

3. Round each number to the nearest tenth.

a) 2056.349 _____

b) 38.157 _____

4. Find the product of the rounded numbers in question 3.

_____

5. Round each number to the nearest tenth.

a) 820.384 _____

b) 13.217 _____

6. Find the quotient of the rounded numbers in question 5, to the nearest tenth.

_____

Use your skills with powers of ten to calculate each of the following.

7. $12.56 \div 200$

_____

8. 7.5×0.003

_____

9. $99.19 \div 0.07$

_____

10. 0.055×800

_____

11. $90\,000 \div 500$

_____

12. 1200×0.04

_____

The numbers in the box are the answers to the following questions, rounded to the nearest tenth. Estimate to find the correct answer for each question.

11.4	27.3	8	17.6	37.9	4.7

13. 11.5×2.37 _____

14. $284 \div 61$ _____

15. 426×0.089 _____

16. $74.6 \div 9.3$ _____

17. 33.4×0.34 _____

18. $9.834 \div 0.56$ _____

Insert brackets to make each statement true.

19. $12.5 \times 6.7 \div 5 + 12.2 \times 6.4 = 94.83$

20. $12.5 \times 6.7 \div 5 + 12.2 \times 6.4 = 185.28$

21. $12.5 \times 6.7 \div 5 + 12.2 \times 6.4 = 1083.2$

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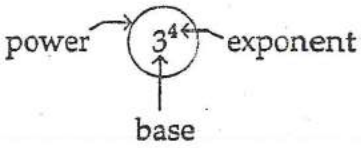
2.1 Exponents

3^4 = $3 \times 3 \times 3 \times 3$ = 81

exponential form — repeated multiplication — standard form



Complete the table.

	Power	Base	Exponent	Standard Form
1.	2^4			
2.		3	3	
3.		7		343
4.	6^2			
5.		8	2	
6.		10		10 000

Write each product in exponential form.

7. $4 \times 4 \times 4 \times 4 \times 4$ _____

8. $(3 \times 3 \times 3) \times (3 \times 3 \times 3 \times 3)$ _____

9. $(7 \times 7 \times 7) \times (7 \times 7)$ _____

Write as a power of 10.

10. 100 _____ 11. 1 000 000 _____

12. 10 000 _____ 13. 1000 _____

Write each product in exponential form.

14. $4^3 \times 4^6$ _____ 15. $9^2 \times 9^2$ _____

16. $2^2 \times 2^5$ _____ 17. $6^8 \times 6^5$ _____

Find the value of ■ in each expression.

18. $3^3 \times 3^{\blacksquare} = 3^8$ _____

19. $5^{\blacksquare} \times 5 = 5^4$ _____

20. $9^2 \times 9^{\blacksquare} = 9^7$ _____

21. $2^9 \times 2^3 = 2^{\blacksquare}$ _____

Write each quotient in exponential form.

22. $3^6 \div 3^2$ _____ 23. $4^8 \div 4$ _____

24. $6^9 \div 6^4$ _____ 25. $11^7 \div 11^6$ _____

Find the value of ■ in each expression.

26. $8^7 \div 8^{\blacksquare} = 8^3$ _____

27. $5^5 \div 5^2 = 5^{\blacksquare}$ _____

28. $2^9 \div 2 = 2^{\blacksquare}$ _____

29. $7^{\blacksquare} \div 7^3 = 7^5$ _____

Simplify. Leave your answer in exponential form.

30. $5^3 \times 5^4 \div 5^2$ _____

31. $2^8 \times 2 \div 2^2$ _____

32. $7^4 \div 7 \times 7^5$ _____

33. $9^8 \div 9^5 \times 9^3$ _____

34. $3^4 \times 3^2 \div 3$ _____

35. $4^7 \div 4^4 \times 4^2$ _____

36. $6^2 \times 6^2 \div 6^3$ _____

37. $10^6 \div 10 \times 10^4$ _____

Evaluate.

38. $(2^2)^3$ _____ 39. $(1^6)^7$ _____

40. $(5^2)^2$ _____ 41. $(3^2)^3$ _____

42. $(2^3)^2$ _____ 43. $(4^2)^2$ _____

2.2 Squares and Square Roots

MATHPOWER™ *Eight*, pp. 49–51

The square root of a number, say 64, is the number that, when multiplied by itself, gives 64.

Since $8 \times 8 = 64$, then $\sqrt{64} = 8$.

The symbol $\sqrt{\ }$ means the positive or **principal square root** of a number.

Evaluate.

1. $\sqrt{121}$ _____ 2. $\sqrt{225}$ _____

3. $\sqrt{169}$ _____ 4. $\sqrt{81}$ _____

5. $\sqrt{1.96}$ _____ 6. $\sqrt{2.56}$ _____

7. $\sqrt{0.49}$ _____ 8. $\sqrt{6.25}$ _____

9. Circle the numbers that are perfect squares.

125 256 14.4 900 1.96
361 0.49 354 1024

Find a number with a square root between each of the following numbers.

10. 6 and 7 _____

11. 5 and 6 _____

12. 10 and 11 _____

13. 12 and 13 _____

14. 13 and 14 _____

15. 15 and 16 _____

Write the two whole numbers closest to each square root.

16. $\sqrt{27}$ _____

17. $\sqrt{18}$ _____

18. $\sqrt{70}$ _____

19. $\sqrt{65}$ _____

20. $\sqrt{120}$ _____

Estimate. Then, evaluate to the nearest tenth using your calculator.

21. $\sqrt{40}$ _____

22. $\sqrt{85}$ _____

23. $\sqrt{188}$ _____

24. $\sqrt{820}$ _____

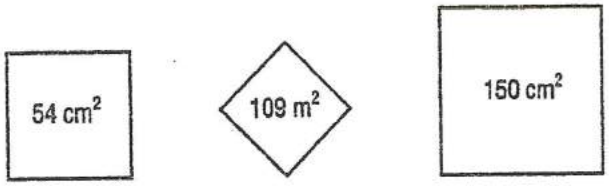
25. $\sqrt{1700}$ _____

26. $\sqrt{0.5}$ _____

27. $\sqrt{0.05}$ _____

28. Calculate the length of one side of each square, to the nearest tenth.

a) b) c)



_____ _____ _____

29. A number is squared. The result is squared, then that result is squared. The final number is 6561.

a) What was the original number? _____

b) What were the next 2 numbers? _____

c) Which of these numbers are perfect squares?

_____

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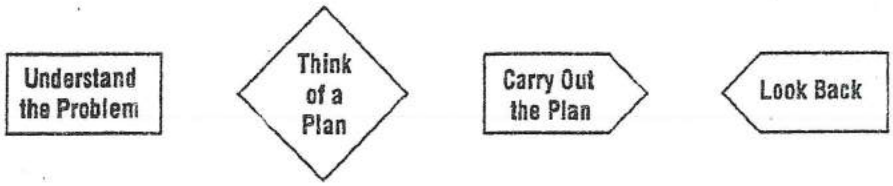
2.3 Problem Solving: Solve a Simpler Problem

MATHPOWER™ *Eight*, pp. 52–53



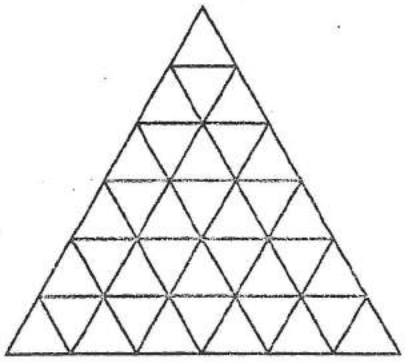
Find the sum.

1. $1 + 5 + 9 + 13 + \ldots + 49$ _____

2. $0 + 3 + 6 + 9 + \ldots + 30$ _____

3. $40 + 80 + 120 + \ldots + 400$ _____

4. How many triangles are in the diagram?

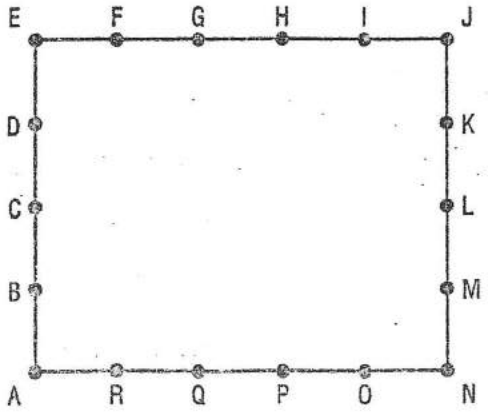


_____

5. What would be the height of 1000 dimes?

_____

6. How many different line segments can be drawn in the following diagram?



_____

7. A rectangular field measures 480 m by 320 m. The field is to be fenced with fence posts placed 8 m apart and with one post in each corner. How many fence posts will be needed?

_____

8. Nathan covers 70 cm with one step. How many steps would he take to walk 35 km?

_____

9. In a 500-page book, how many times is the digit 5 used in the page numbers?

_____

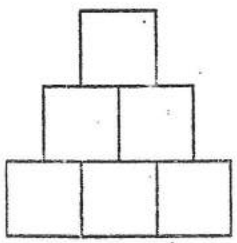
10. The 6 schools in the volleyball league play each other 3 times. How many games are played in the regular season?

_____

11. A florist has 8 different kinds of cut flowers. How many different bouquets can he make using 2 kinds of flowers in each one?

_____

12. A toy store has a large display of teddy bears stacked in boxes against a wall.



How many bears are on display if there are 20 rows of boxes?

_____

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2.1 Factors and Divisibility

MATHPOWER™ *Seven*, pp. 52–53

The factors of a number each divide the number evenly.

$48 \div 1 = 48$ $48 \div 2 = 24$ $48 \div 3 = 16$ $48 \div 4 = 12$ $48 \div 6 = 8$
$48 \div 48 = 1$ $48 \div 24 = 2$ $48 \div 16 = 3$ $48 \div 12 = 4$ $48 \div 8 = 6$

The factors of 48 are 1, 2, 3, 4, 6, 8, 12, 16, 24, and 48.
The divisibility rules can help you find the factors of a number.
A number is divisible by

2 if it ends in 0, 2, 4, 6, or 8.
3 if the sum of the digits is divisible by 3.
4 if the last two digits are divisible by 4.
5 if it ends in 0 or 5.
6 if it is divisible by 2 and 3.
8 if the last three digits are divisible by 8.
9 if the sum of the digits is divisible by 9.
10 if it ends in 0.

State the missing factor.

1. $5 \times \_\_\_\_ = 45$
2. $\_\_\_\_ \times 3 = 21$
3. $11 \times \_\_\_\_ = 77$
4. $\_\_\_\_ \times 6 = 54$
5. $\_\_\_\_ \times 7 = 49$
6. $2 \times \_\_\_\_ = 16$
7. $\_\_\_\_ \times 4 = 28$
8. $9 \times \_\_\_\_ = 36$

Write two pairs of factors for each number.

9. $\_\_ \times \_\_ = 24$; $\_\_ \times \_\_ = 24$
10. $\_\_ \times \_\_ = 26$; $\_\_ \times \_\_ = 26$
11. $\_\_ \times \_\_ = 48$; $\_\_ \times \_\_ = 48$
12. $\_\_ \times \_\_ = 80$; $\_\_ \times \_\_ = 80$
13. $\_\_ \times \_\_ = 108$; $\_\_ \times \_\_ = 108$

Complete each list of factors.

14. 32: 1, 2, __, 8, __, 32
15. 65: 1, __, 13, __
16. 80: __, 2, __, 5, __, 10, __, 20, __, 80
17. 72: __, __, 3, 4, __, __, 9, 12, 18, __, __, 72

List all the factors of each number.

18. 52 _____
19. 36 _____
20. 57 _____
21. 63 _____
22. 96 _____

23. In questions 18–22, which numbers

a) are divisible by 2? _____

b) are divisible by 3? _____

c) are divisible by 2 and 3? _____

State the missing factors. Use factors greater than 1.

24. $2 \times \_\_\_\_ \times \_\_\_\_ = 180$
25. $\_\_\_\_ \times \_\_\_\_ \times \_\_\_\_ = 300$
26. $\_\_\_\_ \times 4 \times \_\_\_\_ = 240$
27. $8 \times \_\_\_\_ \times \_\_\_\_ = 192$
28. $\_\_\_\_ \times \_\_\_\_ \times 2 = 168$
29. $\_\_\_\_ \times 9 \times \_\_\_\_ = 225$
30. $\_\_\_\_ \times \_\_\_\_ \times \_\_\_\_ = 212$

Find the smallest number whose factors are

31. 3, 4, and 5. _____
32. 2, 4, and 9. _____
33. 11, 4, and 2. _____
34. 10, 2, and 6. _____

Use the divisibility rules to determine which of the following numbers are divisible by 8 and which are divisible by 9.

35. 729 _____ 36. 1520 _____
37. 14 112 _____

38. There are 24 desks in the classroom. In how many ways can the desks be arranged in equal groups?

_____

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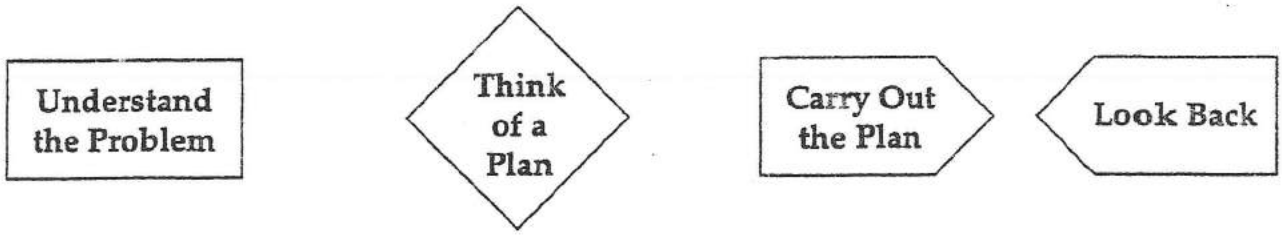
Name _____

2.2 Problem Solving: Work Backward

MATHPOWER™ *Seven*, pp. 54–55



1. Domenic started with a number. He added 9, multiplied by 2, and subtracted 6. The result was 112. What was the number?

2. Natalie chose a number. She multiplied by 9, added 35, then divided by 5. The result was 34. What was Natalie's number?

3. An elevator started from the first floor. On the fourth floor, 3 people got off and 4 got on. On the seventh floor, 2 people got off and 3 got on. The elevator then went back to the first floor, where the remaining 6 people got off. How many people were on the elevator when it started from the first floor?

4. Aldo asked his grandmother in what year she was born. His grandmother told him that if he divided the year by 2 and subtracted the square of 8, the result would be 900. In what year was John's grandmother born?

5. Nicole received her allowance before she went to the movies. She spent $1.80 on bus fare, $5.00 for admission, and $2.30 for snacks. The next day she paid half of what she had left on lunch with her friends. She then had $5.45 left. How much is Nicole's allowance?

6. Steven made a down payment on a new stereo and then paid the remainder at $65.00 each month for 12 months. His total payments were $900.00. How much was the down payment?

7. The Flanagan family are going on vacation. Their airplane leaves at 16:30, the drive to the airport takes 25 min, and they want to check in 1 h before their departure time. At what time should they leave home?

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2.6 Composite and Prime Numbers

MATHPOWER™ *Eight*, pp. 60–61

A **prime number** is a whole number with exactly two factors: itself and 1.

$3 = 3 \times 1$

A **composite number** is a whole number with more than two factors.

$6 = 3 \times 2$

$6 = 6 \times 1$

The number 1 is neither prime nor composite.

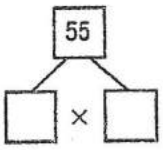
---

1. Circle all the prime numbers.

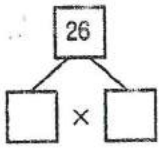
18	33	11	27	29	31
7	51	47	49	81	73
89	17	23	9	14	67

Complete each factor tree.

2.



3.



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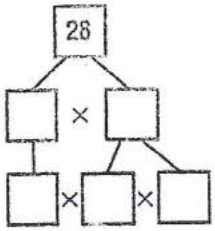
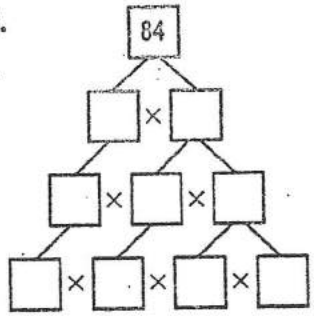


5.



Draw a factor tree for each number.

6. 44

7. 100

8. 60

9. 225

Write each number as the product of prime factors.

10. 42 _____

11. 110 _____

12. 525 _____

13. 180 _____

14. 126 _____

15. 441 _____

16. 396 _____

17. 1080 _____

Find the missing prime factor.

18. $2^2 \times 3^3 \times \square = 324$

19. $2^4 \times 3^2 \times \square = 720$

20. $5^2 \times 3^2 \times \square = 1575$

21. $7^2 \times 2^5 \times \square = 17\,248$

22. $3^3 \times 11^2 \times \square = 16\,335$

23. a) The prime factors of a number are 7, 11, and 13. What is the number?

_____

b) List three other factors of the number that are not prime.

_____

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2.7 Greatest Common Factor

MATHPOWER™ *Eight*, pp. 62–63

The **greatest comon factor** (GCF) of two or more numbers is the largest factor they have in common.

24: 1, 2, 3, 4, [6], 8, 12, 24

30: 1, 2, 3, 5, [6], 10, 15, 30

The GCF of 24 and 30 is 6.

Write all the factors of each number, then state the GCF of each set of numbers.

1. 8 _____
   12 _____
   GCF = _____

2. 9 _____
   18 _____
   21 _____
   GCF = _____

3. 16 _____
   32 _____
   40 _____
   GCF = _____

4. 15 _____
   30 _____
   50 _____
   GCF = _____

Find the greatest common factor of each pair of numbers.

5. 42, 60 _____
6. 26, 91 _____
7. 135, 110 _____
8. 63, 81 _____
9. 80, 65 _____
10. 54, 45 _____
11. 28, 35 _____
12. 72, 108 _____
13. 48, 168 _____
14. 51, 119 _____

Find the greatest common factor of each group of numbers.

15. 88, 33, 66 _____
16. 39, 65, 91 _____
17. 28, 56, 70 _____
18. 84, 102, 120 _____
19. 45, 63, 99 _____
20. 42, 56, 105 _____

21. Find 3 numbers with a GCF of 14.

_____

22. The GCF of 2 numbers less than 100 is 27. What are the possible numbers?

_____

23. Find 3 numbers whose greatest common factor is 25.

_____

24. The physical education teacher has to organize 27 grade 6 students, 36 grade 7 students, and 54 grade 8 students into groups of equal number.

a) What is the greatest number of students who can be in each group?

_____

b) How many groups will there be?

_____

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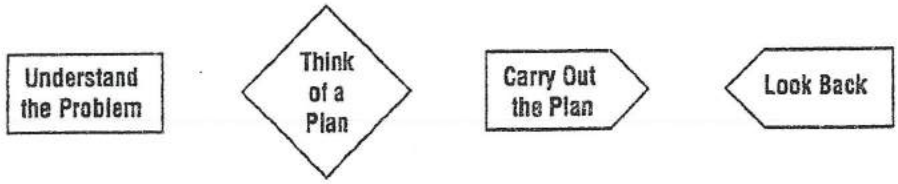
2.8 Problem Solving: Work Backward

MATHPOWER™ *Eight*, pp. 64–65



1. Sena chose a number. She multiplied it by 12, added 40, then divided by 8. The result was 26. What was Sena's number?

_____

2. When Julian got on the bus, 8 people got on and 2 got off. At the next stop, 5 people got on and 3 got off. At Julian's stop, he noticed that 7 people got on, 9 got off, and there were 16 people left. How many passengers were on the bus before Julian got on?

_____

3. Carmen had some hockey cards. She gave 5 to her sister and shared the rest equally among herself and three friends. Carmen's share was 11 cards. How many cards did she have originally?

_____

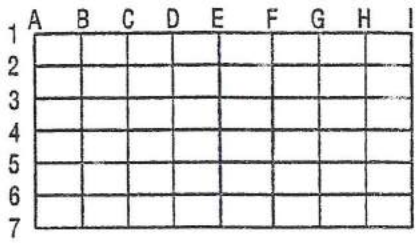
4. When Emil purchased his stereo, he made a down payment and then paid the remainder of the cost at $55.10 per month for 12 months. His total payments were $1175.00. How much was his down payment?

_____

5. The train leaves at 09:00. It takes 25 min to get to the station. You should allow 10 min to buy your ticket. You need 15 min to eat breakfast and 30 min to shower and dress. For what time should you set your alarm?

_____

6. The city's streets are numbered and the avenues are lettered.



a) To get to school on the corner of Avenue F and 6th Street, Connie walks 2 blocks east, one block north, 2 blocks east, and 4 blocks south. On what corner does Connie live?

_____

b) Martin walks 5 blocks west and one block south to meet Harram. They then walk 2 blocks east and 3 blocks south to get to school. On what corner does Martin live? On what corner does he meet Harram?

_____

_____

7. On her father's birthday, Mirella calculated that if she subtracted her age from her father's age, then divided by her sister's age, the result would be 3. Mirella is 13 and her sister is 4 years younger. What age is her father?

_____

8. Cyril made the following transactions on his bank account in one month.

deposit	$125.00	
cheque		$53.75
cheque		$35.28
withdrawal		$60.00
deposit	$90.00	

The balance at the end of the month was $526.58. What was the balance at the beginning of the month?

_____

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2.9 Multiples and the Lowest Common Multiple

MATHPOWER™ *Eight*, pp. 66–67

A **multiple** is the product of a given number and any whole number.
Three multiples of 4 are 4, 8, and 12.

The **lowest common multiple** (LCM) of a set of numbers is the smallest number that is a multiple of each number in the set.

Write the first 10 multiples for each pair of numbers, then circle the LCM.

1. 8 _____
   6 _____
2. 3 _____
   5 _____
3. 4 _____
   7 _____

Use multiples to find the LCM.

4. 4, 3 _____
5. 2, 5 _____
6. 6, 7 _____
7. 4, 10 _____
8. 8, 3 _____
9. 9, 6 _____
10. 11, 5 _____
11. 12, 9 _____

Use the prime factorizations to find each pair of numbers and their LCM.

12. $2 \times 2 \times 2 \times 7$
    $2 \times 2 \times 2 \times 2 \times 2$

_____

13. $2 \times 2 \times 2 \times 2 \times 3 \times 3$
    $2 \times 2 \times 3 \times 3 \times 3$

_____

Use prime factors to find the LCM.

14. 6, 15 _____
15. 8, 14 _____
16. 28, 8 _____
17. 24, 36 _____
18. 25, 15 _____

Find the LCM of each set.

19. 6, 7, 8 _____
20. 10, 12, 15 _____
21. 9, 12, 20 _____
22. 9, 21, 63 _____
23. 10, 20, 45 _____

24. A flat of petunias contains 4 plants, a flat of impatiens contains 6 plants, and a flat of marigolds contains 8 plants.

a) What is the smallest number of each kind of plant you must buy to have the same number of each kind?

_____

b) How many flats of each kind of plant must you buy?

_____

25. In a fireworks display, a red rocket goes off every 10 s, a green rocket goes off every 6 s, and a white rocket goes off every 12 s. How often do they all go off together?

_____

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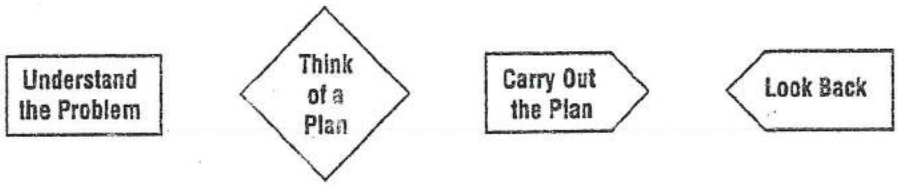
2.10 Problem Solving: Make Assumptions

MATHPOWER™ *Eight*, pp. 68–69



Assume that each pattern continues, and write the next 3 terms.

1. 2, 4, 6, 8, ____, ____, ____

2. 19, 16, 13, ____, ____, ____

3. 3, 6, 12, 24, ____, ____, ____

4. 729, 243, 81, ____, ____, ____

5. 0, 2, 5, 9, ____, ____, ____

6. a, d, c, f, e, h, ____, ____, ____

7. Twenty-eight students are going on a canoe trip. The park is 150 km from the school. The bus can travel at 80 km/h.

a) How long will it take to get to the park?

b) What assumptions have you made?

8. A field with dimensions 100 m by 50 m is to be fenced. Thirty fence posts are to be used.

a) How far apart should each post be?

b) What assumptions did you make?

9. Each week, Mr. Tait purchases 3 loaves of bread for his family. This week, bread costs $1.49 for a loaf.

a) How much will he spend on bread in a year?

b) What assumptions have you made?

10. The Ortega's home gas bill this month was $75.10.

a) How much will they pay for gas in one year?

b) What assumptions have you made? Are your assumptions reasonable? Explain.

11. Madeleine paid $25.00 for 43.5 L of gasoline last week.

a) How much will Madeleine spend on gasoline this year?

b) How much gasoline will she use this year?

c) What assumptions have you made? Are your assumptions reasonable? Explain

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Test One CHAPTER 2: Number Theory

MATHPOWER™ *Eight*, pp. 41–75

Write each product in exponential form and in standard form.

1. $(5 \times 5) \times (5 \times 5)$

_____

2. $(4 \times 4 \times 4 \times 4) \times (4 \times 4 \times 4)$

_____

3. $(2 \times 2 \times 2) \times (2 \times 2 \times 2 \times 2 \times 2)$

_____

Simplify. Write in exponential form.

4. $3^3 \times 3^6$ _____

5. $10^8 \div 10^3$ _____

6. $5^2 \times 5^2 \div 5^3$ _____

7. $7^6 \div 7 \times 7^3$ _____

8. $9^8 \div 9^2 \times 9$ _____

Find the value of ◆ in each expression.

9. $4^2 \times 4^{\blacklozenge} = 4^7$ _____

10. $3^2 \times 3 = 3^{\blacklozenge}$ _____

11. $6^{\blacklozenge} \div 6 = 6^3$ _____

12. $8^9 \div 8^8 = 8^{\blacklozenge}$ _____

Evaluate.

13. $(3^2)^2$ _____

14. $(1^5)^8$ _____

Evaluate.

15. $\sqrt{196}$ _____

16. $\sqrt{1.44}$ _____

Evaluate to the nearest tenth.

17. $\sqrt{43}$ _____

18. $\sqrt{6.75}$ _____

19. Circle the composite numbers.

17 16 3 9 21 39

20. Write the prime numbers between 30 and 80.

_____

Simplify.

21. $(2^3 + 3^2) \times 4$ _____

22. $6^2 - 3^2 \times 4$ _____

23. $1.4^2 \div 2 + 7^2$ _____

24. $(5 \times 9 - 40)^2$ _____

List all the factors of each number.

25. 56 _____

26. 62 _____

27. 100 _____

28. 37 _____

Draw a factor tree for each number.

29. 16

30. 81

Find the greatest common factor.

31. 16, 40 _____

32. 26, 65 _____

33. 36, 60, 108 _____

34. 42, 70, 112 _____

Find the lowest common multiple.

35. 8, 5 _____

36. 4, 7 _____

37. 3, 4, 5 _____

38. 6, 8, 10 _____

39. Sheila has the same amount of money in dimes as she has in quarters. What is the smallest number of each that she can have?

_____

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Test Two CHAPTER 2: Number Theory

MATHPOWER™ *Eight*, pp. 41–75

Simplify. Write in exponential form.

1. $3^3 \times 3^6$ _____ 2. $5^{11} \div 5^2$ _____

3. $6^5 \times 6^7$ _____ 4. $9^8 \div 9^7$ _____

5. $4^2 \times 4^3 \times 4^4$ _____

6. $7^8 \times 7^3 \div 7^6$ _____

7. $3^2 \times 3^4 \div 3$ _____

8. $8^5 \div 8^2 \times 8^4$ _____

Evaluate.

9. $(3^2)^4$ _____ 10. $(2^4)^2$ _____

11. $(5^2)^3$ _____ 12. $(6^2)^2$ _____

Evaluate.

13. $\sqrt{144}$ _____ 14. $\sqrt{2.25}$ _____

Write the two whole numbers closest to each square root.

15. $\sqrt{34}$ _____

16. $\sqrt{72}$ _____

17. $\sqrt{110}$ _____

Evaluate to the nearest tenth.

18. $\sqrt{175}$ _____

19. $\sqrt{62}$ _____

20. $\sqrt{0.07}$ _____

Evaluate.

21. $6^2 + 4 \times (9 - 2)$ _____

22. $\dfrac{42}{3^2 + 15 \div 3}$ _____

23. $(0.1 + 3.9)^2 \div 8 - 1.2^2$ _____

Write the missing factor(s). Use factors greater than 1.

24. $9 \times \blacklozenge = 261$ _____

25. $\blacklozenge \times 14 \times \blacklozenge = 294$ _____, _____

26. $\blacklozenge \times \blacklozenge \times 17 = 935$ _____, _____

List all the factors of each number.

27. 24 _____

28. 88 _____

29. 31 _____

30. Circle the prime numbers.

18 19 2 27 49 53

Find the greatest common factor.

31. 18, 45 _____

32. 42, 70 _____

33. 24, 60, 84 _____

34. 32, 56, 72 _____

Find the lowest common multiple.

35. 3, 7 _____

36. 4, 6 _____

37. 2, 3, 5 _____

38. 4, 7, 9 _____

39. Every 4th day the lunchroom students in one school have movie day. Every 15th day is pizza day. What is the first day that both events occur on the same day?

_____

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Extension CHAPTER 2: Number Theory

MATHPOWER™ *Eight*, pp. 41–75

Write in standard form.

1. $5^2 \times 5^3 \times 3^7 \div 3^4$ _____

2. $(6^4 \times 6^2) \div (4^8 \div 4^5)$ _____

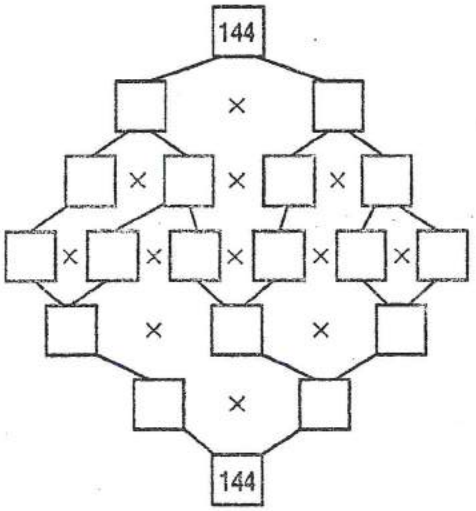
3. $10^7 \div 10^5 \times 5^6 \div 5^4$ _____

4. $4^5 + 4^4 \div 2^5 \times 2^8$ _____

5. The prime factors of a number are 2, 5, 7, and 11. Write the number and state four other factors of the number.

_____

6. Complete the double factor tree.



7. a) Write the numbers from 1 to 10 that are factors of 20 160.

_____

b) Calculate the quotients when the number is divided by each factor.

_____

_____

8. a) Complete the table.

$1^2 - 0 =$	$4^2 - 3^2 =$
$2^2 - 1^2 =$	$5^2 - 4^2 =$
$3^2 - 2^2 =$	$6^2 - 5^2 =$

b) Describe the pattern. _____

_____

9. Use the pattern in question 8 to answer the following subtractions. Check your answers by calculating.

a) $7^2 - 6^2 =$ _____ b) $10^2 - 9^2 =$ _____

c) $15^2 - 14^2 =$ _____ d) $18^2 - 17^2 =$ _____

e) $24^2 - 23^2 =$ _____ f) $30^2 - 29^2 =$ _____

10. The prime factors of the base of a perfect square are 2 and 7. What is the perfect square?

_____

Find the greatest common factor of each set of numbers.

11. 153, 85, 187, 51, 306 _____

12. 138, 299, 92, 115, 253 _____

13. 99, 225, 171, 108, 162 _____

Write the smallest number whose factors are the following.

14. 4, 5, 10 _____ 15. 2, 9, 15 _____

16. 7, 4, 28 _____ 17. 12, 5, 20 _____

18. 8, 5, 24 _____ 19. 25, 3, 6 _____

20. a) Write all the numbers that can be formed using the digits 3, 5, and 8.

_____

b) Write the numbers in part a) that are divisible by 2.

_____

c) Write the numbers that are divisible by 7.

_____

d) Write the numbers that are prime.

_____

e) List the prime factors of the difference between the largest number and the smallest number.

_____

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3.1 Terms in Geometry

MATHPOWER™ *Eight*, pp. 80–81

A **point** identifies a position. • A

A **line** is a straight path of points that extends forever in both directions. $\overleftrightarrow{AB}$ or line m

A **ray** is a part of a line that begins at one endpoint and extends forever in one direction. $\overrightarrow{AB}$

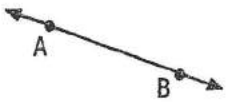
A **line segment** is part of a line and has two endpoints. $\overline{AB}$ or AB

An **angle** is formed by two rays or line segments with a common endpoint, called the vertex. $\angle ABC$

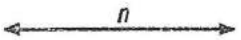
Name each figure.

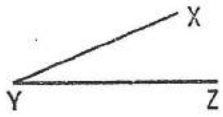
1. 

2. 

3. 

4. 

5. 

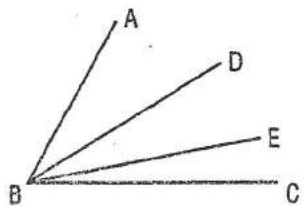
6. 

7. Points A, B, C, and D are on the same line.

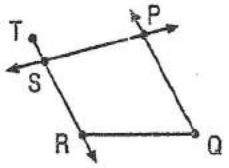
a) Name all the rays.

b) Name all the line segments.

8. Name all the angles in the diagram.



Use the diagram to name the following.



9. 5 points

10. 4 rays

11. 1 line

12. 5 line segments

13. 4 angles

14. Use the instructions to draw a diagram.

a) Draw point P.

b) From P, draw rays PQ and PR.

c) Draw ray QR.

d) On line segment PQ, mark point A.

e) On line segment PR, mark point B.

f) Draw line segment AB.

g) Name 6 angles in the diagram.

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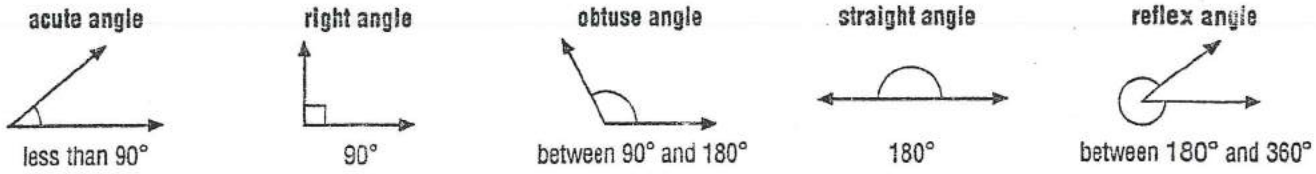
3.2 Measuring, Drawing, and Classifying Angles

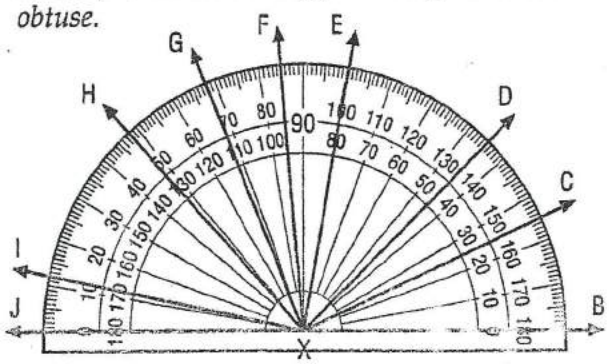
MATHPOWER™ *Eight*, pp. 82–83

Angles are commonly measured in degrees.
Angles are classified according to their measures.



A protractor is used to measure and draw angles.

Write the measures of the following angles shown on the protractor. Classify each angle as acute or obtuse.



1. ∠BXG _____ 2. ∠CXF _____

3. ∠CXI _____ 4. ∠BXH _____

5. ∠EXI _____ 6. ∠FXH _____

7. ∠JXI _____ 8. ∠JXC _____

9. ∠FXB _____ 10. ∠DXH _____

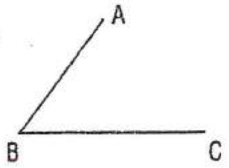
With your protractor, draw angles with the following measures. Classify each angle.

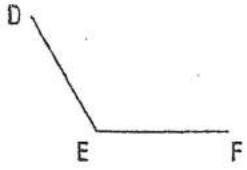
11. 50° 12. 65°

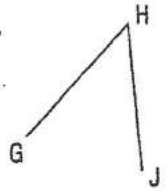
13. 110° 14. 90°

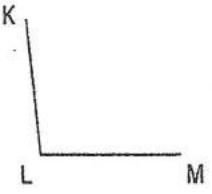
15. 228° 16. 180°

Estimate the measure of each angle. Then, check your estimate by measuring.

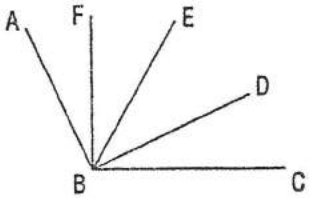
17. 

18. 

19. 

20. 

Use this diagram to name the following.



21. 4 acute angles _____

22. 2 right angles _____

23. 1 obtuse angle _____

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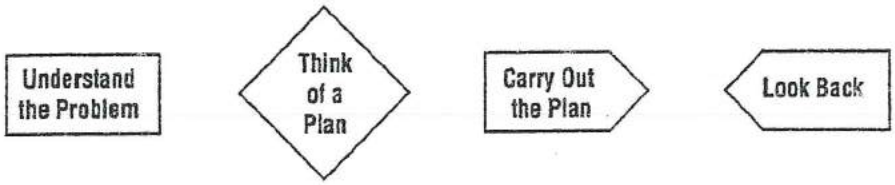
3.3 Problem Solving: Guess and Check

MATHPOWER™ *Eight*, pp. 84–85



1. Rebecca bought a swimsuit, a towel, and a pair of swim goggles. The towel and the goggles cost the same amount, and the swimsuit was $29.45 more than each of them. If the total cost was $50.45, how much was each item?

2. The product of two numbers is 2565. The digits are 2, 5, 7, and 9. What are the two numbers?

3. Use the digits 2, 4, 5, 8, and 9 to make two- and three-digit numbers that give the following.

a) smallest sum

b) smallest product

c) smallest difference

d) largest sum

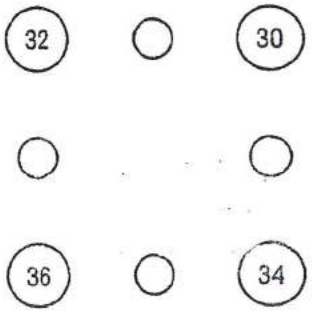
e) largest product

f) largest difference

4. Liam has $4.05 in quarters and dimes. He has 5 times as many quarters as dimes. How many of each coin does he have?

5. The length of a rectangle is 3 times the width and the area is 192 cm^2. Find the dimensions of the rectangle.

6. The number in each large circle is found by adding the numbers in the small circles connected to it. Find the numbers in the small circles.



7. Find the whole number whose cube is closest to 10 000.

8. Meghan scored 14 more runs than Paula during the baseball season. Together, they scored 48 runs. How many runs did each of them score?

9. At a craft store, a card of glass beads costs $2.49, a box of coloured laces costs $5.95, and a set of ceramic buttons costs $2.98. How many of each item is purchased in each of the following transactions.

a) $36.27 is paid for 11 items

b) $60.63 is paid for 19 items

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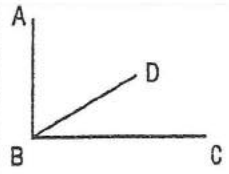
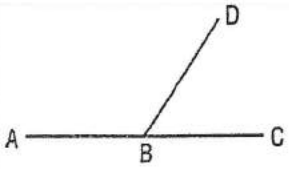
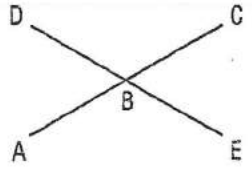
3.4 Angle Relationships

MATHPOWER™ *Eight*, pp. 86–87

Complementary angles add to 90°.	**Supplementary angles** add to 180°.	**Opposite angles** are equal.
		
∠ABD + ∠DBC = 90°	∠ABD + ∠DBC = 180°	∠ABD = ∠CBE

State the measure of the angle that is complementary to each of the following.

1. 48° _____ 2. 19° _____

3. 65° _____ 4. 13° _____

5. 45° _____ 6. 52° _____

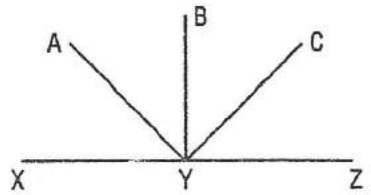
State the measure of the angle that is supplementary to each of the following.

7. 41° _____ 8. 96° _____

9. 125° _____ 10. 80° _____

11. 160° _____ 12. 90° _____

13. Measure each angle and state 3 pairs of complementary angles.

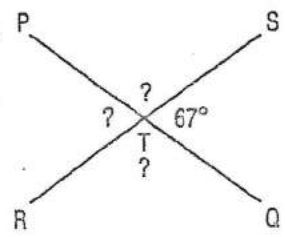


_____

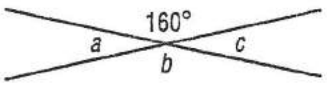
_____

_____

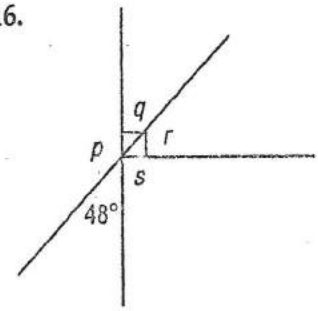
Determine the missing angle measures.

14. 

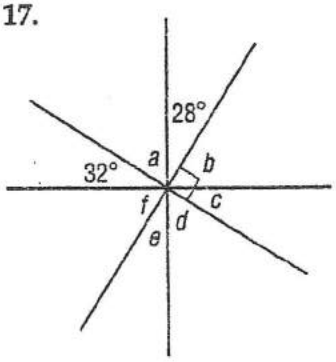
∠PTS = _____
∠PTR = _____
∠RTQ = _____

15. 

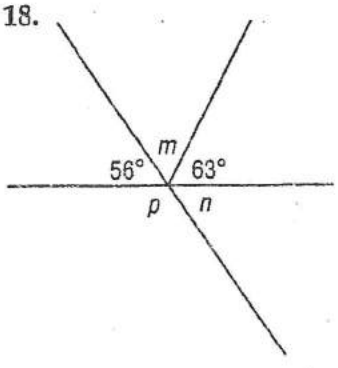
∠a = _____
∠b = _____
∠c = _____

16. 

∠p = _____
∠q = _____
∠r = _____
∠s = _____

17. 

∠a = _____
∠b = _____
∠c = _____
∠d = _____
∠e = _____
∠f = _____

18. 

∠m = _____
∠n = _____
∠p = _____

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Name _____

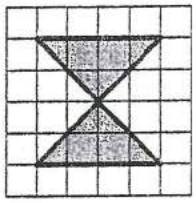
3.6 Lines of Symmetry

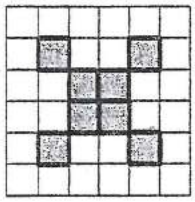
MATHPOWER™ *Eight*, pp. 90–91

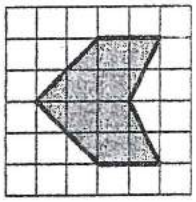
A **line of symmetry** divides a figure into 2 congruent parts such that the two halves are reflection images of each other.

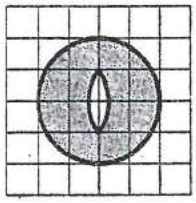
The fold line is the line of symmetry.

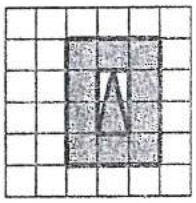
Draw all the lines of symmetry for each of the following.

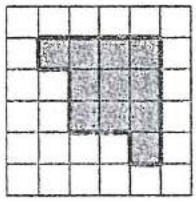
1. 

2. 

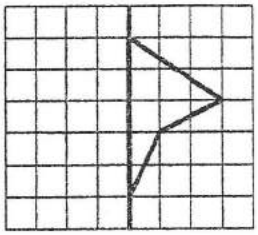
3. 

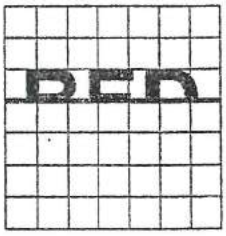
4. 

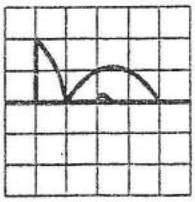
5. 

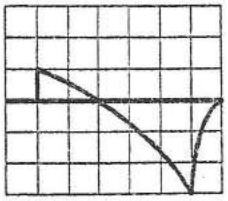
6. 

Complete each figure so that there is a line of symmetry.

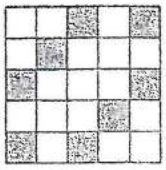
7. 

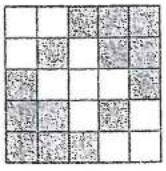
8. 

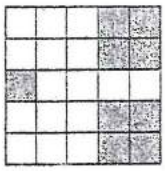
9. 

10. 

Draw all the lines of symmetry.

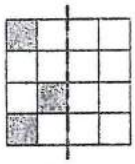
11. 

12. 

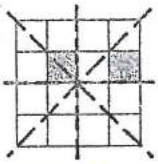
13. 

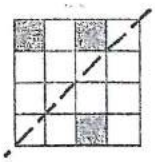
14. 

Complete the shading for each diagram so that each pattern has the given number of lines of symmetry.

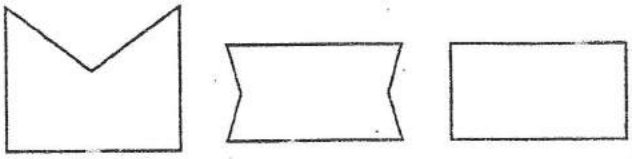
15. 
1 line

16. 
2 lines

17. 
4 lines

18. 
1 line

19. a) Combine the 3 figures to draw 2 different designs with at least one line of symmetry.



b) Draw all the lines of symmetry on your 2 designs.

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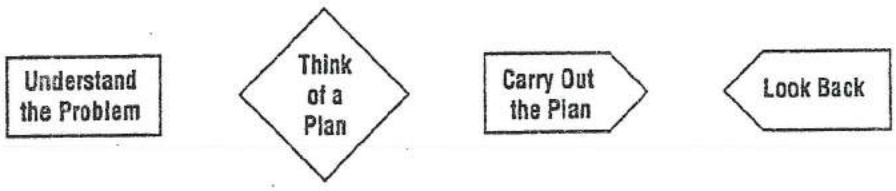
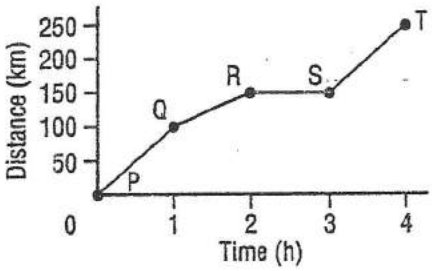
3.7 Problem Solving: Draw and Read Graphs

MATHPOWER™ *Eight*, pp. 92–93



1. The graph shows the distance between two cities and the time taken for a car to travel this distance.



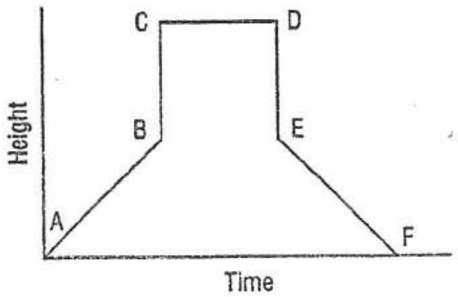
a) Describe what is happening between P and Q.

b) Describe what is happening between Q and R.

c) Describe what is happening between R and S.

d) Describe what is happening between S and T.

2. The graph shows the height of the water in the bathtub during Terry's bath.



Describe what happened between

a) A and B

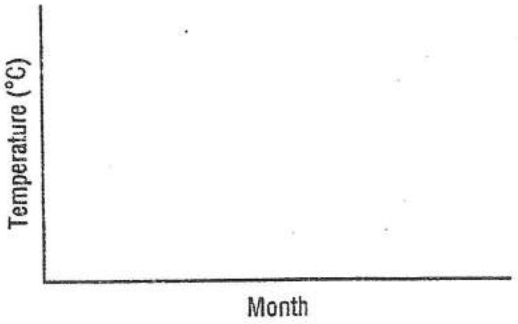
b) B and C

c) C and D

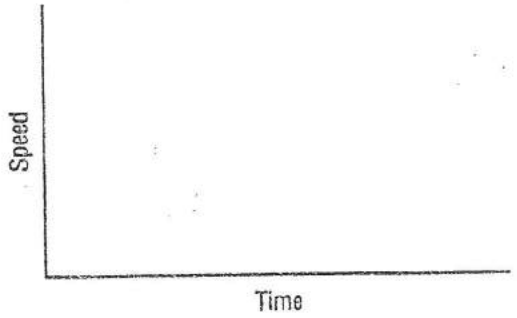
d) D and E

e) E and F

3. Sketch a graph of the average monthly temperature versus the month of the year for your city or town.



4. Sketch a graph of the speed of a merry-go-round from the beginning of the ride to the end of the ride.



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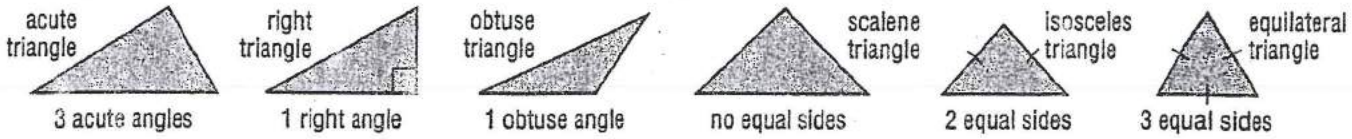
3.8 Triangles and Angles

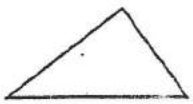
MATHPOWER™ *Eight*, pp. 94–95

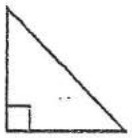
Triangles are classified by the measures of their angles and the lengths of their sides.



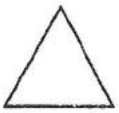
The sum of the interior angles of a triangle is 180°.

Measure the angles and sides in each triangle and classify it in two ways.

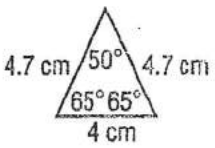
1. 

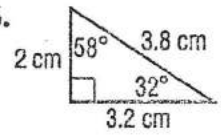
2. 

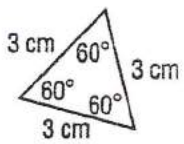
3. 

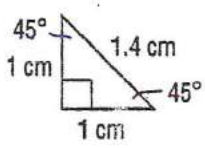
4. 

Classify each triangle in two ways, by its sides and angles.

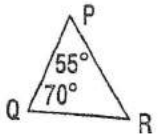
5. 

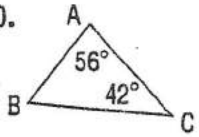
6. 

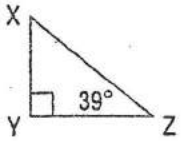
7. 

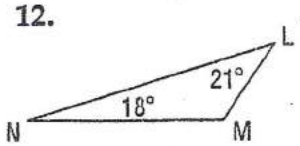
8. 

Find the measure of the unknown angle.

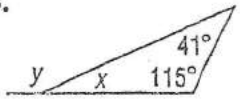
9. 

10. 

11. 

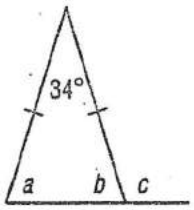
12. 

Calculate the missing angle measures.

13. 

$\angle x =$ _____

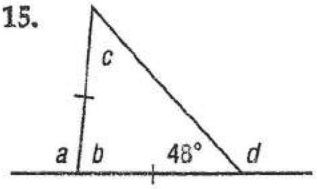
$\angle y =$ _____

14. 

$\angle a =$ _____

$\angle b =$ _____

$\angle c =$ _____

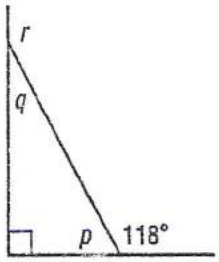
15. 

$\angle a =$ _____

$\angle b =$ _____

$\angle c =$ _____

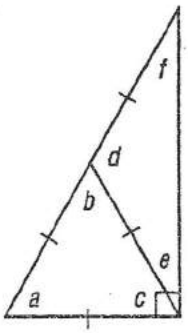
$\angle d =$ _____

16. 

$\angle p =$ _____

$\angle q =$ _____

$\angle r =$ _____

17. 

$\angle a =$ _____

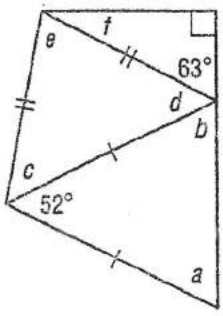
$\angle b =$ _____

$\angle c =$ _____

$\angle d =$ _____

$\angle e =$ _____

$\angle f =$ _____

18. 

$\angle a =$ _____

$\angle b =$ _____

$\angle c =$ _____

$\angle d =$ _____

$\angle e =$ _____

$\angle f =$ _____

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3.9 Polygons

MATHPOWER™ *Eight*, pp. 98–99

A **polygon** is a closed figure formed by 3 or more line segments.

A polygon is named according to its number of sides. In a **regular polygon**, all the sides are the same length and all the angles have the same measure.

The sum of the interior angles of a polygon with n sides is $180° \times (n - 2)$.

Find the sum of the interior angles in each of the following.

1. hexagon

2. octagon

3. pentagon

4. decagon

Name the polygon in which the sum of the interior angles is the following.

5. 180°

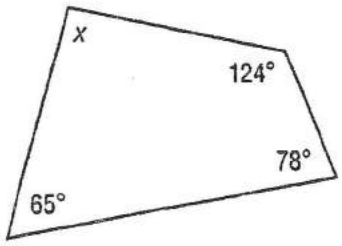
6. 900°

7. 1260°

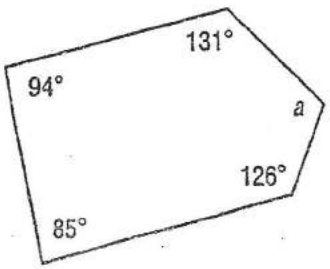
8. 1800°

Find the measure of the unknown angle in each polygon.

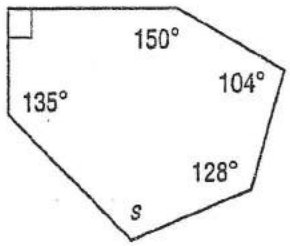
9.



10.



11.



Find the measure of each interior angle in the following.

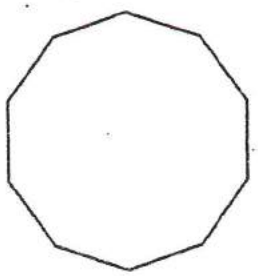
12. regular octagon

13. regular dodecagon

14. square

15. regular nonagon

16. In the regular decagon,



a) how many lines of symmetry can be drawn?

b) how many diagonals can be drawn?

c) what is the measure of each interior angle?

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Using Angle Relationships

MATHPOWER™ *Eight*, pp. 100–101

You have learned the relationships between pairs of lettered angles in diagrams 1 to 4, below. You have also learned the sums of the lettered angles in diagrams 5 and 6.

Diagram 1

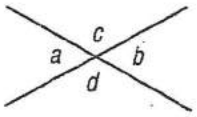


Diagram 2

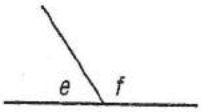


Diagram 3

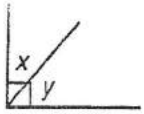


Diagram 4

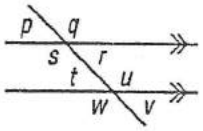


Diagram 5

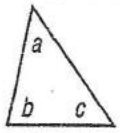
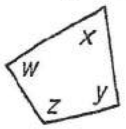
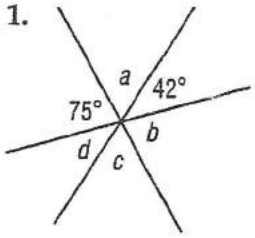


Diagram 6



Find the unknown angle measures.

1.



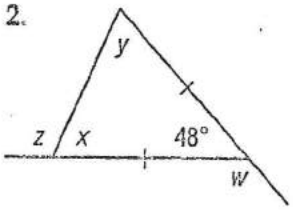
$\angle a =$ _____

$\angle b =$ _____

$\angle c =$ _____

$\angle d =$ _____

2.



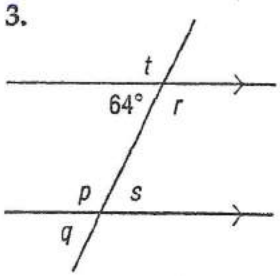
$\angle w =$ _____

$\angle x =$ _____

$\angle y =$ _____

$\angle z =$ _____

3.



$\angle p =$ _____

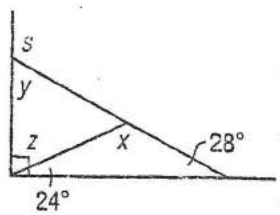
$\angle q =$ _____

$\angle r =$ _____

$\angle s =$ _____

$\angle t =$ _____

4.



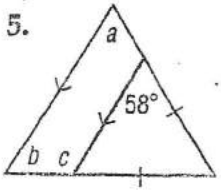
$\angle x =$ _____

$\angle y =$ _____

$\angle z =$ _____

$\angle s =$ _____

5.

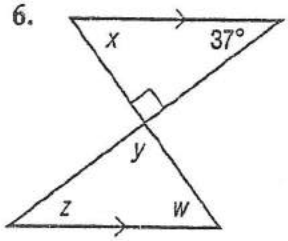


$\angle a =$ _____

$\angle b =$ _____

$\angle c =$ _____

6.



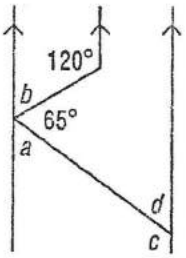
$\angle w =$ _____

$\angle x =$ _____

$\angle y =$ _____

$\angle z =$ _____

7.



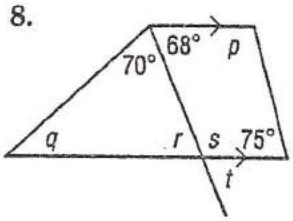
$\angle a =$ _____

$\angle b =$ _____

$\angle c =$ _____

$\angle d =$ _____

8.



$\angle p =$ _____

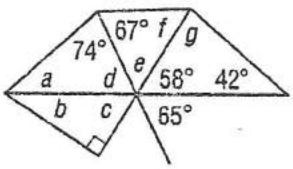
$\angle q =$ _____

$\angle r =$ _____

$\angle s =$ _____

$\angle t =$ _____

9.



$\angle a =$ _____

$\angle b =$ _____

$\angle c =$ _____

$\angle d =$ _____

$\angle e =$ _____

$\angle f =$ _____

$\angle g =$ _____

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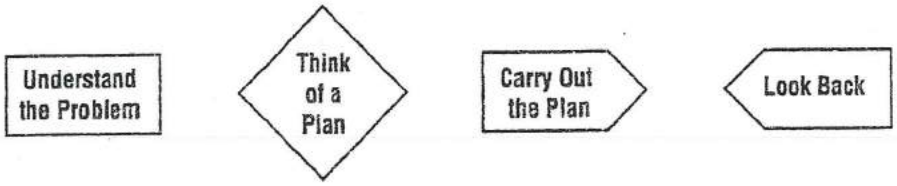
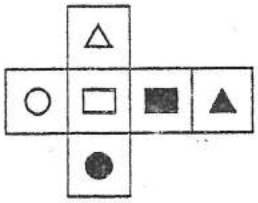
3.11 Problem Solving: Use a Diagram

MATHPOWER™ *Eight*, pp. 102–103



1. A die has the following symbols on its faces.



Make sketches to help you determine which symbol will be on the bottom and the back

a) when the white triangle is on top and the white rectangle is on the front.

_____ bottom _____ back

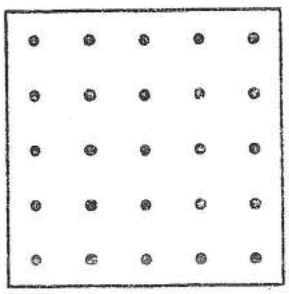
b) when the black rectangle is on top and the white triangle is on the front.

_____ bottom _____ back

2. What is the smallest number of toothpicks needed to make 6 identical triangles? Some triangles may have common sides.

_____

3. How many different-sized squares can you make on a 5 × 5 geoboard?



_____

4. Each of the 8 teams in a soccer league plays each other twice. How many games are played?

_____

5. One hundred twenty-five cubes are stored in a cubical box without a lid.

a) How many cubes can be seen from above the box?

_____

b) How many cubes touch the sides or the bottom of the box?

_____

c) How many cubes do not touch the box and cannot be seen?

_____

6. Forty fence posts are spaced evenly around a rectangular field. Twelve posts form the length. How many posts form the width?

_____

7. An elevator started on the ground floor, rose 18 floors, descended 6 floors, rose 12 floors, rose 3 floors, descended 8 floors, descended 6 floors, and rose 2 floors. Where was the elevator in relation to the ground floor?

_____

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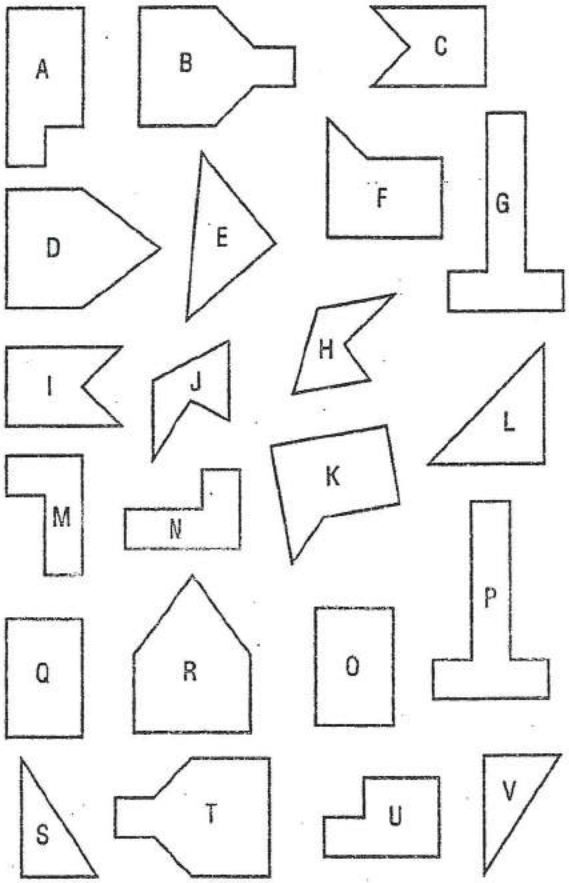
3.12 Congruent Polygons

MATHPOWER™ *Eight*, pp. 104–105

Congruent figures have the same size and shape.

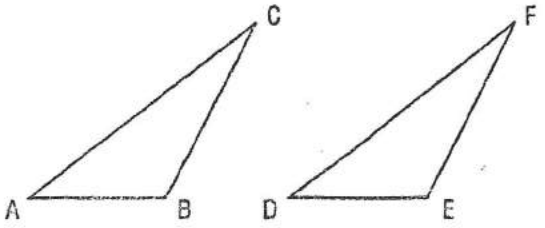
The **corresponding parts** of congruent polygons are also congruent or equal.

1. List the pairs of congruent polygons.

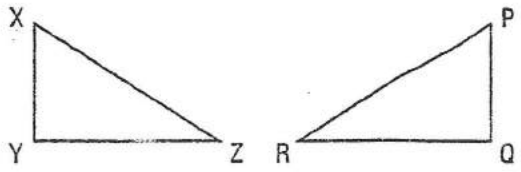


List the corresponding equal parts in each pair of congruent polygons.

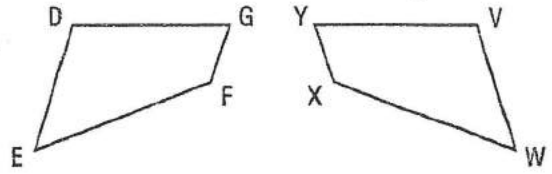
2.



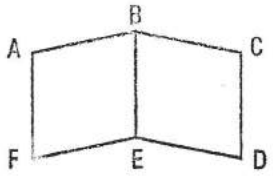
3.



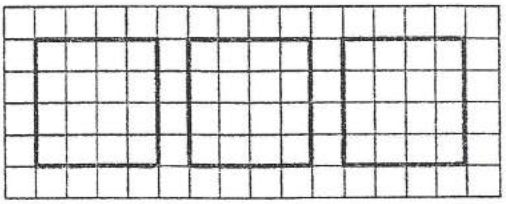
4.



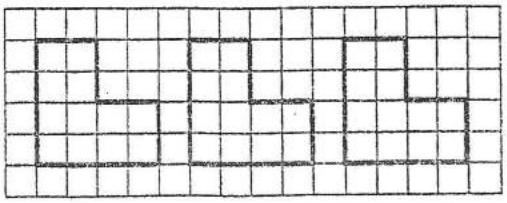
5.



6. Divide the square into 4 congruent parts in 3 different ways.



7. Divide the shape into the indicated number of congruent parts.



2 3 4

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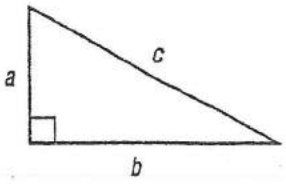
3.13 The Pythagorean Theorem

MATHPOWER™ *Eight*, pp. 108–109

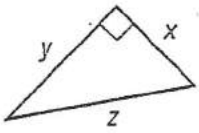
The Pythagorean Theorem states that in any right triangle, if c is the length of the hypotenuse, and a and b are the lengths of the legs, then

$$a^2 + b^2 = c^2$$



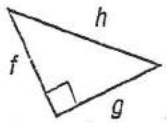
State the relationship in the form $a^2 + b^2 = c^2$ for the sides in each triangle.

1.



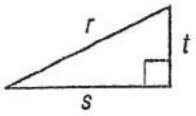
_____

2.



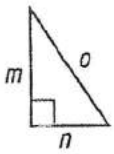
_____

3.



_____

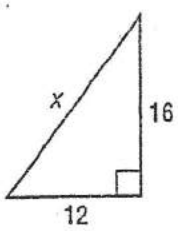
4.



_____

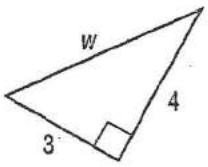
Find the length of the unknown side in each right triangle.

5.



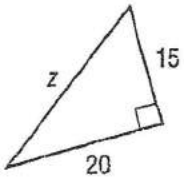
$x =$ _____

6.



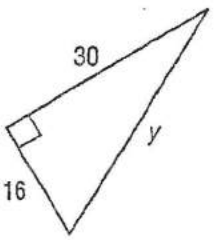
$w =$ _____

7.



$z =$ _____

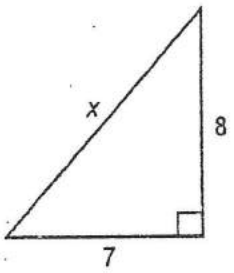
8.



$y =$ _____

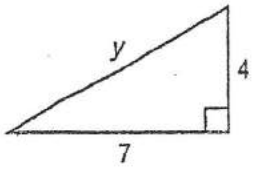
Calculate the length of the unknown side, to the nearest tenth.

9.



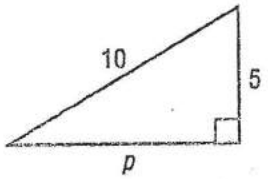
$x =$ _____

10.



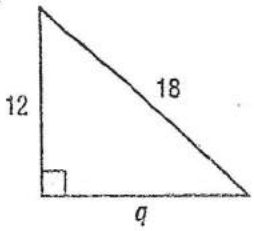
$y =$ _____

11.



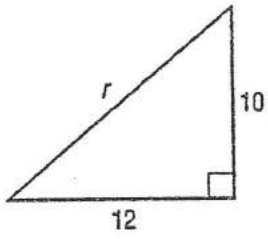
$p =$ _____

12.



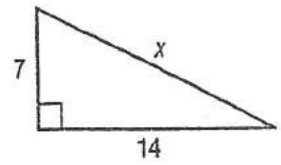
$q =$ _____

13.



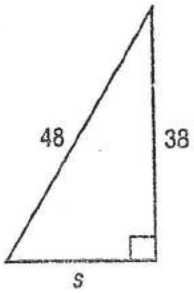
$r =$ _____

14.



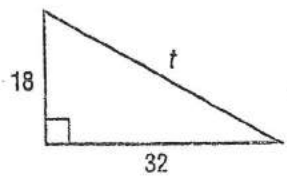
$x =$ _____

15.



$s =$ _____

16.



$t =$ _____

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Name _____

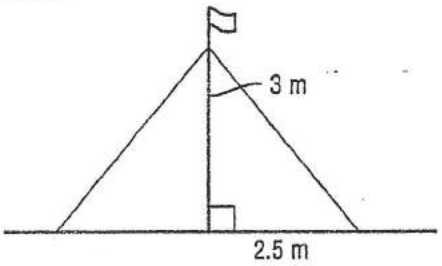
3.14 Using the Pythagorean Theorem

MATHPOWER™ *Eight*, pp. 110–111

1. A 12-m ladder is leaning against a wall. The foot of the ladder is 3 m from the base of the building. How far up the wall is the top of the ladder?

_____

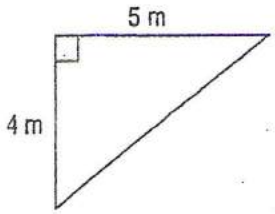
2. Wires are used to support a flagpole at the fairground.



The wires are attached 3 m from the ground and 2.5 m from the base of the pole. How long is each wire?

_____

3. Jacob sectioned off a triangular area in his yard for a vegetable garden.

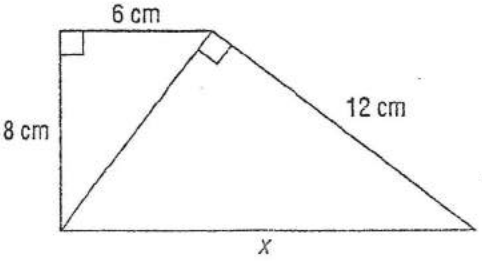


How much fence does he need, in metres, to surround the three sides of the garden?

_____

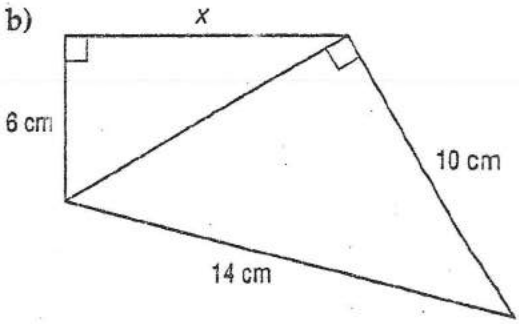
4. Find x to the nearest tenth of a centimetre.

a)



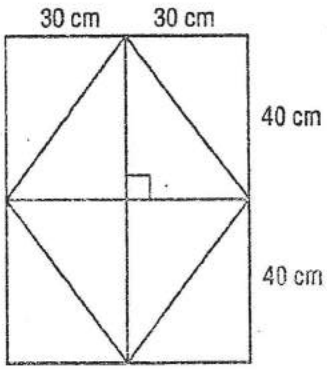
$x =$ _____

b)



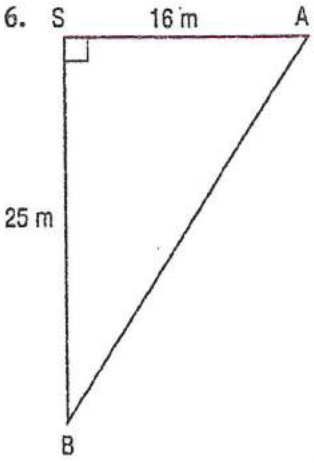
$x =$ _____

5. A decorative window has 4 diagonal bars as shown. What is the length of each one?



_____

6.



A power cable runs east from the station, S, to point A, and south to point B. What is the length of the cable that runs between A and B, to the nearest tenth of a metre?

_____

7. The pegs on a 3-by-3 geoboard are spaced 5 cm apart. Sketch all the different right triangles that can be made on it, and calculate the length of each side, to the nearest tenth of a centimetre.

_____

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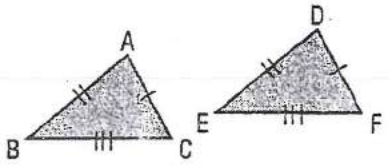
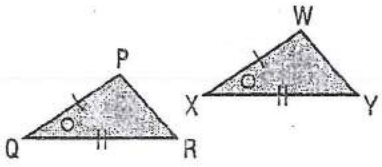
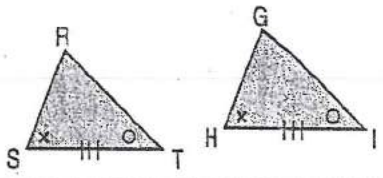
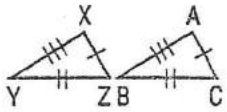
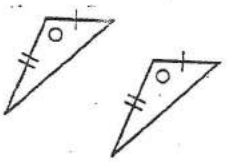
3.15 Conditions for Congruent Triangles

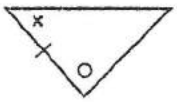
MATHPOWER™ *Eight*, pp. 122–123

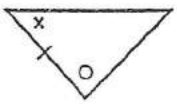
Case: SSS	Case: SAS	Case: ASA
		

State whether the triangles are congruent by SSS, SAS, or ASA.

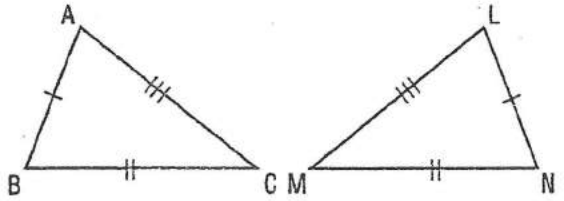
1. 

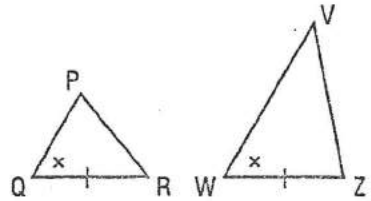
2. 

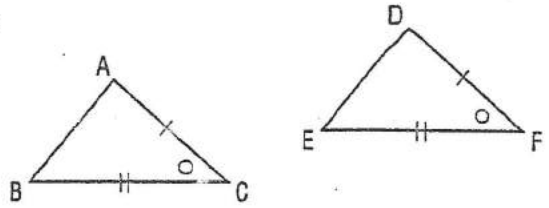
3. 

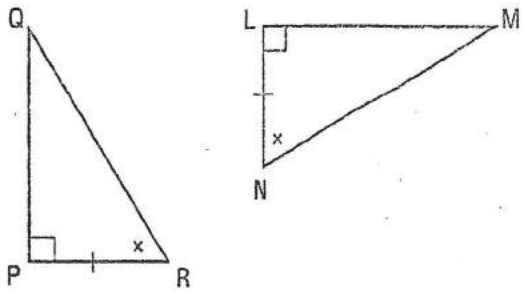


Are the pairs of triangles congruent? If they are, give the case, SSS, SAS, or ASA. List all the equal parts in each pair.

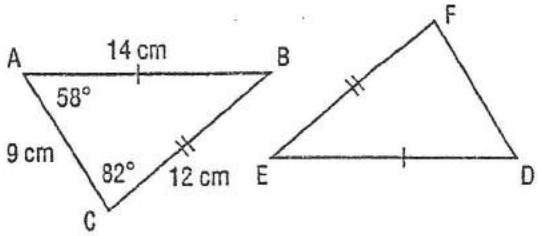
4. 

5. 

6. 

7. 

8. The triangles are congruent. State the size of each line segment and each angle.



DF = _____ ∠FDE = _____

DE = _____ ∠DEF = _____

EF = _____ ∠EFD = _____

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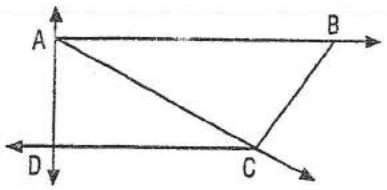
Name _____

Test One CHAPTER 3: Geometry

MATHPOWER™ *Eight*, pp. 77–131

Use the diagram to name the following.



1. 4 points _____
2. 5 rays _____
3. 1 line _____
4. 5 line segments _____
5. 6 angles _____

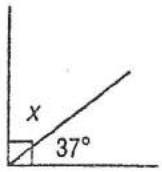
_____

Classify each angle.

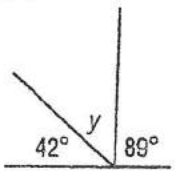
6. 48° _____
7. 182° _____
8. 97° _____
9. 230° _____
10. 90° _____
11. 88° _____

Determine the missing angle measures.

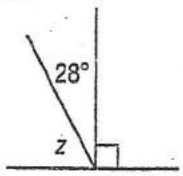
12.



13.



14.



$\angle x =$ _____ $\angle y =$ _____ $\angle z =$ _____

Find the sum of the interior angles in each of the following. What is the measure of each angle?

15. regular pentagon

Sum: _____

Angle measure: _____

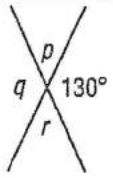
16. regular decagon

Sum: _____

Angle measure: _____

Determine the missing angle measures.

17.

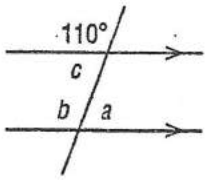


$\angle p =$ _____

$\angle q =$ _____

$\angle r =$ _____

18.

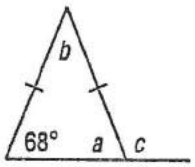


$\angle a =$ _____

$\angle b =$ _____

$\angle c =$ _____

19.

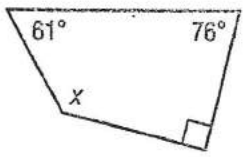


$\angle a =$ _____

$\angle b =$ _____

$\angle c =$ _____

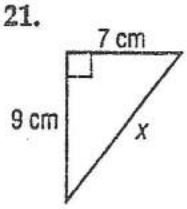
20.



$\angle x =$ _____

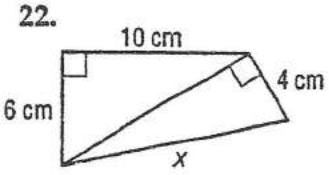
Find x to the nearest tenth of a centimetre.

21.



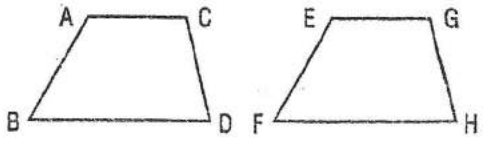
$x =$ _____

22.



$x =$ _____

23. List the corresponding equal parts in the pair of congruent quadrilaterals.



_____

_____

_____

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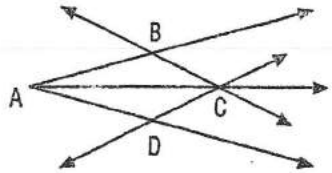
Test Two CHAPTER 3: Geometry

MATHPOWER™ *Eight*, pp. 77–131

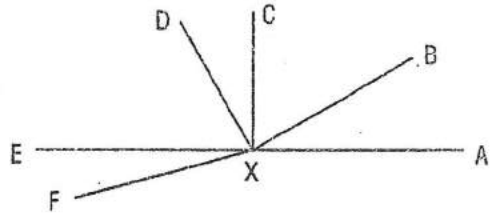
Use the diagram to name the following.



1. 4 points _____
2. 5 rays _____
3. 2 lines _____
4. 5 line segments _____
5. 6 angles _____

_____

Measure and classify each angle.



6. ∠AXB _____
7. ∠CXE _____
8. ∠DXA _____
9. ∠BXF _____
10. ∠AXE _____
11. ∠BXD _____

State the measure of the angle that is complementary to each of the following.

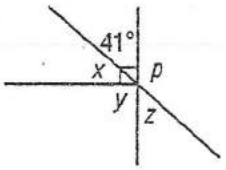
12. 49° _____ 13. 78° _____

State the measure of the angle that is supplementary to each of the following.

14. 47° _____ 15. 132° _____

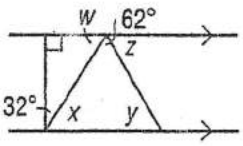
Determine the missing angle measures.

16.



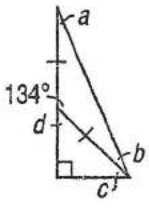
∠p = _____
∠x = _____
∠y = _____
∠z = _____

17.



∠w = _____
∠x = _____
∠y = _____
∠z = _____

18.



∠a = _____
∠b = _____
∠c = _____
∠d = _____

Draw all the lines of symmetry.

19.

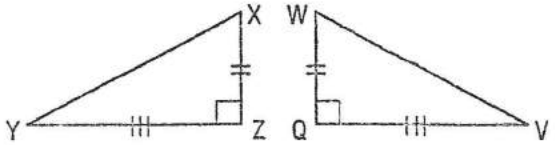
20.

Name the polygon in which the sum of the interior angles is the following.

21. 540° _____

22. 1080° _____

23. State whether the triangles are congruent by SSS, SAS, or ASA. List all the equal parts.



_____

_____

_____

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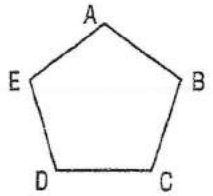
Extension CHAPTER 3: Geometry

MATHPOWER™ *Eight*, pp. 77–131

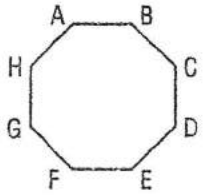
1. 

In the regular pentagon, join AC, AD, BD, BE, and CE.

a) What figure is formed at the centre of the pentagon?

_____

b) Sketch and classify all the different triangles you can see in the figure.

2. 

In the regular octagon, join AF, BE, CH, and DG.

a) What figure is formed at the centre of the octagon?

_____

b) Name the congruent figures that can be seen in the diagram.

_____

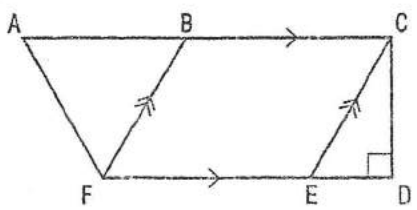
_____

_____

c) What kind of quadrilateral is GACE?

_____

Use the following diagram to answer questions 3 to 6.



3. Name a trapezoid. _____

4. Name a parallelogram. _____

5. △ABF is equilateral. What is the size of each of the following angles?

a) ∠FAB _____ b) ∠FBC _____

c) ∠BFE _____ d) ∠ECD _____

6. A perpendicular is drawn from point B to meet line segment FE at G.

a) What figure is formed?

_____

b) To what other figure is it congruent?

_____

c) State the condition for congruency and list the equal parts.

_____

_____

Solve the riddles.

7. I have 2 congruent, parallel lines, 1 horizontal line, and 4 right angles. What letter am I?

_____

8. I have 4 diagonal lines and 3 acute angles. What letter am I?

_____

Write a riddle for each letter.

9. Z _____

_____

10. E _____

_____

11. K _____

_____

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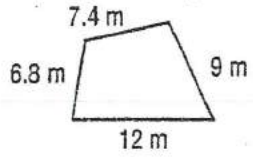
4.1 Perimeter

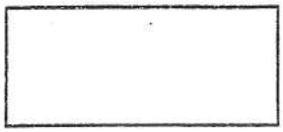
MATHPOWER™ *Eight*, pp. 136–137

The **perimeter** of a figure is the distance around it.

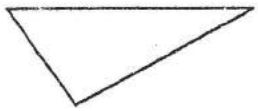


$P = 6.8\text{ m} + 7.4\text{ m} + 9\text{ m} + 12\text{ m}$
$= 35.2\text{ m}$

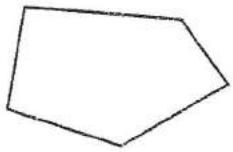
Estimate, then measure each side of the figures. Calculate the perimeter of each figure.

1. 

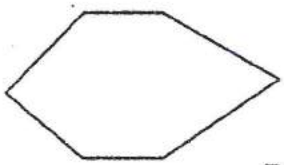
$P =$ _____

2. 

$P =$ _____

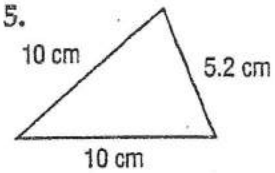
3. 

$P =$ _____

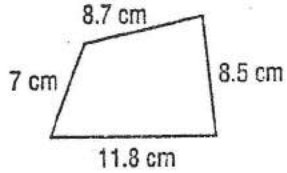
4. 

$P =$ _____

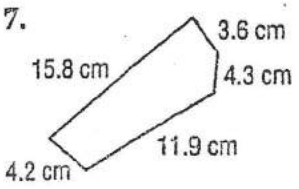
Find the perimeter of each polygon.

5. 

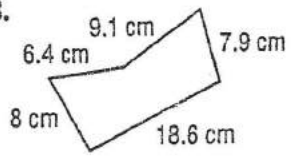
$P =$ _____

6. 

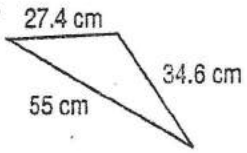
$P =$ _____

7. 

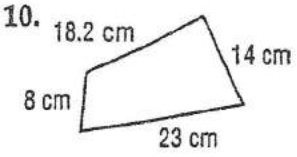
$P =$ _____

8. 

$P =$ _____

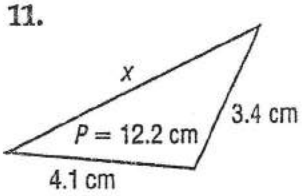
9. 

$P =$ _____

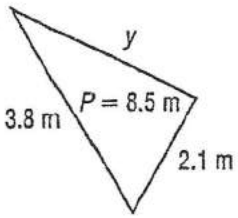
10. 

$P =$ _____

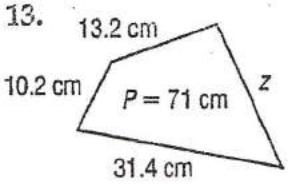
Find the missing length.

11. 

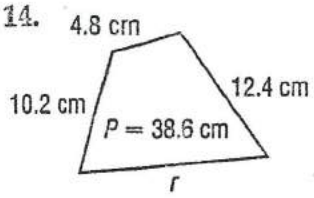
$x =$ _____

12. 

$y =$ _____

13. 

$z =$ _____

14. 

$r =$ _____

Complete the tables.

	a	*b*	*c*	*P*
15.	11.4	8.6	6.8	
16.	6.2	11.5		32.1
17.	8.1		7.6	21.4
18.		7.8	17.6	48.4

	a	*b*	*c*	*d*	*P*
19.	8.9		12.8	7.6	62.4
20.	11.6	17.8	8.5		50.2
21.	26.2	11.7		18.4	83.5
22.		2.4	6.8	12.7	32.9

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4.2 Perimeters of Polygons

MATHPOWER™ *Eight*, pp. 138–139

Find the perimeter of each regular polygon for the given side length.

1. hexagon; $s = 12.5$ cm

$P =$ _____

2. heptagon; $s = 6.2$ cm

$P =$ _____

3. nonagon; $s = 8.9$ cm

$P =$ _____

4. dodecagon; $s = 10.2$ cm

$P =$ _____

5. triangle; $s = 3.5$ cm

$P =$ _____

Find the length of a side of each regular polygon.

6. pentagon; $P = 45$ cm

$s =$ _____

7. decagon; $P = 38.4$ cm

$s =$ _____

8. square; $P = 46$ cm

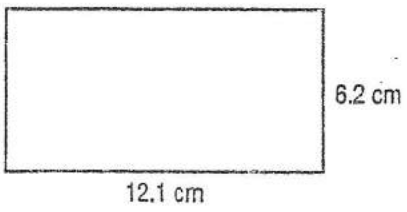
$s =$ _____

9. octagon; $P = 62.8$ cm

$s =$ _____

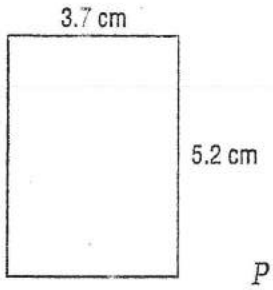
Calculate each perimeter.

10.



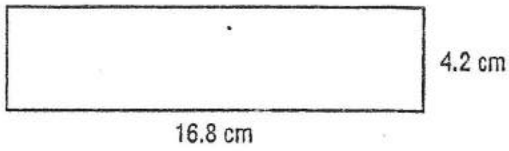
$P =$ _____

11.



$P =$ _____

12.



$P =$ _____

Complete the table for each rectangle.

	l	w	P
13.	8	4	
14.	3.6	4	
15.		8	36
16.	7.1		26.6

17. A tennis court measures 23.7 m by 11 m. Find the perimeter of the tennis court.

_____

18. A baseball diamond is a square that measures 27.4 m on each side. Find the distance a player must run after hitting a home run.

_____

19. The largest palace in the world is the Imperial Palace in Beijing, China. It covers a rectangle 960.1 m by 749.8 m. Find the perimeter of the palace.

_____

20. The Pentagon in Arlington, Virginia, is a regular pentagon with a perimeter of 1405 m. What is the length of each side of the building?

_____

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4.3 Circumference of a Circle

MATHPOWER™ *Eight*, pp. 142–143

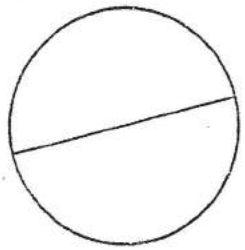
The perimeter of a circle is called the **circumference**.

The distance across a circle through the centre of the circle is called the **diameter**.

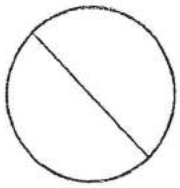
The formula used to calculate the circumference is $C = \pi \times d$. (Use $\pi = 3.14$.)

Measure the diameter of each circle and calculate the circumference, to the nearest tenth.

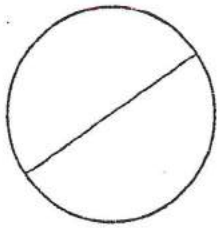
1. $d =$ _____
   $C =$ _____



2. $d =$ _____
   $C =$ _____



3. $d =$ _____
   $C =$ _____



Calculate the circumference of each circle.

4. $d = 9.5$ cm
   $C =$ _____

5. $d = 28$ cm
   $C =$ _____

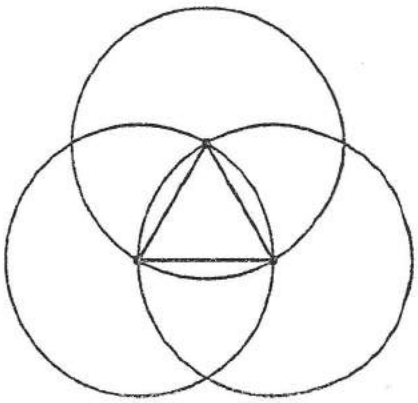
6. $r = 6.8$ cm
   $C =$ _____

7. $r = 3.4$ m
   $C =$ _____

8. $d = 17.8$ cm
   $C =$ _____

9. $r = 7.25$ cm
   $C =$ _____

10. The circumference of each circle is 40.82 cm. What is the perimeter of the triangle?



_____

11. The diameter of a quarter is 23.9 mm. Find the circumference.

_____

12. The circumference of a dime is 56.52 mm. Find the diameter.

_____

13. The largest tires ever manufactured measured 3.7 m in diameter. What was the circumference of each tire?

_____

14. The first Ferris wheel was erected in 1893 at the Chicago World's Fair. It measured 240.8 m in circumference. Find the diameter, to the nearest tenth of a metre.

_____

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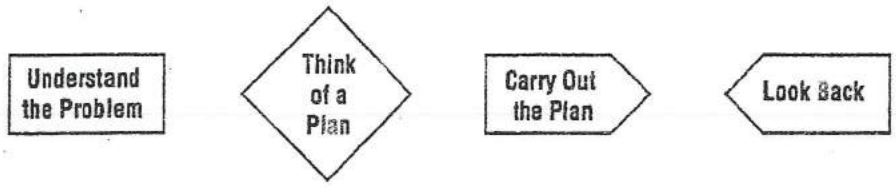
4.4 Problem Solving: Use a Formula

MATHPOWER™ *Eight*, pp. 144–145



The height, in metres, of a highrise building is about 4 times the number of storeys.

1. Write a formula to calculate the height of a highrise.

2. Find the height of the following buildings.

a) 72-storey First Canadian Place, Toronto

b) 47-storey Place Victoria, Montreal

c) 27-storey Oxford Tower, Edmonton

d) 36-storey Royal Centre, Vancouver

3. The average temperature on Earth's surface is 15°C. The temperature increases by about 0.03°C for every metre you go down into Earth's crust. The temperature can be found using the following formula.

$$T = 15 + 0.03 \times d$$

T is the temperature in degrees Celsius and d is the depth in metres. Find the temperature at the following depths.

a) 200 m

b) 850 m

c) 2000 m

d) 1200 m

4. The formula gives the time, t seconds, an object takes to fall from a height of h metres.

$$t = \sqrt{\frac{h}{4.9}}$$

Calculate the time, to the nearest tenth of a second, it takes for an object to fall from each of these heights.

a) the top of the 191-m high Calgary Tower

b) the top of the 553-m high CN Tower

c) the top of the 52.7-m high totem pole at Alert Bay, British Columbia

5. Yolanda drove at an average speed of 80 km/h on her trip to the cottage. The distance she travelled is calculated from the following formula.

$$D = 80 \times h$$

D is the distance in kilometres and h is the number of hours of driving. Calculate the distance travelled in the following number of hours.

a) 2.5 h

b) 4 h

c) 6 h

d) 5.5 h

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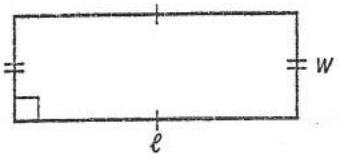
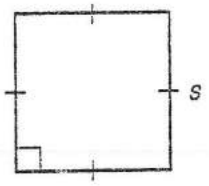
4.5 Area of a Rectangle and Square

MATHPOWER™ *Eight*, pp. 148–149

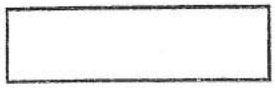


$A = l \times w$

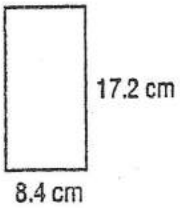


$A = s^2$

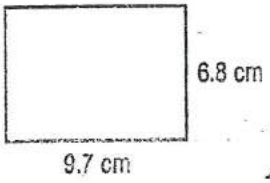
Calculate the area of each rectangle.

1. 

$A =$ _____

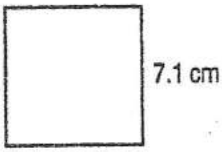
2. 

$A =$ _____

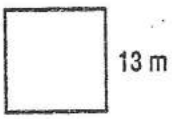
3. 

$A =$ _____

Calculate the area of each square.

4. 

$A =$ _____

5. 

$A =$ _____

Complete each table.

	l	w	A
6.	2.4	1.8	
7.	14.4		89.28
8.		6.7	28.81

	s	A
9.	4.5	
10.		324
11.	17.2	

12. The length of a skating rink is three times its width. Its width is 10 m. What is its area?

_____

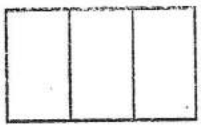
13. The perimeter of a square sandbox is 4.8 m. What is its area?

_____

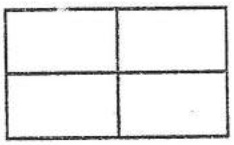
14. The area of a rectangular playground is 1350 m^2. The width is 27 m. How long is the playground?

_____

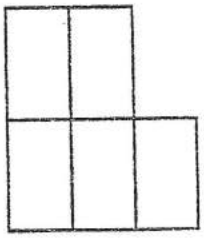
15. A postage stamp has dimensions 2 cm by 3.5 cm. Calculate the area of each of the following arrangements of stamps.

a) 

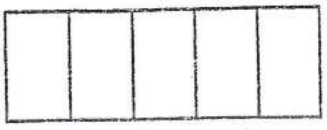
$A =$ _____

b) 

$A =$ _____

c) 

$A =$ _____

d) 

$A =$ _____

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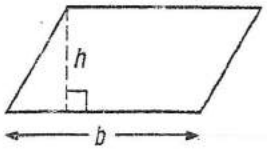
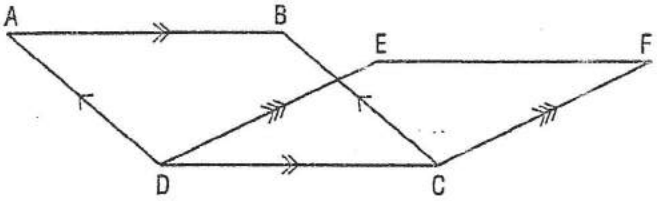
4.6 Area of a Parallelogram

MATHPOWER™ *Eight*, pp. 150–151



$A = b \times h$

Measure the necessary dimensions to calculate each area.



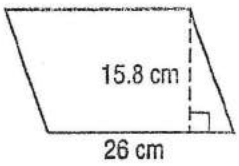
1. parallelogram ABCD

_____

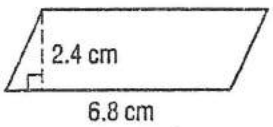
2. parallelogram EFCD

_____

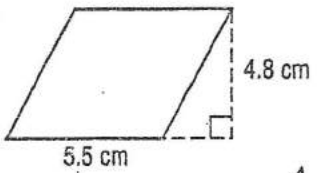
Calculate the area of each parallelogram.

3. 

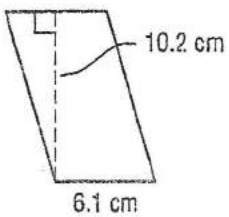
$A =$ _____

4. 

$A =$ _____

5. 

$A =$ _____

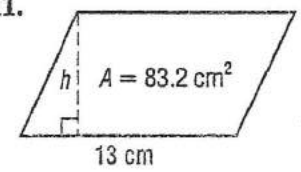
6. 

$A =$ _____

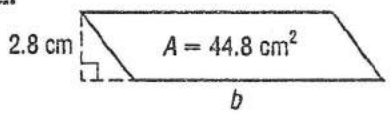
Complete the table.

	b	h	A
7.	12.5	6.4	
8.		13.5	32.4
9.	1.15		30.36
10.		7.6	136.8

Find the missing measure.

11. 

$h =$ _____

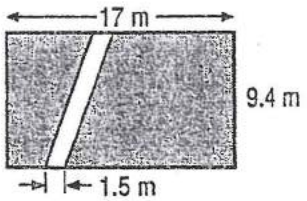
12. 

$b =$ _____

13. The area of a parallelogram is 418.75 m^2. The base is 33.5 m. Find the height.

_____

14. A sidewalk cuts through the front yard of a house.



a) What is the area of the sidewalk?

_____

b) What area of the front yard is grass?

_____

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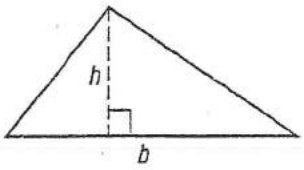
4.7 Area of a Triangle

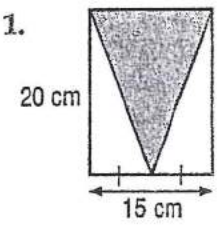
MATHPOWER™ *Eight*, pp. 154–155



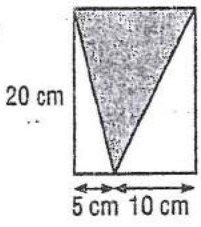
$$A = \frac{1}{2} \times b \times h$$

Find the area of the shaded triangle in each diagram.

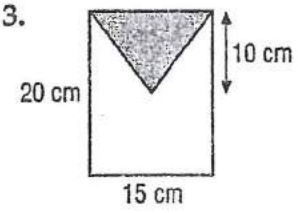
1.



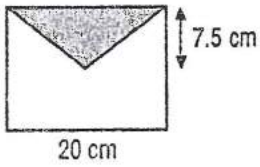
2.



3.

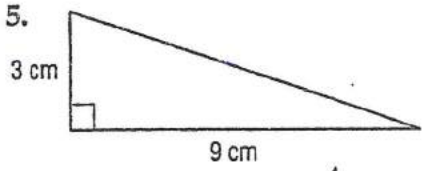


4.



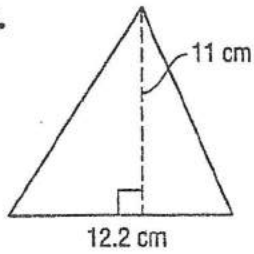
Calculate the area of each triangle.

5.



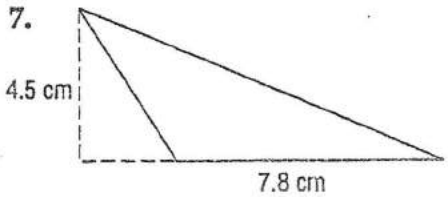
$A =$ _____

6.



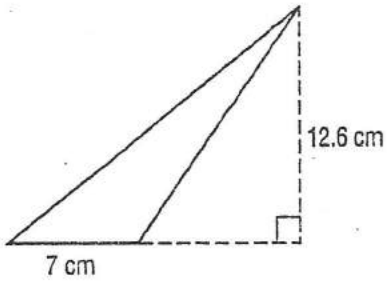
$A =$ _____

7.



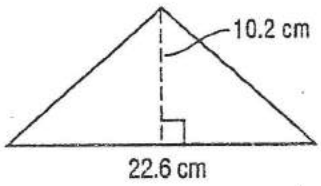
$A =$ _____

8.



$A =$ _____

9.

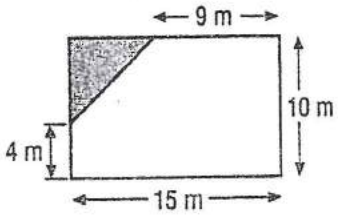


$A =$ _____

Complete the table.

	b	h	A
10.	4.6	10	
11.		8.4	29.4
12.	6.5	5.2	
13.	14.4		75.6
14.		9.8	83.3

15. A triangular vegetable garden is planted in the corner of a yard.



a) Find the area of the garden.

_____

b) Find the area of the yard that is not planted.

_____

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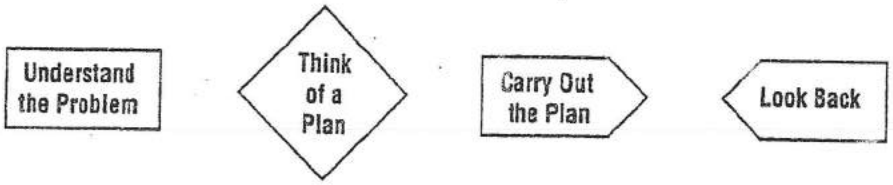
4.8 Problem Solving: Use Logic

MATHPOWER™ *Eight*, pp. 156–157



1. Six students are standing in line at the theatre. They are: Shawn, Aisha, Brian, Emily, Armand, and Ferhan. Brian is beside Ferhan. Shawn has only one person beside him. Brian is last in line. The two people whose names begin with the same letter are not standing together. Emily is behind Aisha. Determine the order in which the six students are standing.

2. Miguel, JoAnne, and David had 36 books between them. JoAnne gave David 4 books. David gave Miguel 1 book. Miguel gave JoAnne 3 books. They each ended up with an equal number of books. How many books did each person start with?

3. Diana, Colin, Hannah, and Paulo each have a pet. They are a dog, a cat, a hamster, and a parrot. No person has a pet that begins with the same letter as his or her name. Hannah's pet does not have 4 legs. Diana's pet does not live in a cage. Paulo's pet is larger than Colin's. Determine who has each pet.

4. Anna laid 5 different Canadian coins on the table. The coin with the smallest value is between the coins with the 2 largest values. The largest coin is in the middle. The smallest coin is immediately to the right of the largest coin. Determine the order of the 5 coins.

5. Anthony, Alexis, Sue, and Marcie are playing a travel game. The game markers are a plane, a bus, a taxi, and a boat. Use the clues to determine who has each marker and the order they are placed in the game.

The boat is ahead of the other markers.
Anthony is neither winning nor losing.
The person in last place has the bus.
Marcie's taxi is between Sue and Anthony.
Sue's marker is the vehicle that travels on water.

6. Three equal stacks of counters are on the table. If 5 counters are removed from each of the first 2 stacks and added to the 3rd stack, the number in the 3rd stack will be equal to the total in the other 2 stacks. How many counters are in each stack?

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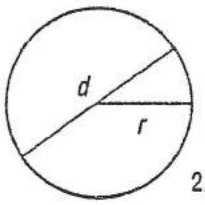
4.9 Area of a Circle

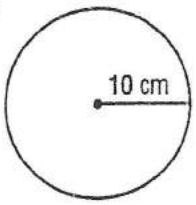
MATHPOWER™ *Eight*, pp. 158–159

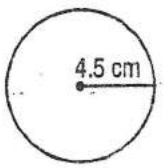


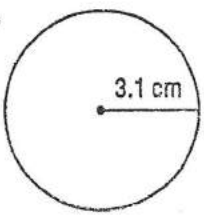
$A = \pi r^2$

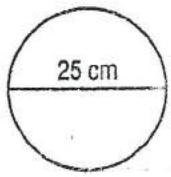
Use $\pi = 3.14$.

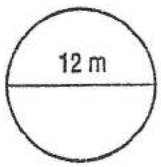
Calculate the area of each circle, to the nearest tenth.

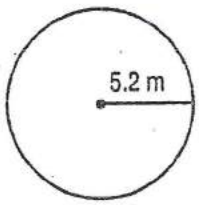
1. 

2. 

3. 

4. 

5. 

6. 

Find the area of each circle, to the nearest tenth.

7. $r = 6.3$ cm _____

8. $d = 24.2$ cm _____

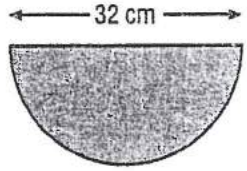
9. $d = 57$ m _____

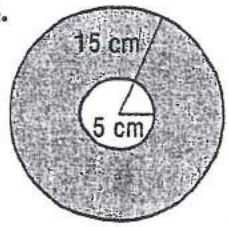
10. $r = 10.5$ m _____

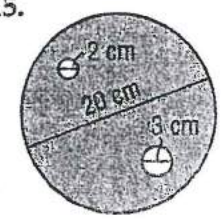
11. $d = 15.2$ cm _____

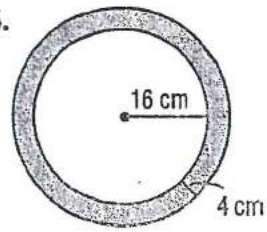
12. $r = 13.4$ cm _____

Calculate the area of the shaded region.

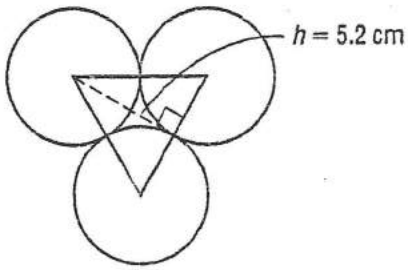
13. 

14. 

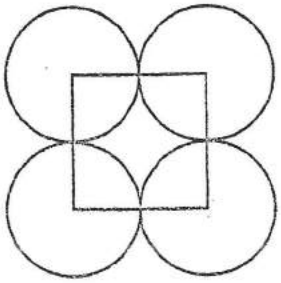
15. 

16. 

17. The area of each circle is 113.04 cm^2. Find the area of the triangle.



18. The area of each circle is 153.86 cm^2. Find the area of the square.



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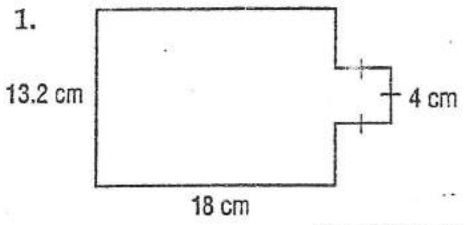
4.10 Area of Composite Figures

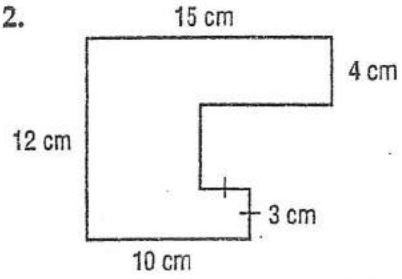
You can calculate the area of some figures by separating the figure into regions and adding or subtracting.

Calculate the area of each figure.

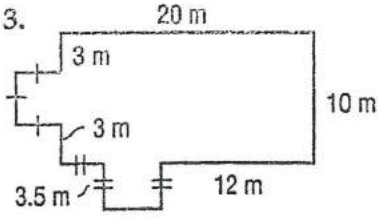
1.



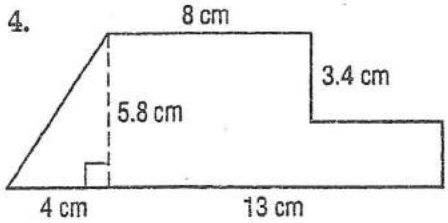
2.



3.

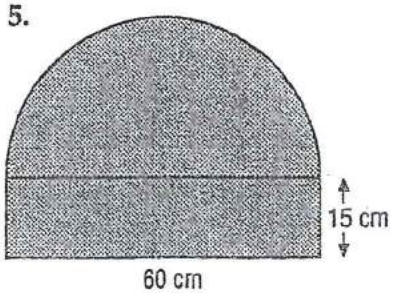


4.



Calculate the area of each shaded region.

5.



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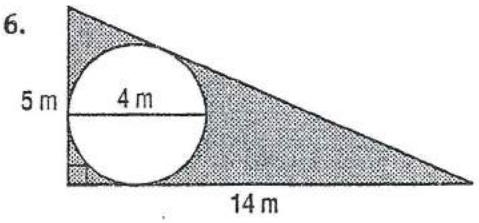

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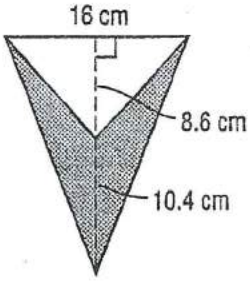
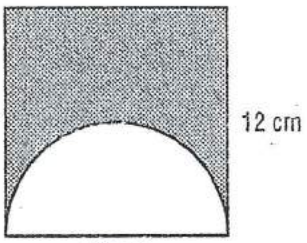
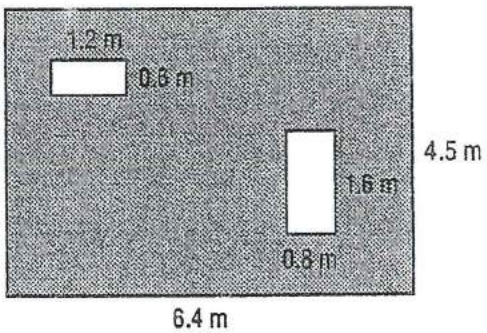


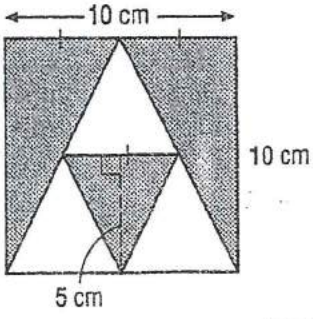
8.



9.

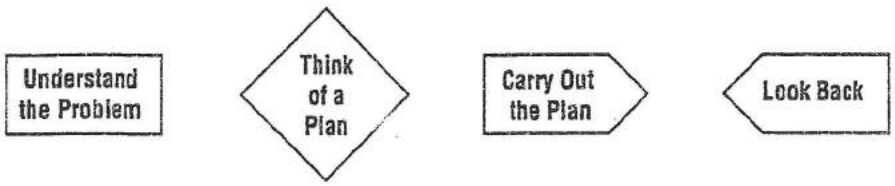


10.



4.12 Problem Solving: Use a Table

MATHPOWER™ *Eight*, pp. 164–165



1. The table shows the average life span of several animals.

Animal	Average Life Span (years)
Grizzly Bear	25
Bobcat	11
African Elephant	60
Tasmanian Devil	8
Moose	20
Gorilla	43

a) How much longer does a gorilla live than a grizzly bear?

b) How many times longer does an African elephant live than a Tasmanian devil?

c) Which animal lives about 3 times longer than the Tasmanian devil?

d) Which animal lives about one-quarter as long as the gorilla?

2. An amusement park charges $25.00 admission. There is an average of 250 visitors per day to the park. Management found that for every $2 reduction in price, the number of visitors will increase by 50 per day. Find the admission price that gives the greatest receipts.

Janine's printing firm sells advertising posters for $5.50 each for up to 25 posters. The price is reduced by $0.25 for each additional 25 posters ordered, to a maximum of 250 posters.

3. Construct a table to show the cost of 1 to 250 posters.

4. Use the table you constructed in question 3 to calculate the cost of each of the following orders.

a) 80 posters

b) 150 posters

c) 190 posters

d) 300 posters

5. There are 4 schools in a soccer league. Each school has played once against each of the others. A win earns 2 points, a tie earns 1 point, and a loss earns no points. Use the information to help you complete the following table.

Armstrong has 6 points.
Berkley has tied 2 games and won no games.
Castleview has 1 win.

Team	Won	Lost	Tied	Points
Armstrong				
Berkley				
Castleview				
Dunsmore				

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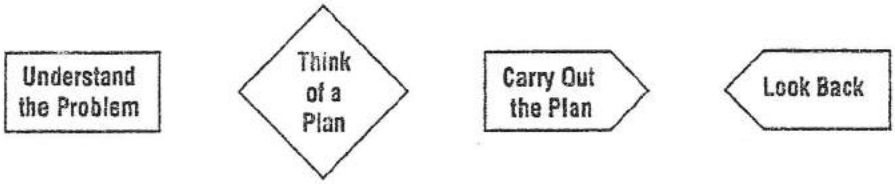
Working with Perimeter and Area



1. A table is 60 cm in diameter. A tablecloth hangs 65 cm all around.

a) What is the area of the tablecloth?

b) How much lace trim is needed to edge the cloth?

c) Lace trim is sold in whole metres at $2.89/m. How much would it cost for the trim?

2. A patio is formed from paving stones laid in a 6-by-4 array. Each stone is 55 cm by 55 cm.

a) What are the dimensions of the patio?

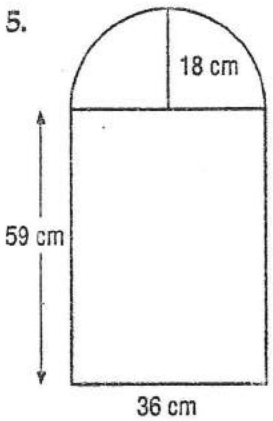
b) What is the perimeter of the patio?

c) What is the area of the patio?

3. A magazine cover measures 28 cm by 22 cm. The title uses one-quarter of the area of the cover. How much area is needed for the title?

4. What rectangular area of fabric is needed to make a triangular neckerchief with a base of 60 cm and a height of 35 cm?

5.



a) What is the perimeter of the mirror?

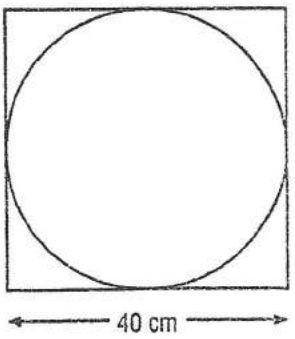
b) What is the area of the mirror?

6. A picture, measuring 27.9 cm by 35.6 cm, is surrounded by a mat 7.6 cm wide.

a) Find the outer perimeter of the picture with the mat.

b) What is the area of the picture including the mat?

7. Miguel drew a circle inside a square with side length 40 cm so that the circle touched all 4 sides of the square.



a) What is the area of the circle?

b) What area of the square is outside the circle?

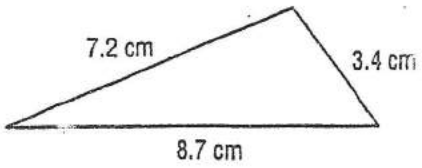
Test One CHAPTER 4: Perimeter and Area

MATHPOWER™ *Eight*, pp. 133–175

52

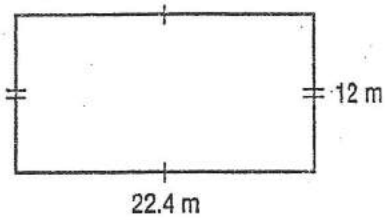
Calculate the perimeter of each figure.

1.



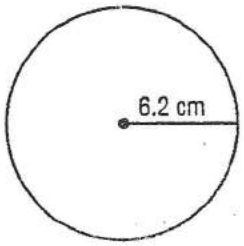
3

2.



3

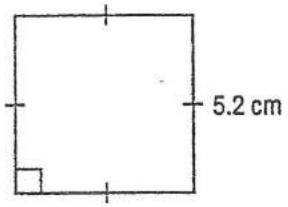
3.



4

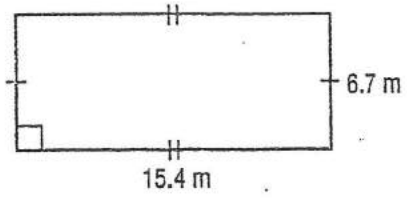
Calculate each area.

4.



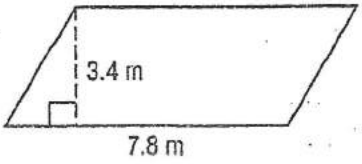
3

5.



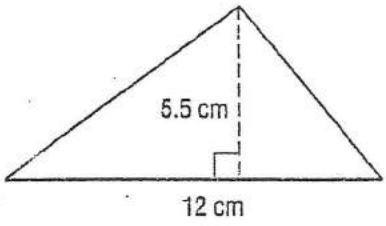
3

6.



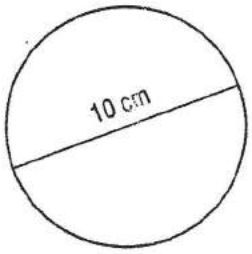
3

7.



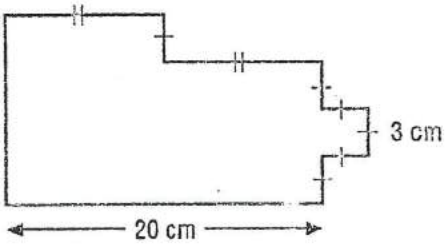
4

8.



4

9. Find the perimeter and area of the figure.

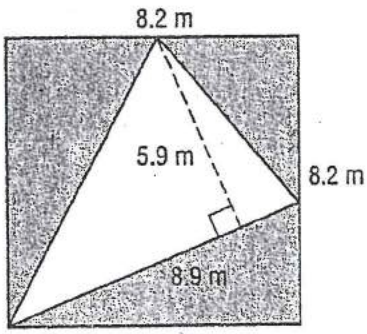


14

$P =$ _____

$A =$ _____

10. A triangular garden is planted within a square grassed area as shown. Find the area of the grassed section, to the nearest tenth of a square metre.



11

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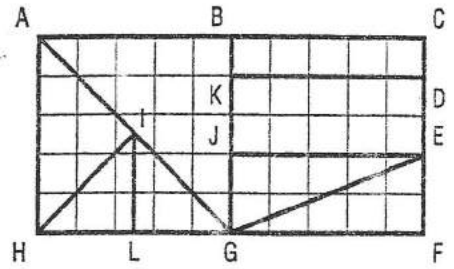
Extension CHAPTER 7: Percent

MATHPOWER™ *Eight*, pp. 235–263

1. 

What percent of the rectangle is each of the following?

a) ABGH _____ b) BCDK _____

c) ABG _____ d) DEJK _____

e) EGJ _____ f) AHI _____

g) BCEJ _____ h) GIL _____

2. The following message has 100 letters.

> MATHPOWER is the textbook used in our classroom. It is blue and has thirteen chapters and four hundred ninety-eight pages.

a) What percent of the message is the first sentence?

_____

b) What percent of the message is made up of vowels?

_____

c) Which letter makes up the greatest percent of the message?

_____

d) Which letter makes up 10% of the message?

_____

e) What percent of the message is words that name numbers?

_____

3. Halfway through the hockey season, a team has won 50% of the 40 games played. Their goal is to win 60% of all their games. How many more games must they win?

_____

4. On a 60-question test, André answered all the questions. He had 50% more questions correct than he had wrong. How many questions did he have correct?

_____

5. During a weekend sale, various articles were reduced in price by the indicated percents. By what percent would the price of each one have to be increased after the sale to return to the original price?

a) Ladies Coats Reduced 30%

_____

b) Microwave Ovens Reduced 25%

_____

c) Blue Jeans Reduced 40%

_____

d) Mountain Bikes Reduced 15%

_____

6. Salary negotiations at a factory resulted in wages being increased by 5% and shift hours being decreased by 5%. Calculate the new wage and hours worked for each of the following original situations.

a) \$450/week for a 40-h week

_____

b) \$280/week for a 25-h week

_____

c) \$370/week for a 36-h week

_____

d) \$520/week for a 44-h week

_____

7. In a survey of 50 students, 40% wore glasses. Of the students wearing glasses, 5% had green eyes. How many students with glasses had green eyes?

_____

8. In a group of television owners, 60% owned 2 sets. Of the remainder, 25% owned 3 or more sets. What percent of television owners owned 1 set?

_____

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5.2 Equivalent Fractions

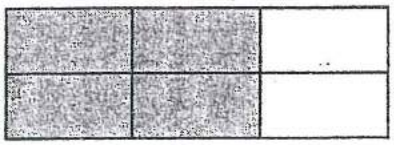
MATHPOWER™ *Eight*, pp. 182–183

Fractions that represent the same value are called **equivalent fractions.**

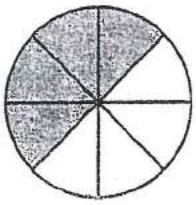
$$\frac{1}{3} = \frac{2}{6}$$

When the numerator and denominator have no common factors other than 1, the fraction is in **simplest form** or **lowest terms.**

Write 2 equivalent fractions for the shaded part of each diagram.

1. 

_____

2. 

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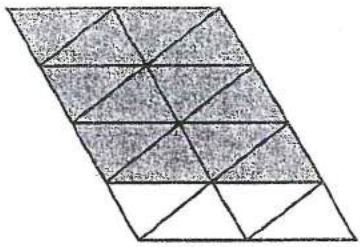
3. 

_____

Write 2 fractions equivalent to each of the following.

4. $\frac{1}{4}$ _____

5. $\frac{3}{5}$ _____

6. $\frac{2}{7}$ _____

7. $\frac{2}{3}$ _____

Find the missing value.

8. $\frac{3}{4} = \frac{\square}{16}$

9. $\frac{16}{18} = \frac{8}{\square}$

10. $\frac{44}{\square} = \frac{11}{7}$

11. $\frac{\square}{6} = \frac{55}{30}$

12. $\frac{3}{8} = \frac{\square}{48}$

13. $\frac{63}{\square} = \frac{7}{9}$

Write each fraction in lowest terms.

14. $\frac{8}{12}$ _____

15. $\frac{10}{18}$ _____

16. $\frac{15}{25}$ _____

17. $\frac{16}{24}$ _____

18. $1\frac{3}{9}$ _____

19. $2\frac{7}{42}$ _____

Order the following fractions from smallest to largest.

20. $\frac{5}{8}, \frac{7}{2}, \frac{9}{4}, \frac{8}{7}, \frac{3}{4}$

_____

21. $\frac{7}{9}, 1\frac{2}{9}, 1\frac{2}{3}, \frac{4}{3}, 1\frac{1}{6}$

_____

22.

$\frac{4}{6}$	$\frac{9}{15}$	$\frac{21}{35}$	$\frac{8}{14}$
$\frac{4}{10}$	$\frac{10}{15}$	$\frac{14}{21}$	$\frac{12}{20}$
$\frac{18}{30}$	$\frac{24}{40}$	$\frac{15}{20}$	$\frac{6}{9}$
$\frac{8}{12}$	$\frac{12}{15}$	$\frac{12}{18}$	$\frac{6}{10}$

a) Shade in red the fractions equivalent to $\frac{2}{3}$.

b) Shade in blue the fractions equivalent to $\frac{3}{5}$.

c) Write the unshaded fractions in lowest terms.

_____

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5.3 Adding Fractions

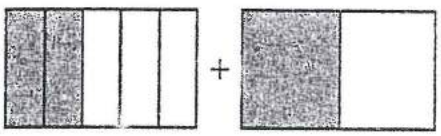
MATHPOWER™ *Eight*, pp. 184–185

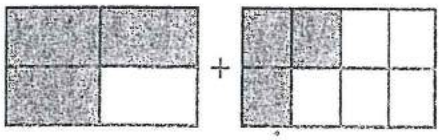
To add fractions with different denominators, write equivalent fractions with the lowest common denominator.

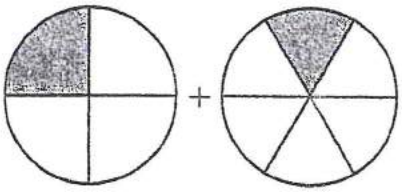
$$\frac{1}{3} + \frac{3}{5} = \frac{5}{15} + \frac{9}{15}$$
$$= \frac{14}{15}$$

Express all answers in lowest terms.

Write the addition indicated by each diagram and find the sum.

1. 

2. 

3. 

Add.

4. $\frac{1}{3} + \frac{1}{3}$ _____ 5. $\frac{5}{8} + \frac{1}{8}$ _____

6. $\frac{3}{5} + \frac{2}{5}$ _____ 7. $\frac{7}{12} + \frac{1}{12}$ _____

Add.

8. $\frac{5}{6} + \frac{1}{3}$ _____ 9. $\frac{3}{8} + \frac{1}{2}$ _____

10. $\frac{1}{3} + \frac{3}{4}$ _____ 11. $\frac{1}{3} + \frac{1}{2}$ _____

12. $\frac{3}{5} + \frac{3}{4}$ _____ 13. $\frac{7}{9} + \frac{2}{3}$ _____

Estimate, then add.

14. $1\frac{7}{9} + 2\frac{5}{9}$ _____ 15. $4\frac{1}{10} + 3\frac{7}{10}$ _____

16. $2\frac{5}{6} + \frac{1}{6}$ _____ 17. $5\frac{2}{3} + 3\frac{2}{3}$ _____

Estimate, then add.

18. $2\frac{1}{2} + \frac{3}{4}$ _____ 19. $1\frac{1}{6} + 2\frac{5}{8}$ _____

20. $4\frac{2}{7} + 3\frac{1}{2}$ _____ 21. $3\frac{1}{3} + 1\frac{1}{4}$ _____

22. $5\frac{4}{5} + 2\frac{2}{3}$ _____ 23. $1\frac{7}{8} + 3\frac{1}{12}$ _____

Estimate, then add.

24. $\frac{1}{6} + \frac{1}{4} + \frac{7}{8}$ _____ 25. $\frac{2}{3} + \frac{1}{6} + 1\frac{5}{6}$ _____

26. $\frac{5}{8} + \frac{1}{2} + 3\frac{3}{4}$ _____ 27. $4\frac{1}{4} + \frac{4}{5} + \frac{7}{10}$ _____

28. Complete the squares by adding across and down.

a)

$\frac{1}{4}$	$\frac{4}{5}$	
$\frac{1}{3}$	$\frac{1}{2}$	

b)

$2\frac{1}{2}$	$\frac{1}{3}$	$2\frac{1}{6}$	
$2\frac{5}{6}$	5	$\frac{5}{12}$	
$1\frac{1}{3}$	$3\frac{1}{12}$	$1\frac{5}{6}$	

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5.4 Subtracting Fractions

MATHPOWER™ *Eight*, pp. 186–187

To subtract fractions with different denominators, write equivalent fractions with the lowest common denominator.

$$3\frac{1}{3} - 1\frac{1}{2} = 3\frac{2}{6} - 1\frac{3}{6} \quad \longleftarrow\ 2 < 3, \text{ so rewrite the first mixed number.}$$
$$= 2\frac{8}{6} - 1\frac{3}{6} \quad \longleftarrow\ \text{Subtract whole numbers, then fractions.}$$
$$= 1\frac{5}{6}$$

Express all answers in lowest terms.

Find the difference.

1. $\frac{7}{8} - \frac{3}{8}$ _____
2. $\frac{9}{10} - \frac{1}{10}$ _____
3. $\frac{3}{5} - \frac{1}{5}$ _____
4. $\frac{7}{12} - \frac{5}{12}$ _____

Subtract.

5. $\frac{7}{9} - \frac{2}{3}$ _____
6. $\frac{7}{8} - \frac{1}{4}$ _____
7. $\frac{9}{10} - \frac{2}{5}$ _____
8. $\frac{3}{4} - \frac{2}{3}$ _____
9. $\frac{7}{8} - \frac{5}{6}$ _____
10. $\frac{3}{5} - \frac{1}{3}$ _____

Estimate, then subtract.

11. $3\frac{4}{7} - \frac{1}{7}$ _____
12. $2\frac{8}{9} - \frac{4}{9}$ _____
13. $4\frac{4}{5} - 1\frac{2}{5}$ _____
14. $5\frac{1}{6} - 2\frac{5}{6}$ _____
15. $2\frac{5}{8} - 1\frac{3}{8}$ _____
16. $6\frac{7}{10} - 4\frac{3}{10}$ _____

Estimate, then subtract.

17. $4\frac{1}{2} - 1\frac{2}{5}$ _____
18. $3\frac{3}{4} - \frac{5}{12}$ _____
19. $3\frac{2}{3} - 1\frac{1}{4}$ _____
20. $4\frac{7}{10} - 3\frac{2}{3}$ _____
21. $5\frac{1}{3} - 2\frac{1}{6}$ _____
22. $2\frac{3}{5} - 2\frac{1}{10}$ _____

Estimate, then subtract.

23. $4\frac{1}{6} - 2\frac{1}{3}$ _____
24. $3 - 1\frac{7}{8}$ _____
25. $5\frac{1}{2} - 2\frac{7}{12}$ _____
26. $1\frac{3}{8} - \frac{5}{6}$ _____

27. Complete the squares by subtracting across and down.

a)

$\frac{5}{6}$	$\frac{1}{3}$	
$\frac{5}{12}$	$\frac{1}{4}$	

b)

$3\frac{2}{3}$	$1\frac{5}{6}$	
$1\frac{3}{5}$	$1\frac{1}{3}$	

c)

$6\frac{1}{2}$	$3\frac{1}{3}$	
$2\frac{1}{4}$	$1\frac{5}{6}$	

28. Write 2 fractions that have different denominators and a difference of $\frac{3}{5}$.

_____

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5.5 Multiplying Fractions

MATHPOWER™ *Eight*, pp. 190–191

To multiply fractions, multiply the numerators and multiply the denominators.

$$2\frac{1}{3} \times 1\frac{4}{5} = \frac{7}{3} \times \frac{9}{5} \leftarrow \text{Write mixed numbers as improper fractions first.}$$
$$= \frac{63}{15}$$
$$= \frac{21}{5} \text{ or } 4\frac{1}{5}$$

Two numbers whose product is 1 are called **reciprocals**.

Since $\frac{3}{5} \times \frac{5}{3} = \frac{15}{15}$ or 1, $\frac{3}{5}$ and $\frac{5}{3}$ are reciprocals.

Express all answers in lowest terms.

Multiply.

1. $\frac{1}{2} \times \frac{1}{4}$ _____
2. $\frac{2}{3} \times \frac{1}{5}$ _____
3. $\frac{3}{4} \times \frac{4}{5}$ _____
4. $\frac{7}{10} \times \frac{2}{3}$ _____
5. $\frac{1}{6} \times \frac{3}{8}$ _____
6. $\frac{2}{7} \times \frac{1}{2}$ _____

Calculate.

7. $\frac{1}{3}$ of 9 _____
8. $\frac{3}{8}$ of 12 _____
9. $\frac{1}{10}$ of $\frac{4}{5}$ _____
10. $\frac{3}{5}$ of $\frac{2}{3}$ _____

Estimate, then multiply.

11. $4 \times 1\frac{1}{8}$ _____
12. $2 \times 2\frac{1}{4}$ _____
13. $5 \times 2\frac{1}{2}$ _____
14. $4 \times 1\frac{3}{4}$ _____
15. $1\frac{3}{4} \times 2\frac{2}{3}$ _____
16. $3\frac{1}{8} \times 1\frac{1}{6}$ _____
17. $4\frac{2}{5} \times 2\frac{3}{10}$ _____
18. $2\frac{1}{2} \times 5\frac{5}{9}$ _____
19. $1\frac{3}{7} \times 3\frac{5}{6}$ _____
20. $3\frac{1}{2} \times 3\frac{1}{2}$ _____

Multiply.

21. $\frac{2}{3} \times 3 \times \frac{1}{8}$ _____
22. $\frac{1}{2} \times 4 \times \frac{4}{5}$ _____
23. $1\frac{1}{7} \times 2\frac{1}{2} \times 1\frac{7}{8}$ _____
24. $7 \times 3\frac{2}{3} \times 1\frac{1}{4}$ _____

Write the reciprocal.

25. $\frac{3}{4}$ _____
26. $\frac{3}{2}$ _____
27. $\frac{2}{7}$ _____
28. $2\frac{1}{6}$ _____
29. $3\frac{2}{7}$ _____
30. $4\frac{1}{4}$ _____

Find the missing value.

31. $\frac{4}{5} \times 1\frac{1}{4} = \square$
32. $1 = \frac{3}{4} \times \square$
33. $\square \times 3\frac{1}{2} = 1$
34. $8 \times \square = 1$
35. $\frac{3}{4} \times \square = \frac{2}{3} \times 1\frac{1}{2}$
36. $4 \times \frac{1}{4} = \square \times 6$

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5.6 Dividing Fractions

MATHPOWER™ *Eight*, pp. 192–193

To divide by a fraction, multiply by its reciprocal.

$$3\frac{1}{2} \div 1\frac{2}{3} = \frac{7}{2} \div \frac{5}{3} \quad \longleftarrow \text{ Write the mixed numbers as improper fractions,}$$
$$= \frac{7}{2} \times \frac{3}{5} \quad \text{then divide.}$$
$$= \frac{21}{10} \text{ or } 2\frac{1}{10}$$

Express all answers in lowest terms.

Divide.

1. $\frac{2}{3} \div \frac{1}{5}$ _____
2. $\frac{2}{5} \div \frac{1}{3}$ _____
3. $\frac{1}{2} \div \frac{1}{6}$ _____
4. $\frac{3}{4} \div \frac{1}{2}$ _____

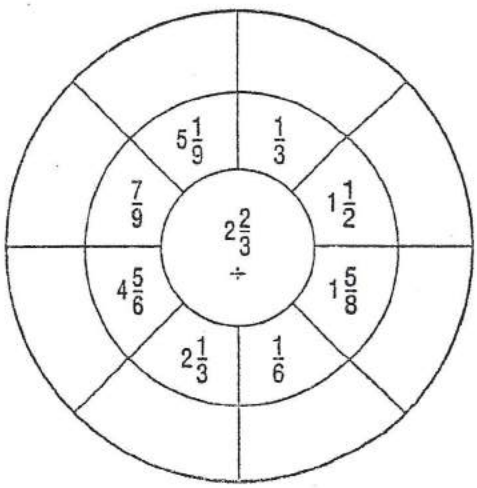
Divide.

5. $5 \div \frac{1}{4}$ _____
6. $4 \div \frac{2}{3}$ _____
7. $\frac{1}{2} \div 3$ _____
8. $\frac{1}{2} \div 7$ _____

Divide.

9. $1\frac{2}{5} \div \frac{5}{9}$ _____
10. $3\frac{2}{3} \div \frac{1}{7}$ _____
11. $2\frac{1}{2} \div \frac{4}{11}$ _____
12. $4\frac{1}{3} \div \frac{2}{5}$ _____
13. $\frac{7}{12} \div 3\frac{1}{2}$ _____
14. $\frac{7}{15} \div 2\frac{2}{3}$ _____
15. $\frac{1}{3} \div 1\frac{1}{4}$ _____
16. $\frac{6}{7} \div 4\frac{3}{4}$ _____
17. $1\frac{3}{8} \div 1\frac{3}{4}$ _____
18. $3\frac{1}{6} \div 1\frac{5}{6}$ _____
19. $2\frac{5}{12} \div 1\frac{1}{3}$ _____
20. $4\frac{3}{7} \div 1\frac{3}{8}$ _____
21. $6 \div 2\frac{3}{4}$ _____
22. $9 \div 4\frac{1}{5}$ _____

23. Complete the division wheel.



24. A juice jug holds $3\frac{3}{4}$ L of juice. How many glasses of juice can you pour if each one holds $\frac{1}{5}$ L?

_____

Calculate the average speed for each of the following.

25. 126 km in $2\frac{1}{4}$ h _____
26. $292\frac{1}{2}$ km in $4\frac{1}{2}$ h _____
27. 288 km in $3\frac{3}{5}$ h _____

Find the missing value.

28. $\frac{2}{15} \div \square = \frac{2}{3}$
29. $\frac{5}{8} \div \square = 1\frac{2}{3}$
30. $\square \div 1\frac{5}{7} = \frac{3}{4}$
31. $\square \div 2\frac{1}{4} = 1\frac{1}{5}$

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5.7 Fractions and Decimals

MATHPOWER™ *Eight*, pp. 196–197

Fractions to Terminating Decimals	Fractions to Repeating Decimals
$\frac{3}{8} = 8\overline{)3.000}$ or 0.375	$\frac{5}{6} = 6\overline{)5.000}$ or 0.833... $= 0.8\overline{3}$

Use a bar to show the digits that repeat.

Express all answers in lowest terms.

Write each decimal using bar notation.

1. 0.434 343... _____
2. 0.777 777... _____
3. 0.166 666... _____
4. 0.361 361... _____
5. 5.678 78... _____
6. 9.239 239... _____

Write as a decimal.

7. $\frac{4}{5}$ _____ 8. $\frac{5}{9}$ _____
9. $\frac{3}{25}$ _____ 10. $\frac{7}{15}$ _____
11. $\frac{5}{27}$ _____ 12. $3\frac{2}{3}$ _____
13. $2\frac{5}{16}$ _____ 14. $1\frac{8}{11}$ _____

Write as a fraction.

15. 0.555... _____
16. $0.\overline{23}$ _____
17. 0.363 63... _____
18. $0.8\overline{3}$ _____

Write as a mixed number.

19. 2.1333... _____
20. 3.074 074... _____

Write >, <, or = between each of the following.

21. $\frac{5}{6}$ ☐ 0.83
22. $\frac{7}{8}$ ☐ $0.\overline{87}$
23. $\frac{7}{11}$ ☐ $0.\overline{63}$
24. $\frac{4}{15}$ ☐ $0.\overline{26}$
25. $\frac{4}{33}$ ☐ $0.1\overline{2}$
26. $\frac{72}{99}$ ☐ 0.727
27. $\frac{2}{9}$ ☐ 0.2
28. $\frac{11}{18}$ ☐ $0.6\overline{1}$

29. **a)** Find the decimal equivalent for each of the following.

$\frac{1}{9}$ _____ $\frac{4}{9}$ _____ $\frac{7}{9}$ _____

b) Describe the pattern.

_____

_____

c) Use the pattern to predict the decimal equivalent for each of the following.

$\frac{2}{9}$ _____ $\frac{5}{9}$ _____ $\frac{8}{9}$ _____ $\frac{13}{9}$ _____

30. Express each amount in dollars and cents.

a) $\$14\frac{2}{5}$ _____ b) $\$8\frac{3}{8}$ _____

c) $\$25\frac{5}{6}$ _____ d) $\$12\frac{7}{15}$ _____

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5.8 Order of Operations

MATHPOWER™ *Eight*, pp. 198–199

B	E	DM	AS
Brackets	Exponents	Divide and multiply in order from left to right.	Add and subtract in order from left to right.

Express all answers in lowest terms.

Complete the table.

	a	b	$a + b$	$a - b$	$a \times b$	$a \div b$
1.	$\frac{3}{5}$	$\frac{1}{4}$				
2.	$\frac{7}{8}$	$\frac{2}{3}$				
3.	$1\frac{1}{6}$	$\frac{1}{2}$				
4.	$1\frac{3}{4}$	$1\frac{1}{3}$				
5.	$2\frac{1}{2}$	$1\frac{4}{5}$				

Underline the part of each question to be calculated first, then simplify each one.

6. $\frac{1}{2} - \frac{1}{3} \div \frac{3}{4} + \frac{2}{5}$ _____

7. $\frac{1}{5} + \frac{1}{5} \times \frac{1}{4} \div \frac{2}{3}$ _____

8. $\frac{1}{4} \times \left(\frac{3}{5} + \frac{2}{3}\right) \div 1\frac{1}{2}$ _____

9. $\frac{2}{3} \div \frac{1}{4} - \frac{1}{8} + \frac{2}{5}$ _____

Calculate.

10. $\frac{1}{3} \times \left(\frac{1}{4}\right)^2$ _____

11. $\left(\frac{1}{8} \times 1\frac{2}{3}\right)^2$ _____

12. $\left(6 \div \frac{1}{3}\right)^2$ _____

13. $\left(3\frac{4}{5} - 1\frac{1}{10}\right)^2$ _____

14. $\left(2\frac{1}{2} + 3\frac{3}{4}\right)^2$ _____

Simplify.

15. $\frac{5}{9} - \frac{1}{2} \times \frac{1}{4} + \frac{1}{3}$ _____

16. $\frac{1}{8} \times \frac{2}{3} + 4 \div 1\frac{1}{2}$ _____

17. $\frac{4}{5} \div \frac{5}{6} - \frac{1}{4} + \frac{2}{5}$ _____

18. $\frac{1}{3} + \frac{1}{3} \times \frac{5}{6} \div \frac{1}{2}$ _____

Calculate.

19. $\frac{1}{3}\left(\frac{1}{4} + \frac{7}{8}\right)$ _____

20. $6\frac{3}{4} \div \left(3\frac{2}{3} - 1\frac{1}{6}\right)$ _____

21. $\frac{7}{8} + 2\frac{3}{4} \div 3\frac{1}{2}$ _____

22. $2\frac{3}{4} + \frac{3}{5} \times 1\frac{1}{4}$ _____

23. $2\frac{3}{5} \times 1\frac{1}{2} + \frac{2}{3}$ _____

24. $7\frac{1}{4} - 3\frac{1}{5} \times 1\frac{1}{4}$ _____

Insert a pair of brackets to make each statement true.

25. $\frac{1}{2} + \frac{2}{3} - \frac{1}{4} \times \frac{2}{5} \div \frac{1}{6} = 6\frac{2}{5}$

26. $\frac{1}{2} + \frac{2}{3} - \frac{1}{4} \times \frac{2}{5} \div \frac{1}{6} = \frac{17}{30}$

27. $\frac{1}{2} + \frac{2}{3} - \frac{1}{4} \times \frac{2}{5} \div \frac{1}{6} = 3\frac{9}{10}$

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Test One CHAPTER 5: Fractions

MATHPOWER™ *Eight*, pp. 177–205

Write each improper fraction as a mixed number.

1. $\frac{23}{5}$ _____ 2. $\frac{29}{6}$ _____

3. $\frac{19}{4}$ _____ 4. $\frac{23}{3}$ _____

Write each mixed number as an improper fraction.

5. $1\frac{3}{5}$ _____ 6. $4\frac{1}{8}$ _____

7. $2\frac{3}{10}$ _____ 8. $3\frac{5}{9}$ _____

Find the missing value.

9. $\frac{3}{5} = \frac{9}{\square}$ 10. $\frac{4}{9} = \frac{\square}{27}$

11. $\frac{\square}{5} = \frac{21}{35}$ 12. $\frac{4}{\square} = \frac{16}{28}$

Order the fractions from smallest to largest.

13. $\frac{3}{4}, \frac{1}{8}, \frac{3}{5}, \frac{7}{10}$ _____

14. $\frac{1}{3}, \frac{4}{9}, \frac{2}{5}, \frac{9}{15}$ _____

15. $1\frac{1}{2}, \frac{5}{6}, 1\frac{7}{12}, \frac{3}{4}, 1\frac{2}{3}$ _____

Simplify. Write your answers in lowest terms.

16. $\frac{1}{3} + \frac{1}{4}$ _____ 17. $\frac{7}{9} - \frac{1}{6}$ _____

18. $\frac{3}{4} \times \frac{1}{3}$ _____ 19. $\frac{7}{12} \div \frac{2}{3}$ _____

20. $1\frac{1}{3} + 2\frac{1}{4}$ _____ 21. $2\frac{5}{6} - 1\frac{3}{5}$ _____

22. $1\frac{2}{5} \times 1\frac{1}{3}$ _____ 23. $1\frac{3}{4} \div \frac{1}{6}$ _____

Calculate. Write your answers in lowest terms.

24. $\frac{2}{3} \times \frac{1}{7} + \frac{1}{2}$ _____

25. $1\frac{1}{3} - \frac{3}{4} \times \frac{1}{3}$ _____

26. $\frac{4}{9} + \frac{7}{12} - \frac{5}{6}$ _____

27. $\frac{1}{3}$ of $8 + \frac{1}{4} - \frac{5}{12}$ _____

28. $\frac{3}{4} - \left(\frac{1}{3} \times \frac{7}{8}\right) \div \frac{3}{4}$ _____

29. $\left(3\frac{1}{2} \times 1\frac{3}{4}\right) - \left(\frac{3}{8}$ of $4\right)$ _____

30. $\left(3\frac{1}{2} + \frac{2}{3}\right) \times \frac{2}{5}$ _____

31. $2\frac{1}{4} \div \left(\frac{1}{2} + \frac{2}{5}\right)^2$ _____

Write each fraction as a terminating or repeating decimal.

32. $\frac{1}{6}$ _____ 33. $\frac{5}{8}$ _____

34. $\frac{11}{15}$ _____ 35. $\frac{9}{20}$ _____

36. $\frac{4}{9}$ _____ 37. $\frac{17}{25}$ _____

Write each decimal as a fraction in lowest terms.

38. 0.32 _____ 39. 0.9 _____

40. 1.25 _____ 41. $0.\overline{7}$ _____

42. 0.06 _____ 43. 2.55 _____

44. $0.\overline{27}$ _____ 44. $3.\overline{3}$ _____

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6.1 Ratio

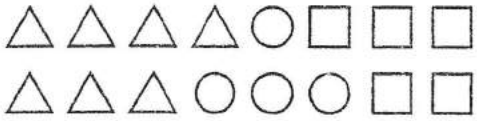
MATHPOWER™ *Eight*, pp. 210–212

A **ratio** is a comparison of numbers with the same units.

The ratio of black to white is $\frac{4}{3}$ or 4:3 or 4 to 3.

As with fractions, ratios can be written in lowest terms.

Use the diagram to express each ratio in 3 ways.



1. triangles to circles

_____ _____ _____

2. all shapes to triangles

_____ _____ _____

3. squares to all shapes

_____ _____ _____

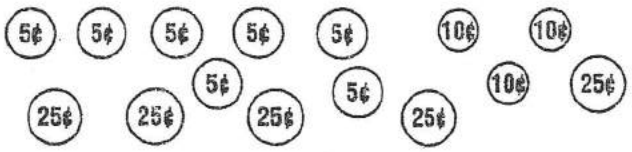
4. squares to triangles

_____ _____ _____

5. circles to squares

_____ _____ _____

Describe the quantities being compared in each of the following ratios.



6. 5:7 _____

7. 3:5 _____

8. 7:3 _____

9. 5:15 _____

10. 7:15 _____

For the names of the months, state the following ratios.

11. the months beginning with J to the months ending in R

_____

12. the months ending with Y to the months beginning with A

_____

13. the months with more than 4 letters to the months with less than 4 letters

_____

14. the months with more than 7 letters to the months with less than 6 letters

_____

Write each ratio in lowest terms.

15. 10 to 15 _____

16. 4:12 _____

17. $\frac{6}{8}$ _____

18. $\frac{14}{4}$ _____

Change each pair of quantities to the same unit and write as a ratio in lowest terms.

19. 40 min to 3 h _____

20. 3 quarters to 15 dimes _____

21. 5 m to 20 cm _____

22. 1 year to 25 days _____

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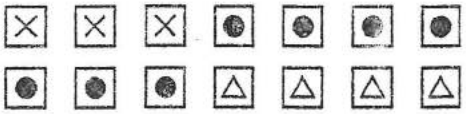
6.2 Three-Term Ratios

MATHPOWER™ *Eight*, p. 213

Use the diagram to write the following ratios.



1. ☒ to ● to △

_____

2. ● to ☒ to all squares

_____

3. all squares to △ to ●

_____

4. △ to all squares to ●

_____

Write each ratio in lowest terms.

5. 9:12:3 _____

6. 7:14:21 _____

7. 100:50:150 _____

8. 16:24:48 _____

9. 10:30:50 _____

10. 63:27:36 _____

11. 12:16:40 _____

12. 36:18:42 _____

13. The annual numbers of days of fog in 3 Canadian cities are as follows.
Saint John 108, Montreal 20, Victoria 28

Write the ratio of days of fog in Saint John to days of fog in Victoria to days of fog in Montreal. Write the ratio in lowest terms.

_____

14. The table shows the number of moons for each planet in the solar system.

Mercury	0
Venus	0
Earth	1
Mars	2
Jupiter	16
Saturn	17
Uranus	15
Neptune	8
Pluto	1

Write the following ratios in lowest terms.

a) moons of Jupiter to moons of Neptune to moons of Mars

_____

b) moons of Saturn to moons of Uranus to moons of Jupiter

_____

15. A cash register contains twenty $2 bills, twelve $5 bills, and eight $10 bills.

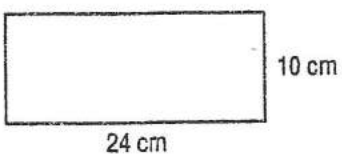
a) What is the ratio of $2 bills to $5 bills to $10 bills? Write the ratio in lowest terms.

_____

b) What is the ratio of the value of the $2 bills to the value of the $5 bills to the value of the $10 bills? Write the ratio in lowest terms.

_____

16.



a) Write the ratio of length to width in the rectangle. Write the ratio in lowest terms.

_____

b) Write the ratio of length to width to perimeter. Write the ratio in lowest terms.

_____

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6.3 Equivalent Ratios and Proportions

MATHPOWER™ *Eight*, pp. 214–215

Equivalent ratios represent the same comparison.

A statement that 2 ratios are equal, such as $\frac{2}{3} = \frac{4}{6}$, is called **a proportion.**

State whether each pair of ratios is equivalent.

1. 1:4 and 3:12 _____
2. 3:2 and 2:3 _____
3. 4:6 and 2:5 _____
4. 5:1 and 25:5 _____
5. $\frac{2}{7}$ and $\frac{4}{21}$ _____
6. $\frac{18}{6}$ and $\frac{3}{1}$ _____
7. 1 to 8 and 7 to 54 _____
8. 4 to 3 and 132 to 99 _____

Find the missing value in each proportion.

9. $\frac{2}{5} = \frac{\square}{20}$
10. $\frac{9}{12} = \frac{3}{\square}$
11. $\frac{\square}{30} = \frac{3}{10}$
12. $\frac{8}{\square} = \frac{56}{49}$
13. 10:11 = □:77
14. 8:3 = 40:□
15. □:42 = 5:6
16. 14:□ = 70:55

Find each unknown value.

17. x:8 = 15:20 ____
18. 3:5 = x:75 ____
19. 6:11 = 72:y ____
20. 8:y = 2:13 ____

21. At the Summer Olympics in Barcelona, Spain, the ratio of Canada's medals to Sweden's medals was 3:2. Sweden won 12 medals. How many medals did Canada win?

_____

22. The ratio of the average life span of a Canadian lynx to an African elephant is 1:2. An African elephant's average life span is 30 years. What is the average life span of a lynx?

_____

23. Write 3 ratios equal to the ratio of Xs to Ys.

a) X X Y
X Y
Y Y Y

_____
_____
_____

b) X Y
X Y X Y
X X Y

_____
_____
_____

24. The ratio of the length to the width of a rectangle is 4:3. The width is 12 cm. What is the length?

_____

25. What is the ratio of the length of a side to the perimeter of a regular pentagon?

_____

22. Calculate the perimeter of a regular hexagon for each of the following side lengths.

a) 2 cm _____
b) 3.5 cm _____
c) 5.2 cm _____
d) 7.4 cm _____

27. In a vote for Student Council president, 4 out of 5 students voted. If 432 votes were cast, how many students were in the school?

_____

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6.4 Rate

MATHPOWER™ *Eight*, pp. 218–219

A **rate** is a comparison of 2 numbers with different units.

A rate is usually written as a **unit rate**, in which the second term is 1.

Complete each proportion.

1. $\frac{18}{2} = \frac{\square}{1}$

2. $\frac{32}{4} = \frac{\square}{1}$

3. $\frac{21}{7} = \frac{\square}{1}$

4. $\frac{48}{12} = \frac{\square}{1}$

5. $\frac{12}{6} = \frac{\square}{1}$

6. $\frac{42}{6} = \frac{\square}{1}$

Complete each statement.

7. 60 crayons in 5 boxes
= _____ crayons/box

8. 400 km in 5 h
= _____ km/h

9. 160 books on 4 shelves
= _____ books/shelf

10. 540 boxes in 45 cartons
= _____ boxes/carton

Write as a unit rate.

11. $1.60 for 8 rolls _____

12. 48 m in 8 s _____

13. $1745 for 5 plane tickets
_____

14. earnings of $61.20 for 8 h
_____

15. $4.90 for 350 g _____

16. $3.28 for 4 L of milk
_____

17. 297.5 km in 3.5 h _____

18. Twelve theatre tickets cost $66. What is the cost of 5 tickets?
_____

19. A jet travelled 4500 km in 6 h. At this rate, how far would the jet travel in

a) 4 h? _____ b) 9 h? _____

c) 5.5 h? _____ d) 7.25 h? _____

20. When a US dollar cost $1.18 Canadian, how much did US $300.00 cost?
_____

21. At summer camp, 336 campers were organized into 14 teams. How many more campers would be needed to make up 18 teams of the same size?
_____

22. There are 468 pages in a book with 13 chapters. About how many pages would you expect to find in 6 chapters?
_____

23. A salesperson travelled 675 km in 9 h. At this rate, how far would he travel in

a) 4 h? _____ b) 7 h? _____

c) 1 h? _____ d) 12 h? _____

24. Suzanne earned $190.50 for working 30 h one week. How much did she earn per hour?
_____

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6.6 Scale Drawings

MATHPOWER™ *Eight*, pp. 224–225

We often use a scale drawing when it is impossible to draw an object to its actual size.

Every scale drawing has a scale. If an object measures 3 cm and the scale is 1:100, the actual length of the object is 100 × 3 cm or 300 cm or 3 m.

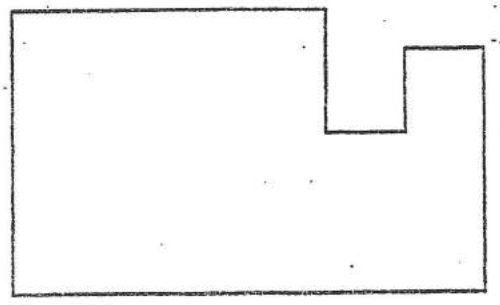
Write each ratio in lowest terms.

1. 3:9 _____
2. 4:16 _____
3. 10:5 _____
4. 36:4 _____
5. 1000:10 _____
6. 0.5:100 _____

Write each scale as a ratio in lowest terms.

7. 10 cm represents 1500 cm _____
8. 1 cm represents 4 m _____
9. 0.5 cm represents 1 m _____
10. 1 cm represents 0.3 cm _____
11. 1 cm represents 200 km _____
12. 2 cm represents 500 km _____
13. 1 cm represents 5 mm _____
14. 0.5 cm represents 50 km _____

15.



a) Measure the dimensions of the diagram. Calculate the perimeter.

_____

b) The scale of the diagram is 1:200. Find the perimeter of the actual region.

_____

16. The length of a Siberian tiger is 2.3 m. A scale diagram is drawn with a scale of 1:20. What is the length of the diagram?

_____

17. The width of a river is represented on a map by 1.25 cm. The actual width is 112.5 m. What is the scale?

_____

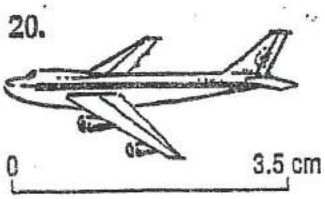
18. The scale drawing of an ant is 12 cm. The scale is 40:1. What is the actual length of the ant?

_____

19. An advertising flyer shows address labels as 4.3 cm by 1.2 cm. The ratio of the flyer label to the actual label is 2:3. What are the dimensions of the actual address labels?

_____

20.



The scale of the drawing is 1:1680. Find the actual length of the jumbo jet.

_____

21. The Empire State building is 441.6 m high. A scale drawing of the building is 15 cm. What is the scale of the drawing?

_____

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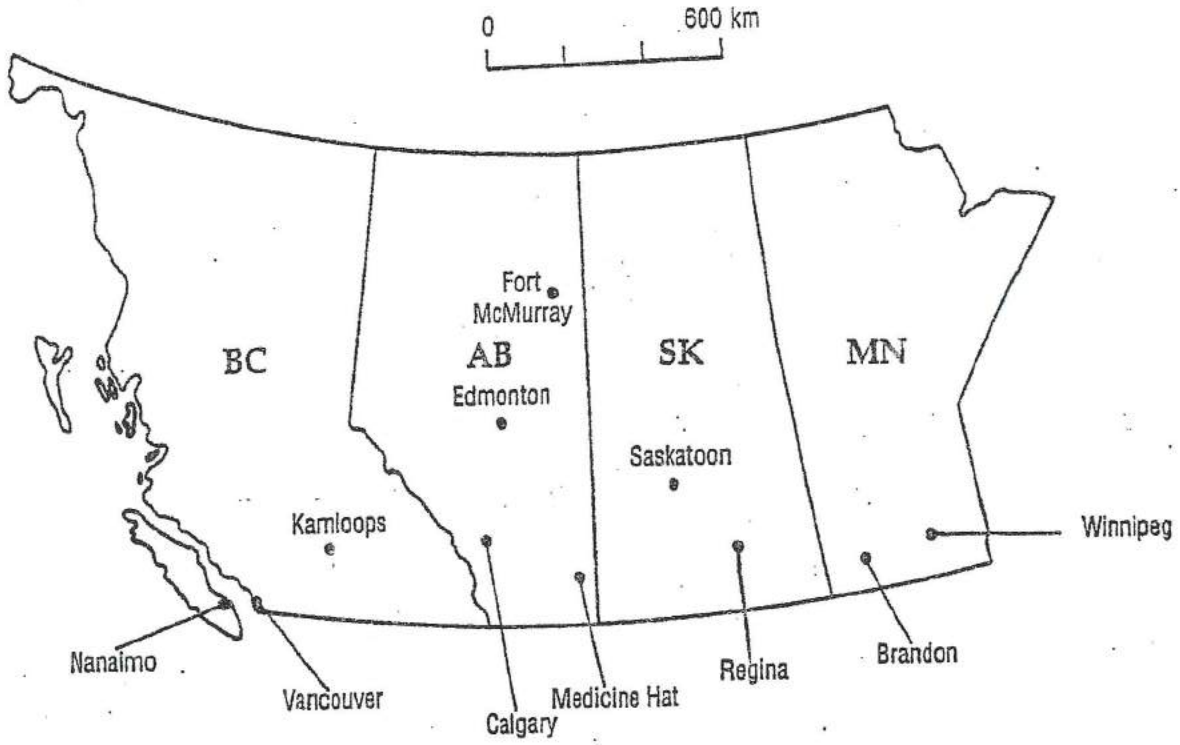
6.7 Maps and Scales

MATHPOWER™ *Eight*, pp. 226–227



1. On a map with a scale of 1:50 000 000, what actual distance, in kilometres, is represented by 4 cm?

2. On a map with a scale of 1:100 000 000, what distance, in centimetres, represents an actual distance of 2500 km?

3. Charlottetown is 976 km from Ottawa. How far apart are they on a map with a scale of 1:20 000 000?

4. On a map, the distance from Halifax to Montreal is 4 cm. The scale is 1:20 000 000. Calculate the actual distance, in kilometres, from Halifax to Montreal.

5. St. John's is 2125 km from Toronto. How far apart are they on a map with a scale of 1:50 000 000?

Use the map of Western Canada, above, to calculate the following distances by air.

6. Vancouver to Regina

7. Winnipeg to Saskatoon

8. Nanaimo to Brandon

9. Kamloops to Edmonton

10. Medicine Hat to Fort McMurray

11. Calculate the distance between the 2 cities that are farthest apart.

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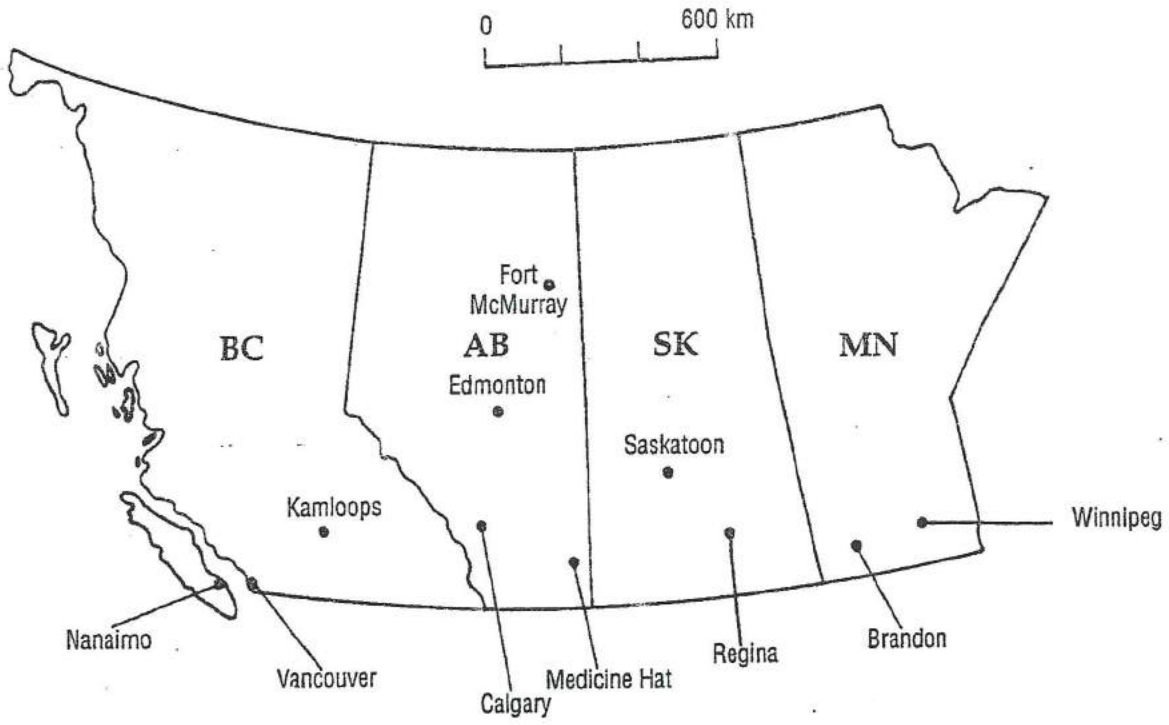
6.7 Maps and Scales

MATHPOWER™ *Eight*, pp. 226–227



1. On a map with a scale of 1:50 000 000, what actual distance, in kilometres, is represented by 4 cm?

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Test One CHAPTER 6: Ratio and Rate

Use the diagram to write the following ratios in lowest terms.

A	A	A	A	B	B	B
C	C	C	C	C	B	B

1. A to B _____

2. C to A _____

3. B to C _____

4. A to B to C _____

5. C to all squares _____

6. A to B to all squares _____

Write each ratio in lowest terms.

7. 30:45 _____ 8. 63:27 _____

9. $\frac{15}{60}$ _____ 10. $\frac{84}{12}$ _____

11. 140 to 70 _____

12. 325 to 450 _____

Change each pair of quantities to the same unit and write as a ratio in lowest terms.

13. 4 mm to 7 cm _____

14. 3 dimes to 4 quarters _____

15. 27 min to 2 h _____

16. 250 g to 3 kg _____

17. 2 km to 500 m _____

18. Shannon drove 507 km in 6.5 h. What was her rate of speed?

_____

Find the missing value in each proportion.

19. $\frac{\square}{7} = \frac{12}{21}$ 20. $\frac{6}{11} = \frac{42}{\square}$

21. $\frac{45}{72} = \frac{\square}{24}$ 22. $\frac{32}{96} = \frac{1}{\square}$

23. 24:□ = 6:5 24. 2:9 = □:45

25. A box of 15 greeting cards costs $5.25. A box of 25 cards costs $7.50. Which is the better buy?

_____

26. On a map with a scale of 1:15 000 000, what actual distance, in kilometres, is represented by 2.5 cm?

_____

27. Calgary is 3000 km from Montreal. How far apart are they on a map with a scale of 1:25 000 000?

_____

28. When the school juice machine was emptied, it contained 45 loonies, 120 quarters, 54 dimes, and 45 nickels.

a) What was the ratio of loonies to quarters?

_____

b) What was the ratio of quarters to dimes to nickels?

_____

c) What was the ratio of the value of loonies to the value of quarters?

_____

d) What was the ratio of the value of dimes to the value of nickels?

_____

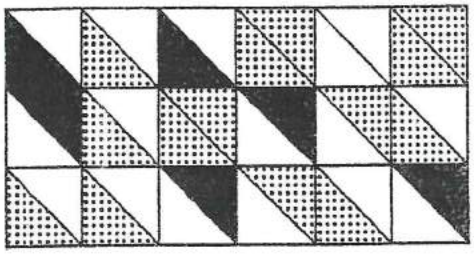
e) The unit cost of the juice was 95¢. How many cans of juice had been purchased?

_____

Test Two CHAPTER 6: Ratio and Rate

MATHPOWER™ *Eight*, pp. 207–233

Use the diagram to write the following ratios in lowest terms.



1. black triangles to white triangles

_____

2. white triangles to all triangles

_____

3. black triangles to dotted triangles

_____

4. all triangles to black triangles

_____

5. black triangles to dotted triangles to all triangles

_____

6. dotted triangles to white triangles

_____

Write each ratio in lowest terms.

7. 20:15 _____

8. 42:28 _____

9. $\frac{13}{65}$ _____

10. $\frac{76}{68}$ _____

11. 16 to 48 _____

12. 165 to 22 _____

13. $\frac{120}{36}$ _____

14. $\frac{284}{68}$ _____

Change each pair of quantities to the same unit and write as a ratio in lowest terms.

15. 7 nickels to 3 quarters _____

16. 55 mm to 2 m _____

17. 1 kg to 300 g _____

18. 65 cm to 4 m _____

19. 1.5 L to 750 mL _____

Complete each proportion.

20. $\frac{6}{7} = \frac{48}{\square}$

21. $\frac{\square}{26} = \frac{1}{13}$

22. $\frac{125}{\square} = \frac{5}{3}$

23. $\frac{4}{1} = \frac{48}{\square}$

24. 10:$\square$ = 2:3

25. 24:96 = $\square$:4

26. Luis bought 350 g of cold meat for $6.80.

a) Calculate the cost for 100 g.

_____

b) Calculate the cost per kilogram.

_____

27. Miro travelled 1360 km in 17 h.

a) At this rate, how far would he travel in 24 h?

_____

b) What was his speed?

_____

28. The scale drawing of a cheetah is 8.5 cm long. The scale is 1:20. What is the actual length of the cheetah?

_____

29. On a map with a scale of 1:65 000 000, what actual distance, in kilometres, is represented by 3.2 cm?

_____

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Extension CHAPTER 6: Ratio and Rate

MATHPOWER™ *Eight*, pp. 207–233

Use the diagram to describe the discs that result in each ratio.

Green	Red	White
○○○ ○○	○○○○ ○○○○	○○○ ○○○○

1. 5:7

2. 8:20

3. $\frac{8}{5}$

4. $\frac{20}{5}$

5. 8:7:5

6. 5:7:20

The ratio of consonants to vowels in the word DECIMAL is 4:3. Find the ratio of consonants to vowels in each of these words.

7. MATHEMATICS

8. FRACTION

9. COMPOSITE

10. SUBTRACTION

The ratio of square numbers to numbers that are not square for the numbers 1 to 24 is 4:20. Find this ratio for each of the following.

11. 1 to 50

12. 1 to 100

13. 101–200

14. 201–500

15. Jeffrey has 100 coins in quarters and loonies. The ratio of quarters to loonies is 13:7.

a) How many of each coin does Jeffrey have?

b) How much money does Jeffrey have?

c) What will be the lowest-terms ratio if he adds 10 of each type of coin?

The student council runs hot dog days. The cost of the hot dogs is 10 for $2.19 when they buy up to 50. For each additional 50 hot dogs, the unit price decreases by 0.5¢ per hot dog. How much will they pay for each number of hot dogs?

16. 100 hot dogs

17. 200 hot dogs

18. 250 hot dogs

19. 400 hot dogs

20. The ostrich is the largest bird and the wandering albatross is the largest flying bird. The ratio of the mass of the ostrich to the mass of the albatross is 38:3. The ratio of the height of the ostrich to the wingspan of the albatross is 3:5.

a) The albatross is 12 kg. What is the mass of the ostrich?

b) The ostrich is 2.4 m tall. What is the wingspan of the albatross?

21. Write four examples of lowest-terms ratios using only composite numbers.

22. During a touring vacation, the Lengs drove about 6 h a day on 6 days. Their speed on major highways was 100 km/h, on secondary highways was 80 km/h, and in city limits was 50 km/h. The ratio of major highway time to secondary highway time to city time was 4:3:2.

a) How far did the Lengs travel at each speed?

b) How far did they drive altogether?

c) What was their average speed?

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7.1 Percents

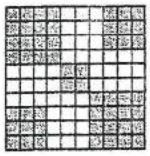
MATHPOWER™ *Eight*, pp. 240–241

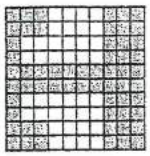
Percent means "out of 100." To express a fraction as a percent, change it to an equivalent fraction with a denominator of 100.

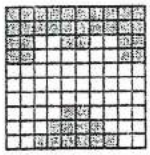
$\frac{3}{5} = \frac{60}{100}$
$= 60\%$

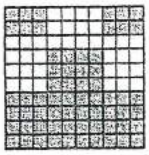
$\frac{6}{8} = \frac{3}{4}$
$= \frac{75}{100}$
$= 75\%$

Express the shaded part of each figure as a percent.

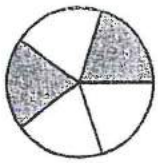
1. 

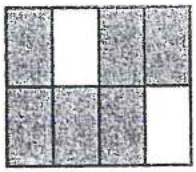
2. 

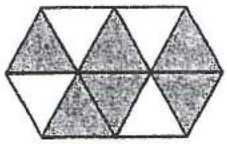
3. 

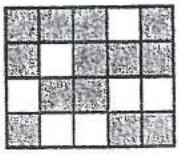
4. 

What percent of each figure is not shaded?

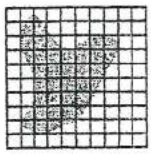
5. 

6. 

7. 

8. 

Estimate the percent shaded.

9. 

10. 

Complete the following.

11. $\frac{2}{5} = \frac{\square}{100} = \square\%$

12. $\frac{29}{50} = \frac{\square}{100} = \square\%$

13. $\frac{\square}{4} = \frac{\square}{100} = 75\%$

14. $\frac{\square}{2} = \frac{\square}{100} = 50\%$

15. $\frac{\square}{20} = \frac{\square}{100} = 85\%$

16. $\frac{13}{25} = \frac{\square}{100} = \square\%$

Write as a percent.

17. $\frac{3}{25}$ _____

18. $\frac{2}{10}$ _____

19. $\frac{37}{50}$ _____

20. $\frac{76}{100}$ _____

21. $\frac{1}{4}$ _____

22. $\frac{21}{25}$ _____

23. $\frac{3}{20}$ _____

24. $\frac{28}{50}$ _____

Write each fraction in lowest terms and then write as a percent.

25. $\frac{12}{30}$ _____, _____

26. $\frac{27}{75}$ _____, _____

27. $\frac{51}{300}$ _____, _____

28. About $\frac{17}{25}$ of British Columbia is covered by forests. What percent of British Columbia is covered by forests?

_____

29. During the winter, only $\frac{1}{4}$ of the surface of Lake Ontario freezes over. What percent of the surface of Lake Ontario does not freeze over?

_____

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7.2 Ratios, Fractions, Decimals, and Percents

MATHPOWER™ *Eight*, pp. 242–243

$1{:}3 = \frac{1}{3}$
$= 0.333$ (nearest thousandth)
$= 0.333 \times 100\%$
$= 33.3\%$

$0.135 = \frac{13.5}{100}$
$= 13.5\%$
or $0.135 = 0.135 \times 100\%$
$= 13.5\%$

$\frac{3}{8} = 3 \div 8$
$= 0.375$
$= 0.375 \times 100\%$
$= 37.5\%$

Express as a percent.

1. 0.23 _____
2. 4:25 _____
3. 7:20 _____
4. $\frac{1}{5}$ _____
5. 0.825 _____
6. $\frac{23}{25}$ _____
7. $\frac{24}{30}$ _____
8. 0.04 _____

Write each fraction as a decimal to the nearest thousandth and as a percent to the nearest tenth, when necessary.

	Fraction	Decimal	Percent
9.	$\frac{1}{4}$		
10.	$\frac{9}{100}$		
11.	$\frac{19}{25}$		
12.	$\frac{4}{15}$		
13.	$\frac{1}{8}$		
14.	$\frac{5}{6}$		
15.	$\frac{7}{12}$		

Write as a decimal.

16. 55% _____
17. 86% _____
18. 7% _____
19. 40% _____
20. 27% _____
21. 3% _____

Write as a decimal.

22. 82.4% _____
23. 0.6% _____
24. $8\frac{1}{2}\%$ _____
25. $21\frac{3}{4}\%$ _____

Complete the table. Fractions are in lowest terms.

	Fraction	Decimal	Percent
26.	$\frac{3}{10}$		
27.		0.84	
28.		0.55	
29.			8%
30.	$\frac{5}{8}$		
31.	$\frac{7}{1000}$		
32.		0.115	
33.			4.5%

Insert $>$, $<$, or $=$ to make each statement true.

34. $\frac{11}{20}$ ☐ 0.45
35. 0.6 ☐ $\frac{5}{7}$
36. $\frac{17}{1000}$ ☐ 0.017
37. 7:8 ☐ 87.5%
38. 0.04 ☐ 40%
39. 0.72 ☐ $\frac{17}{25}$

40. Five of Canada's 34 national parks are in Alberta. What percent of Canada's national parks are in Alberta? Write your answer to the nearest percent.

_____

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7.3 Percent of a Number

MATHPOWER™ *Eight*, pp. 244–245

To find the percent of a number, write the percent as a decimal and then multiply by the number.

32% of 300 = 0.32 × 300
= 96

Calculate.

1. 5% of 45 _____
2. 25% of 524 _____
3. 10% of 125 _____
4. 75% of 32 _____
5. 40% of 88 _____
6. 95% of 80 _____

Calculate.

7. 2.5% of 200 _____
8. 67.5% of 400 _____
9. 22.5% of 90 _____
10. 12.5% of 60 _____
11. 1.25% of 500 _____
12. 45.75% of 1000 _____

Calculate each amount to the nearest cent.

13. 45% of $90.00 _____
14. 3% of $14.25 _____
15. 65% of $135.00 _____
16. 22% of $624.00 _____
17. 3.5% of $48.00 _____
18. 8.5% of $128.00 _____

Insert >, <, or = to make each statement true.

19. 8% of 140 ☐ 80% of 14
20. 15% of 300 ☐ 25% of 200
21. 40% of 9 ☐ 45% of 8
22. 23% of 200 ☐ 36% of 150

Calculate each quantity.

23. 3% of 1200 L _____
24. 40% of 350 g _____
25. 4.5% of 2000 kg _____
26. 18% of 45 t _____

27. Some milk contains 1% butter fat. How many millilitres of butter fat are there in 4 L of this milk?

_____

28. The area of Lake Erie is about 31% of the area of Lake Superior. The area of Lake Superior is 82 100 km^2. What is the area of Lake Erie?

_____

29. Margaret estimated that she saved 8% of her net annual salary. She earned $42 700 last year. How much did she save?

_____

30. A concert hall has a capacity of 4590 audience members. How many people are in the hall when it is 80% full?

_____

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7.5 Discount and Sale Price

MATHPOWER™ *Eight*, p. 249

A discount is a reduction in the cost of an item.

The sale price of an item is its regular price minus the discount.

Estimate and then calculate each discount.

1. 25% off a CD at $22.95

2. 40% off a shirt at $49.50

3. 30% off a pair of shoes at $29.95

4. 20% off a stereo at $499.49

5. 35% off a television at $389.45

Estimate and then calculate each sale price.

6. a $1878 computer at 10% off

7. a $12.50 T-shirt at 15% off

8. a $379.99 bicycle at 20% off

9. a $3.99 pair of socks at 5% off

10. a $49.95 pair of jeans at 30% off

11. At the end of the summer, a plant store reduced the original price of its flowering shrubs by 10% the first week, 20% the second week, and 30% the third week. Calculate the price of a $34.79 shrub during each week.

12. The Camera Shop is selling a camera for 20% off the regular price of $349.98. The Photo Place is selling the same camera for 25% off its regular price of $379.99.

a) What is the sale price at the Camera Shop?

b) What is the sale price at the Photo Place?

c) Which store has the lower sale price and by how much?

Complete the table for each amount.

	Price	Rate of Discount	Amount of Discount	Sale Price
13.	$219.50	30%		
14.	$39.95	40%		
15.	$955.00	15%		
16.	$1869.49	20%		
17.	$87.90	35%		

At the end of the day, the Bake Shop reduced the prices of its baked goods by 25%. Calculate the discount and the sale price of each item.

18. rye bread at $2.95

19. gingerbread at $4.29

20. dinner rolls at $1.98

21. cheesecake at $7.50

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7.6 PST and GST

MATHPOWER™ *Eight*, p. 250

The **Goods and Services Tax** (GST) is a federal government tax.
The rate is the same for all provinces.

The **Provincial Sales Tax** (PST) is a rate determined by each province.
In some provinces, the PST is calculated on the selling price only.
In other provinces, the PST is calculated on the sum of the selling price and the Goods and Services Tax (GST).

Estimate the GST and PST in your province.

	Item	Price	GST	PST
1.	Shirt	$30.00		
2.	Car	$17 000.00		
3.	Book	$6.50		
4.	Boots	$79.00		
5.	Clock	$45.50		

Calculate the total cost, including the GST and PST in your province.

	Item	Price	GST	PST	Total Cost
6.	Shampoo	$2.99			
7.	Watch	$32.50			
8.	Stereo	$450.00			
9.	Bicycle	$279.49			
10.	Jacket	$125.50			

11. How much more GST do you pay on a $410.00 item than on a $350.00 item?

_____

12. A pair of ice skates regularly costs $65.00. They are discounted 20%. Calculate the total cost in your province, including all taxes.

_____

13. A calculator costs $49.45. How much does it cost in a province that has a PST rate of 8%?

_____

14. A tennis racquet costs $89.50. How much do you save when the store advertises that it will pay the GST?

_____

15. A laser printer is on sale for $1959.00. The regular price is $2385.00.

a) What is the total cost of the printer, including taxes in your province, if you buy it on sale?

_____

b) How much is saved in taxes in your province by buying the printer on sale?

_____

A computer catalogue is offering some special prices on software. Calculate the GST, the PST, and the total cost of each of the following in your province.

16. a desktop publishing package for $699.00

_____ _____ _____

17. a word processing package for $329.00

_____ _____ _____

18. a drawing package for $79.00

_____ _____ _____

19. a screen saver package for $49.00

_____ _____ _____

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7.7 Commission

MATHPOWER™ *Eight*, p. 251

The **commission** on an item is the percent of the selling price that a salesperson earns when he or she sells the item.

Selling price = \$7340

Commission rate = 6%

Commission = 6% of \$7340
= 0.06 × \$7340
= \$440.40

Calculate the commission for each of the following sales.

1. \$4500 at 4% _____
2. \$12 200 at 6% _____
3. \$3250 at 5% _____
4. \$245 at 8% _____
5. \$75 000 at 3% _____
6. \$5270 at 4% _____
7. \$625 at 12% _____
8. \$21 800 at 2% _____
9. \$140 000 at 6% _____
10. \$365 000 at 5% _____

11. Mala works in a furniture store. She earns \$8.50/h, plus 3% commission. Calculate her earnings for a 25-h week in which her sales were \$6345.00.

_____

12. Joseph paid 6% commission to the real estate agent who sold his house for \$159 000.00. How much commission did Joseph pay?

_____

13. Maria works in a shoe store where she is paid \$480.00 a week, plus 2% commission. In one month, she had weekly sales of \$1420.00, \$1148.50, \$897.75, and \$1648.00. Calculate her earnings for the month.

_____

14. Chris earns \$1200 per month salary, plus commission of 2.5% of sales, for selling tools. In one month, Chris sold \$8352 worth of tools. What were Chris' total earnings for the month?

_____

15. Inga can earn \$375 per week in a plant store, or she can earn 3% of total sales. How much would Inga have to sell to earn more in commission than in salary?

_____

A real estate company charges 6% commission on house sales. The clerk who processes each sale earns 1.5% of the commission. What is the total commission and the clerk's commission for each of these house sales?

16. \$145 800

_____

_____

17. \$189 300

_____

_____

18. \$108 000

_____

_____

19. \$225 500

_____

_____

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7.8 Finding the Percent

MATHPOWER™ *Eight*, pp. 252–253

To find what percent one number is of another, write the numbers as a ratio, determine the decimal equivalent, and multiply by 100%.

16 is what percent of 64?

$$\frac{16}{64} = 0.25$$

$$0.25 \times 100\%$$

$$= 25\%$$

What percent is each of the following?

1. 18 of 25 _____

2. 96 of 200 _____

3. 16 of 80 _____

4. 240 of 480 _____

5. 15 of 24 _____

6. 36 of 45 _____

Calculate each percent in questions 7–12, to the nearest tenth.

7. 24 is what percent of 96?

_____

8. 48 is what percent of 350?

_____

9. 85 is what percent of 485?

_____

10. What percent of 9.6 is 6.9?

_____

11. What percent of 2.4 is 0.5?

_____

12. What percent of 65 is 48?

_____

13. Out of 250 questions in a trivia book, Janine answered 155 and was correct on 124.

a) What percent of all the questions did she have correct?

_____

b) What percent of the questions she answered did she have correct?

_____

14. At the Winter Olympics in Albertville, France, Canada won 7 medals. Of these medals, 3 were silver. What percent of the medals were silver?

_____

15. On average, 124 days of the year in St. John's, Newfoundland, have fog. What percent of the days have fog?

_____

16. The school volleyball team played 24 games. They won 15 games and tied 3 games.

a) To the nearest tenth, what percent of their games did they win?

_____

b) To the nearest tenth, what percent of their games did they tie?

_____

c) To the nearest tenth, what percent of their games did they lose?

_____

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7.9 100% of a Number

MATHPOWER™ *Eight*, pp. 256–257

To find 100% of a number, first find 1% of the number and then multiply by 100, or write as a proportion and solve.

20% of what number is 15?

Method 1

20% is 15

1% is $\frac{15}{20} = 0.75$

100% is $0.75 \times 100 = 75$

Method 2

$$\frac{20}{100} = \frac{15}{x}$$

$$\frac{20 \times 0.75}{100 \times 0.75} = \frac{15}{x}$$

$$\frac{15}{75} = \frac{15}{x}$$

$$75 = x$$

Complete the statements.

1. 16% of a number is 12.
   1% of the number is ☐.
   100% of the number is ☐.

2. 24% of a number is 36.
   1% of the number is ☐.
   100% of the number is ☐.

3. 75% of a number is 48.
   1% of the number is ☐.
   100% of the number is ☐.

Find the missing value.

4. $\frac{30}{100} = \frac{75}{\square}$

5. $\frac{8}{100} = \frac{32}{\square}$

6. $\frac{64}{100} = \frac{40}{\square}$

7. $\frac{12}{100} = \frac{9}{\square}$

Find the number.

8. 20% of a number is 8. _____

9. 45% of a number is 31.5. _____

10. 48% of a number is 43.2. _____

Find the number.

11. 25% of a number is 20. _____

12. 35% of a number is 12.25. _____

13. 8% of a number is 16. _____

Find each amount.

14. 14% is $72.24. _____

15. 48% is $13.92. _____

16. 75% is $937.50. _____

17. 4.5% is $2.25. _____

18. In an election survey, 28% of the people asked said that they would vote for a particular candidate. How many people were surveyed if 112 said they would vote for the candidate?

_____

19. During one season, John Olerud, of the Toronto Blue Jays, hit the ball 36.3% of the times at bat. He got 200 hits that season. How many times was he at bat?

_____

20. Brennan paid $50.75 for the 7% GST on his stereo equipment. What was the price of the equipment?

_____

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7.9 100% of a Number

MATHPOWER™ *Eight*, pp. 256–257

To find 100% of a number, first find 1% of the number and then multiply by 100, or write as a proportion and solve.

20% of what number is 15?

Method 1

20% is 15

1% is $\frac{15}{20} = 0.75$

100% is $0.75 \times 100 = 75$

Method 2

$$\frac{20}{100} = \frac{15}{x}$$

$$\frac{20 \times 0.75}{100 \times 0.75} = \frac{15}{x}$$

$$\frac{15}{75} = \frac{15}{x}$$

$$75 = x$$

Complete the statements.

1. 16% of a number is 12.
   1% of the number is ☐.
   100% of the number is ☐.

2. 24% of a number is 36.
   1% of the number is ☐.
   100% of the number is ☐.

3. 75% of a number is 48.
   1% of the number is ☐.
   100% of the number is ☐.

Find the missing value.

4. $\frac{30}{100} = \frac{75}{\square}$

5. $\frac{8}{100} = \frac{32}{\square}$

6. $\frac{64}{100} = \frac{40}{\square}$

7. $\frac{12}{100} = \frac{9}{\square}$

Find the number.

8. 20% of a number is 8. _____

9. 45% of a number is 31.5. _____

10. 48% of a number is 43.2. _____

Find the number.

11. 25% of a number is 20. _____

12. 35% of a number is 12.25. _____

13. 8% of a number is 16. _____

Find each amount.

14. 14% is $72.24. _____

15. 48% is $13.92. _____

16. 75% is $937.50. _____

17. 4.5% is $2.25. _____

18. In an election survey, 28% of the people asked said that they would vote for a particular candidate. How many people were surveyed if 112 said they would vote for the candidate?

_____

19. During one season, John Olerud, of the Toronto Blue Jays, hit the ball 36.3% of the times at bat. He got 200 hits that season. How many times was he at bat?

_____

20. Brennan paid $50.75 for the 7% GST on his stereo equipment. What was the price of the equipment?

_____

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7.10 Percents Greater Than 100%

MATHPOWER™ *Eight*, p. 258

Percents greater than 100% can be written as fractions or decimals.

$$130\% = \frac{130}{100}$$
$$= \frac{13}{10} \text{ or } 1.3$$

Numbers greater than 1 can be written as percents.

$$3\frac{1}{4} = \frac{13}{4}$$
$$= \frac{325}{100}$$
$$= 325\%$$

Write each percent as a decimal.

1. 300% _____
2. 440% _____
3. 152% _____
4. 270% _____
5. 1410% _____
6. 2500% _____

Write as a percent.

7. 4 _____
8. 2.4 _____
9. 1.45 _____
10. 12 _____
11. 7.25 _____
12. 25.75 _____

Express as a percent.

13. $1\frac{1}{4}$ _____
14. $\frac{6}{5}$ _____
15. $\frac{7}{4}$ _____
16. $2\frac{3}{4}$ _____
17. $3\frac{3}{8}$ _____
18. $5\frac{17}{25}$ _____

Calculate.

19. 200% of 48 _____
20. 110% of 50 _____
21. 260% of 520 _____
22. 350% of 407 _____
23. 1000% of 68 _____
24. 154% of 606 _____

Calculate each amount to the nearest cent.

25. 140% of $32.00 _____
26. 250% of $92.00 _____
27. 325% of $125.00 _____
28. 114% of $58.50 _____
29. 404% of $116.75 _____
30. 105% of $48.24 _____

31. Last year, the price of a ticket to a football game was $17.50. This year the price is $19.60. What percent of last year's price is this year's price?

_____

32. In 1990, 1 482 096 households in Canada had a compact disc player. In 1991, the number of households with a compact disc player was 183% of the number in 1990. How many households had a compact disc player in 1991? Write your answer to the nearest whole number.

_____

33. In some provinces, the cost of an item, including taxes, can be calculated by multiplying the cost of the item by 100% plus the rate of the taxes. Calculate the total cost of each restaurant bill by multiplying by 115%.

a) $18.70 _____ b) $64.95 _____

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7.11 Simple Interest

MATHPOWER™ *Eight*, p. 259

Interest is an amount paid on money borrowed or invested. The money you deposit or borrow is called the **principal**. The total of the principal and the interest is called the **amount**.

The formula to calculate simple interest is

$$I = Prt,$$

where I is the interest, P is the principal, r is the rate of interest, and t is the time in years.

Complete the table for interest earned after one year for each deposit.

	Principal	Interest Rate	Interest	Amount
1.	$700	5%		
2.	$3400	6.5%		
3.	$11 500	10%		
4.	$2400	8.4%		
5.	$480	12%		

Complete the table for each loan.

	Principal	Rate	Time (years)	Interest	Amount
6.	$360	11%	2		
7.	$12 000	9.5%	5		
8.	$840	10%	4.5		
9.	$5500	12.5%	2.5		
10.	$22 000	8.2%	7		

11. Melanie deposited $850.00 in a savings account that earned 5.5% interest per year. How much interest did she earn in 3 years?

_____

12. Jacob has a $2500.00 savings bond. It earns 9% per year. How much money does he have after 6 years?

_____

13. Pierre earned $78.75 interest on his savings bonds in one year. If he had $750.00 in bonds, what was the rate of interest paid?

_____

14. Karina earned $296.65 interest on her savings in two years. The interest rate was 8.5%. How much were her savings?

_____

15. Brian borrowed $22 000 to buy a car. The rate of interest was 9.5% and the length of time was 5 years.

a) How much interest will Brian pay?

_____

b) What will be Brian's total cost for his car?

_____

16. Complete the chart to show the compounded interest and the principal for each year.

Year	Principal	Rate	Interest	Amount
1	$25 000	7%	$1750	$26 750
2	$26 750			
3				
4				
5				

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Test One CHAPTER 7: Percent

MATHPOWER™ *Eight*, pp. 235–263

Write each fraction as a percent.

1. $\frac{3}{5}$ _____
2. $\frac{6}{8}$ _____
3. $\frac{13}{20}$ _____
4. $\frac{7}{25}$ _____
5. $\frac{7}{10}$ _____
6. $\frac{36}{40}$ _____

Write each percent as a fraction in lowest terms.

7. 40% _____
8. 74% _____
9. 86.5% _____
10. 12% _____
11. 117% _____
12. 4% _____

Write each percent as a decimal.

13. 58% _____
14. 137% _____
15. $7\frac{1}{2}\%$ _____
16. 48.4% _____
17. $62\frac{3}{4}\%$ _____
18. 14.8% _____

Write each decimal as a percent.

19. 0.32 _____
20. 0.05 _____
21. 1.42 _____
22. 0.145 _____
23. 4.8 _____
24. 5.04 _____

Calculate.

25. 28% of 300 _____
26. 50% of 78 _____
27. 82% of 214 _____
28. 62% of 870 _____

Calculate each percent.

29. 94 of 200 _____
30. 25 of 500 _____
31. 24 of 120 _____
32. 495 of 1100 _____

Find the number.

33. 20% of a number is 145. _____
34. 72% of a number is 40.32. _____
35. 60% of a number is 120. _____
36. 5% of a number is 48. _____

37. The area of Prince Edward Island is about 55% of the area of Cape Breton Island. The area of Cape Breton Island is 10 311 km^2. What is the area of Prince Edward Island?

_____

38. A jacket regularly priced at $68.00 is on sale for 25% off.

a) Calculate the discount.

_____

b) Calculate the total cost, including taxes in your province.

_____

39. Malcolm earns $500 plus 2.5% of his sales in a music store. How much did he earn if his sales were $3475?

_____

40. In 3 years, Kateri earned $228 interest at $9\frac{1}{2}\%$ on the savings bonds her parents gave her. How much were the bonds worth?

_____

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Test Two CHAPTER 7: Percent

MATHPOWER™ *Eight*, pp. 235–263

Complete the chart. Write fractions in lowest terms.

	Fraction	Decimal	Percent
1.		0.04	
2.	$\frac{17}{25}$		
3.			114%
4.	$\frac{3}{5}$		
5.		4.5	
6.			80%

Write each fraction as a percent to the nearest tenth.

7. $\frac{1}{6}$ _____ 8. $\frac{2}{3}$ _____ 9. $\frac{5}{11}$ _____

10. $\frac{5}{9}$ _____ 11. $\frac{7}{12}$ _____ 12. $\frac{4}{7}$ _____

Calculate.

13. 14% of 250 _____ 14. 7.5% of 70 _____

15. 58% of 165 _____ 16. 125% of 136 _____

Write the original price as a percent of the new price, to the nearest tenth.

	Original Price	New Price	Percent
17.	$3.46	$7.10	
18.	$18.76	$55.80	
19.	$160.49	$208.60	
20.	$84.60	$68.32	

Calculate each amount.

21. 25% of $48.00 _____ 22. 74% of $184.00 _____

23. 42% of $324.50 _____ 24. 80% of $2045.00 _____

25. 118% of $465.00 _____ 26. 8% of $64.00 _____

27. 30% of a number is 1988.

a) What is the number? _____

b) What is 150% of the number? _____

Calculate the discount price of each item during a "20% off" sale and then calculate the GST and PST for your province.

	Item	Original Price	Discount Price	GST	PST
28.	Scarf	$12.50			
29.	Wallet	$49.98			
30.	Jacket	$155.45			
31.	Gloves	$32.50			

32. Natalie earns $250 per week, plus commission, for selling luggage. In one week, she earned a total of $439.70, with sales of $5420. What is Natalie's rate of commission?

_____

33. Interest is being paid on a savings account at a rate of 8.5% per year. How much would be in an account if the following amounts of interest were paid?

a) $72.75 _____ b) $45.50 _____ c) $140.65 _____

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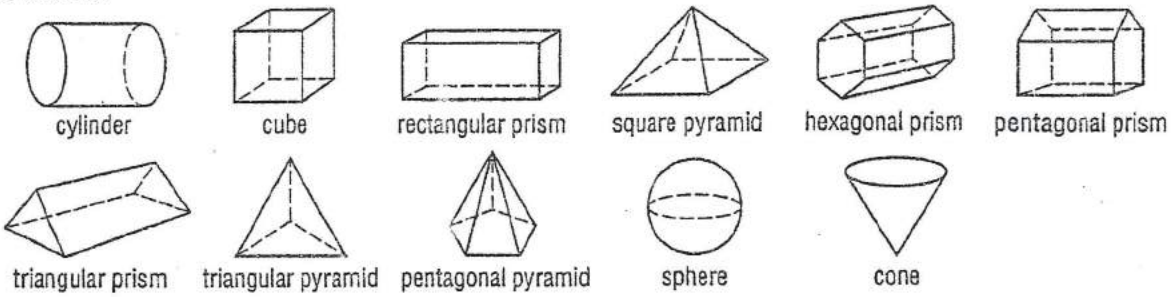
8.1 Three-Dimensional Solids

MATHPOWER™ *Eight*, pp. 268–269

There are many different three-dimensional shapes in a set of geometric solids.



A **polyhedron** is a three-dimensional figure with faces that are polygons.

Use the solids shown at the top of the page to list the following.

1. all the solids with at least one rectangular or square face

2. all the solids with no triangular faces

3. all the solids with at least one circular face

4. all the solids with more than 5 flat faces

Name the geometric solid suggested by each object.

5. 

6. 

7. 

8. 

9. 

10. 

Sketch a three-dimensional figure for each description. Name each figure.

11. 6 rectangular faces

12. 5 triangular faces, 1 pentagonal face

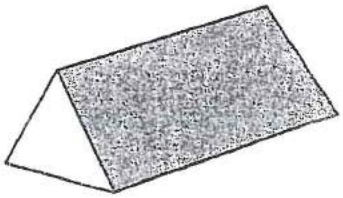
13. 2 triangular faces, 3 rectangular faces

14. 4 triangular faces

15. a) Describe how a prism and a pyramid are different.

b) Describe how they are alike.

16. Show on the diagram how four identical triangular prisms can be used to form another triangular prism.



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Name _____

8.2 Solids, Shells, and Skeletons

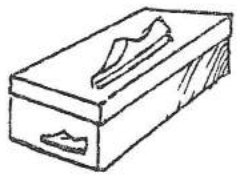
MATHPOWER™ *Eight*, pp. 272–273

A **solid** is a three-dimensional object whose interior is completely filled.
A **shell** is a three-dimensional object whose interior is empty.
A **skeleton** is a representation of the edges of a polyhedron.

In a polyhedron one face of the figure is called the **base**.
The line segment where two faces meet is called an **edge**.
The point at which edges of a polyhedron meet is called a **vertex**.

Identify each object as a solid, a shell, or a skeleton.

1.

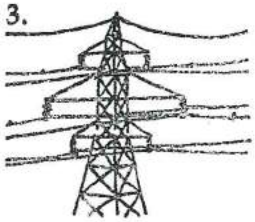


_____

2.

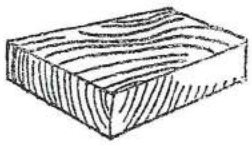
_____

3.



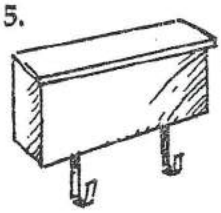
_____

4.



_____

5.



_____

6.

_____

State the number of each face needed to make the shell of each polyhedron.

7. rectangular prism

_____

8. pentagonal prism

_____

9. hexagonal pyramid

_____

Write the number of faces, edges, and vertices for each polyhedron.

	Polyhedron	*F*	*E*	*V*
10.	rectangular prism			
11.	pentagonal prism			
12.	hexagonal pyramid			
13.	cube			
14.	triangular pyramid			

Sketch a polyhedron that matches each description. Name each one.

15. 5 vertices, 8 edges

_____

16. 6 vertices, 9 edges

_____

17. 12 vertices, 18 edges

_____

18. 6 vertices, 10 edges

_____

19. Name at least one example of each of the following that can be found in the school gymnasium.

a) solid _____

b) shell _____

c) skeleton _____

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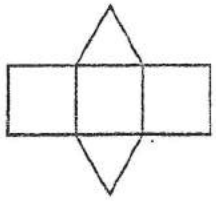
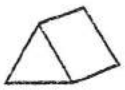
8.3 Nets of Three-Dimensional Shapes

MATHPOWER™ *Eight*, pp. 274–275

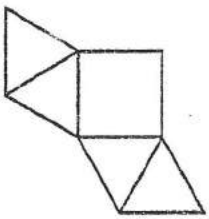
A pattern that can be folded to form a polyhedron is called a **net**.

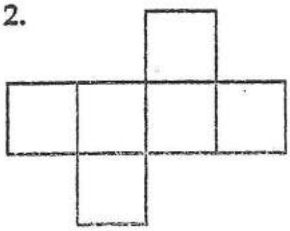


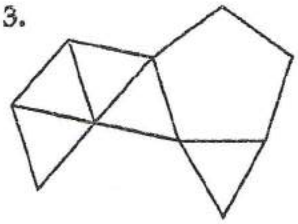


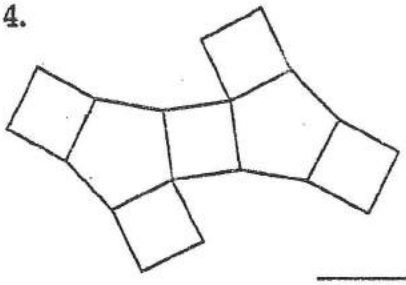
triangular prism

Sketch and name the polyhedron formed by each net.

1. 

2. 

3. 

4. 

5. The cereal box is a rectangular prism. Draw the net of the cereal box.

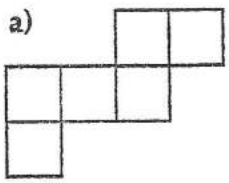
Draw the net of each of the following polyhedra.

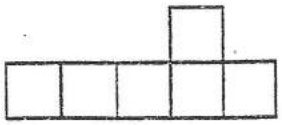
6. triangular pyramid

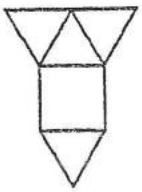
7. hexagonal prism

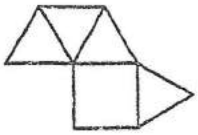
8. triangular prism

Which one of each pair of nets can be formed into a polyhedron? Name the polyhedron.

9. a) 

b) 

10. a) 

b) 

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8.4 Points of View

MATHPOWER™ *Eight*, pp. 278–279

Objects often look very different to us, depending on our point of view, or **perspective**.

1. Sketch the chair as it looks from each point of view.

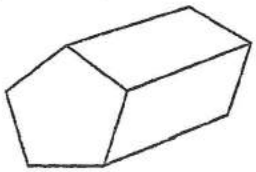
a) side

b) top

c) front

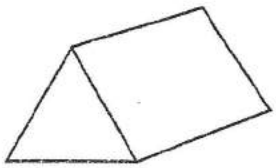
Draw the front view, side view, and top view of each figure.

2.



front side top

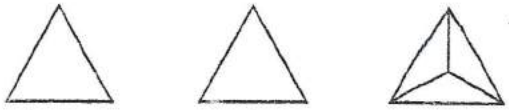
3.



front side top

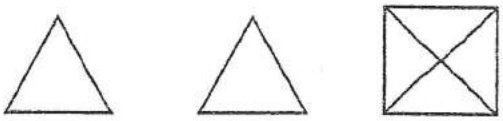
Name each three-dimensional shape.

4.



front side top

5.

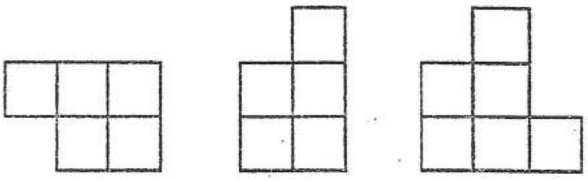


front side top

6.

front side top

7. The diagrams show 3 views of a model made with cubes.



top view right side view front view

a) How many cubes are in the model?

b) Sketch the back view of the model.

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8.5 Sketching Three-Dimensional Shapes

MATHPOWER™ *Eight*, pp. 280–281

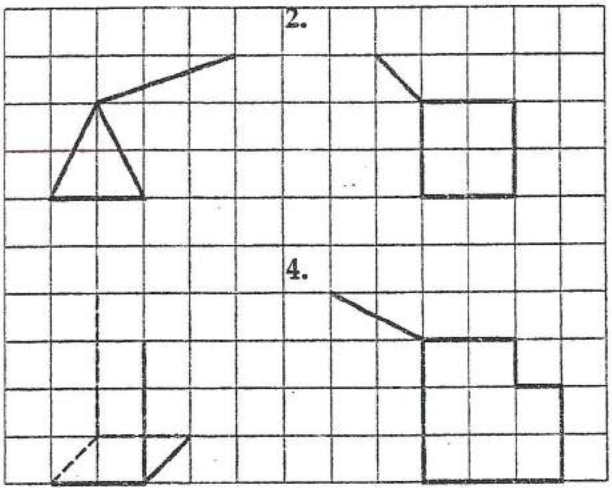
There are several ways to draw three-dimensional shapes using perspective.

You can use grid or dot paper, draw congruent bases, or use a vanishing point.

Complete the drawing of each of the following three-dimensional shapes on grid paper.

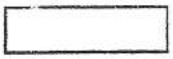
1. 2.

3. 4.



Use the vanishing point to complete each drawing.

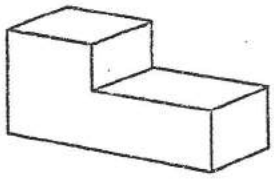
5. V.P.



6. V.P.

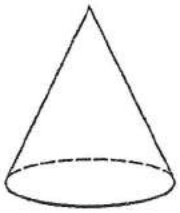
Draw the given views of each figure.

7.



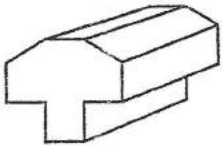
a) front b) bottom left

8.



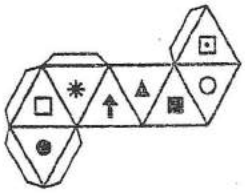
a) bottom right b) top

9.



a) right b) top left

10. The diagram shows the net of an octahedron and the top right view of the octahedron.



Draw the octahedron as it would be seen from each view.

a) top b) bottom

c) back d) top left

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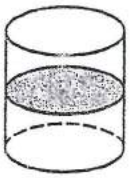
8.6 Planes of Symmetry

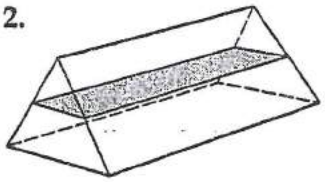
MATHPOWER™ *Eight*, pp. 282–283

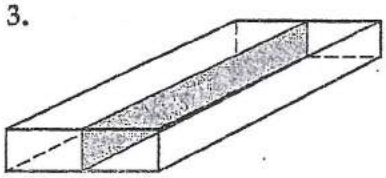
A **line of symmetry** cuts a polygon into 2 congruent parts that are reflection images of each other.

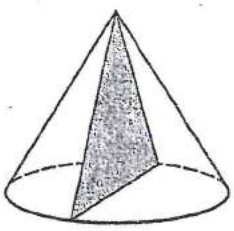
A **plane of symmetry** cuts a polyhedron into 2 congruent parts that are reflection images of each other.

State whether each plane is a plane of symmetry.

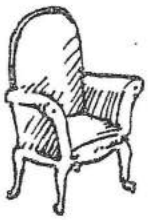
1. 

2. 

3. 

4. 

Show any planes of symmetry on each object.

5. 

6. 

7. 

8. 

Sketch each of the following polyhedra and show all the planes of symmetry.

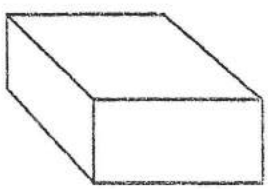
9. regular pentagonal prism

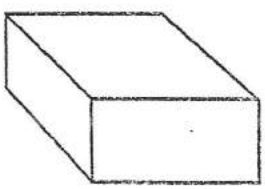
10. square pyramid

11. equilateral triangular prism

12. cube

13. A block of wood can be cut into 8 congruent pieces in at least 2 different ways. Show 2 ways.

a) 

b) 

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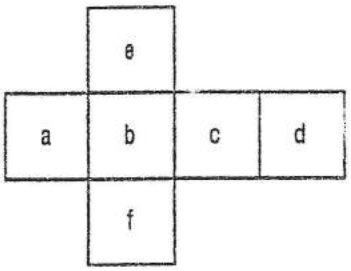
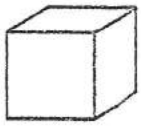
8.7 Surface Areas of Polyhedra

MATHPOWER™ *Eight*, pp. 284–285

The **surface area** of a figure is the sum of the areas of all its faces.

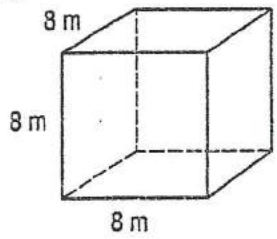
surface area = areas of a + b + c + d + e + f



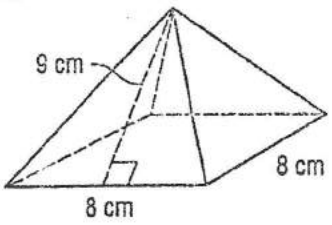


Draw the net and calculate the surface area of each polyhedron.

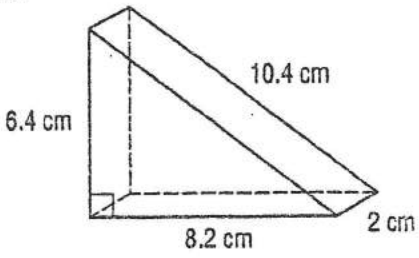
1.



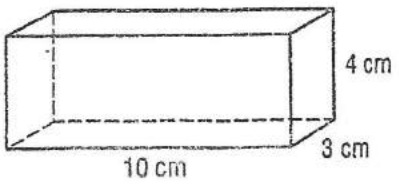
2.



3.

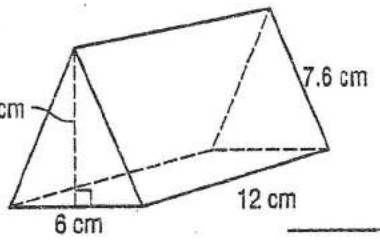


4.

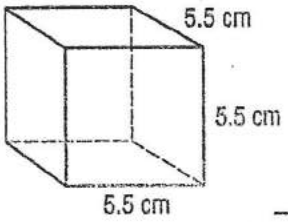


Calculate the surface area.

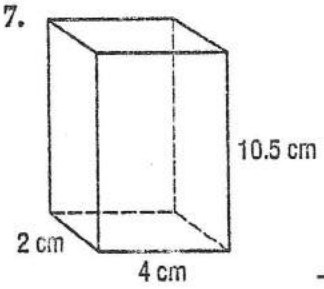
5.



6.

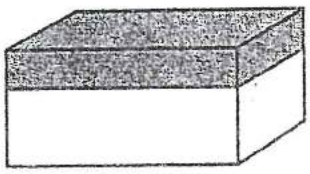


7.



8. A box of facial tissues is 22 cm by 10.5 cm by 8 cm. How much cardboard is on the outside surface?

9. A storage box is 60 cm long, 45 cm wide, and 30 cm high. The lid is 10 cm high. What is the surface area of the box and its lid?



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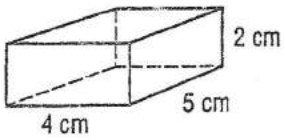
8.8 Volumes of Prisms

MATHPOWER™ *Eight*, pp. 286–287

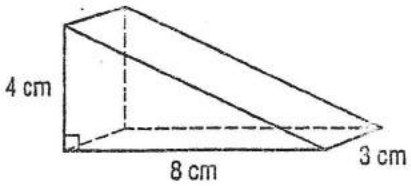
The **volume of a prism** is the area of the base multiplied by the height of the prism.



Area of base $4 \times 5 = 20$

Volume $20 \times 2 = 40$

The volume is 40 cm^3.



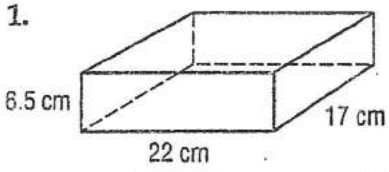
Area of base $\frac{1}{2} \times 4 \times 8 = 16$

Volume $16 \times 3 = 48$

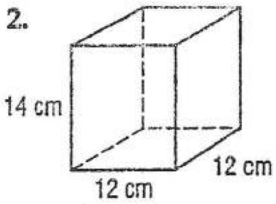
The volume is 48 cm^3.

Calculate the volume of each prism.

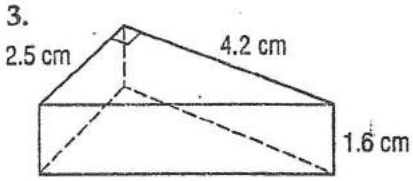
1.



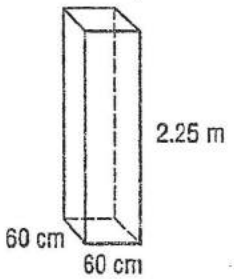
2.



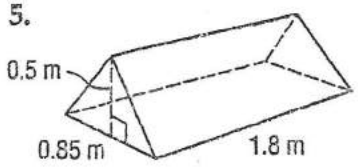
3.



4.

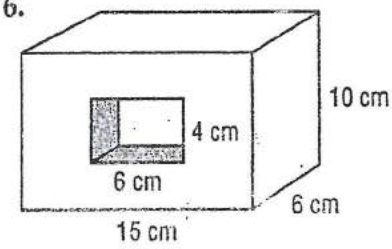


5.

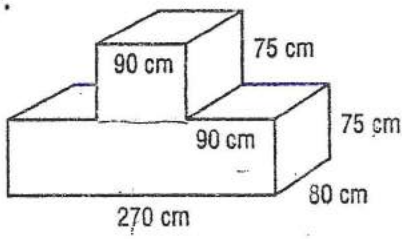


Find the volume.

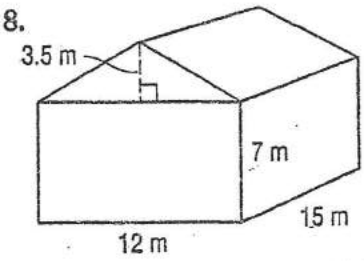
6.



7.



8.



9. a) An aquarium is filled to 3 cm from the top. How much water is in the aquarium if it is 75 cm long, 42 cm wide, and 48 cm high?

b) What is the total volume of the aquarium?

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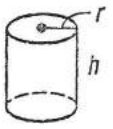
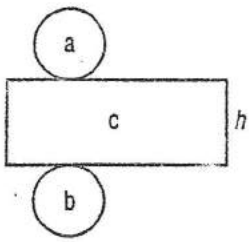
8.9 Surface Area and Volume of a Cylinder

MATHPOWER™ *Eight*, pp. 288–289



Volume = area of base × height
$= \pi r^2 \times h$

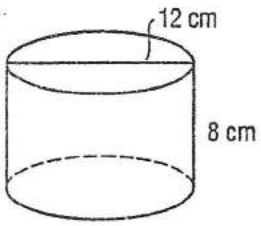


Surface area = areas of a + b + c
$= \pi r^2 + \pi r^2 + (\pi d \times h)$

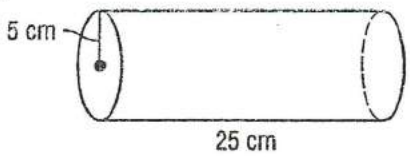
Use $\pi = 3.14$.

Calculate the surface area and the volume of each cylinder.

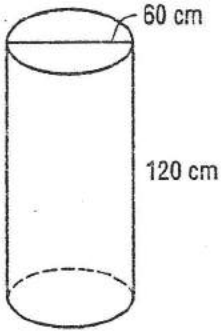
1.



2.



3.



4. A flour canister is 25 cm tall and has a diameter of 20 cm. It is filled to 3 cm from the top. What volume of flour does it contain?

5. A juice can is 16 cm tall and has a diameter of 9 cm. The ends of the can are tin and the body is cardboard.

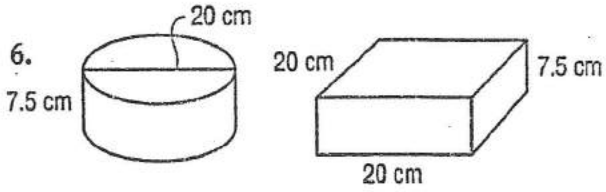
a) What is the volume of the can?

b) What area of tin is used?

c) What area of cardboard is used?

d) What is the total surface area?

6.



a) Which shape has the greater surface area?

b) By how much is it greater?

c) Which shape has the greater volume?

d) By how much is it greater?

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8.10 Mass
8.11 Capacity

MATHPOWER™ *Eight*, pp. 290–291

The mass of an object is the measure of the amount of matter the object is made up of. The base measure of mass is the gram.

1000 mg = 1 g
1000 g = 1 kg
1000 kg = 1 t

Capacity is the greatest volume a container can hold. Capacity is usually measured in litres or millilitres.

1000 cm^3 = 1000 mL = 1 L

Complete.

1. 300 g = _____ kg
2. 4800 kg = _____ t
3. 6 g = _____ mg
4. 2.1 t = _____ kg
5. 75 mg = _____ g
6. 1650 mL = _____ L
7. 820 cm^3 = _____ mL
8. 7500 cm^3 = _____ L
9. 600 L = _____ cm^3
10. 0.5 L = _____ mL

State the unit that would be used to measure the mass of each of the following.

11. a bag of oranges _____
12. a bunch of grapes _____
13. a box of cereal _____
14. a loaf of bread _____
15. a truck load of sand _____
16. a vitamin tablet _____

State the capacity unit that would be used to measure each of the following.

17. a container of frozen yogurt _____
18. a bottle of shampoo _____
19. a barrel of oil _____
20. a drop of medicine _____
21. a box of laundry detergent _____

22. A can of juice concentrate has a capacity of 355 mL. The concentrate is mixed with 3 cans of water.

a) How much juice is made? _____

b) How many full 250-mL glasses can be poured?

_____

23. The average mass of a moose is 700 kg. The average mass of a Siberian tiger is 250 kg. How many times heavier is the moose?

_____

24. A teapot has a capacity of 1.2 L. How many full 200-mL cups of tea can be poured from a full pot of tea?

_____

25. A box of laundry detergent has a capacity of 10 L. How many loads of laundry can be washed if each load uses a 190-mL scoop?

_____

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8.12 Volume, Capacity, and Mass

MATHPOWER™ *Eight*, pp. 292–293

The following relationship exists between the capacity, volume, and mass of water.

$$1\ \text{L} = 1000\ \text{cm}^3 = 1\ \text{dm}^3 = 1\ \text{kg}$$

Express each volume in a unit of capacity.

1. $2500\ \text{cm}^3$ _____

2. $750\ \text{cm}^3$ _____

3. $15\,000\ \text{cm}^3$ _____

4. $150\ \text{dm}^3$ _____

5. $5\ \text{m}^3$ _____

6. $6.3\ \text{m}^3$ _____

7. $85\ \text{m}^3$ _____

8. $27.6\ \text{dm}^3$ _____

State the mass of each volume of water.

9. $650\ \text{cm}^3$ _____

10. $8\ \text{dm}^3$ _____

11. $25\,000\ \text{cm}^3$ _____

12. $6\ \text{m}^3$ _____

13. $3000\ \text{cm}^3$ _____

14. $42\ \text{dm}^3$ _____

15. $25\ \text{m}^3$ _____

16. $120\ \text{m}^3$ _____

State the volume of each mass of water.

17. 450 g _____

18. 10 kg _____

19. 8 t _____

20. 2500 mg _____

21. 16.2 kg _____

22. 145 g _____

23. What mass of water could a 750-cm^3 container hold?

_____

24. What is the capacity of a container that has a volume of $450\ \text{cm}^3$?

_____

25. A swimming pool is 25 m long, 15 m wide, and 2.4 m deep. It is filled to a depth of 1.2 m.

a) What is the volume of water in the pool, in cubic metres?

_____

b) What is the capacity of the pool, in kilolitres?

_____

c) What is the mass, in tonnes, of water in the pool?

_____

26. A water holding tank has a diameter of 15 m and is 9 m high. It is filled to a depth of 6 m.

a) What is the capacity of the tank?

_____

b) What is the volume of the water being held in the tank?

_____

c) What mass of water is in the tank?

_____

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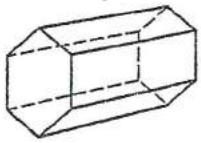
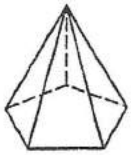
Test One CHAPTER 8: Three-Dimensional Geometry

MATHPOWER™ *Eight*, pp. 265–301

Name each polyhedron and state its number of faces, edges, and vertices.

1. 

2. 

Draw a net for each polyhedron.

3. rectangular prism

4. triangular pyramid

Draw the top, front, and side views of each three-dimensional shape.

5. hexagonal prism

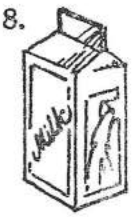
top front side

6. pentagonal pyramid

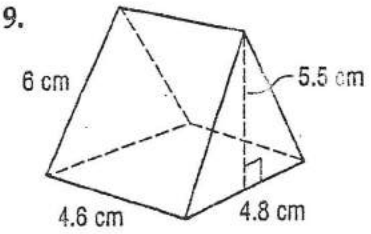
top front side

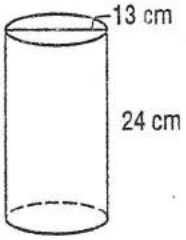
Show any planes of symmetry.

7. 

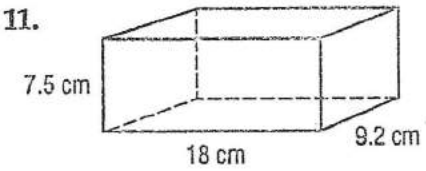
8. 

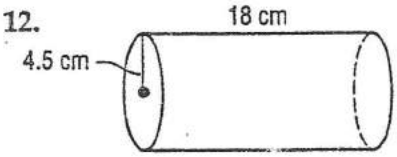
Calculate the surface area.

9. 

10. 

Calculate the volume.

11. 

12. 

13. The average mass of a grizzly bear is 336 kg. The average mass of a giraffe is 1175 kg. How many times lighter is the grizzly bear? Write your answer to the nearest tenth.

14. A juice jug has a capacity of 1.4 L.

a) How many full 125-mL glasses of juice can be poured from a full jug?

b) How much juice is left over?

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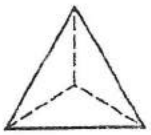
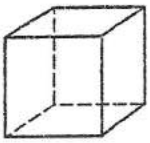
Test Two CHAPTER 8: Three-Dimensional Geometry

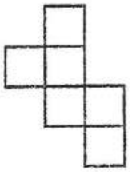
MATHPOWER™ *Eight*, pp. 265–301

Name each polyhedron and state its number of faces, edges, and vertices.

1. 

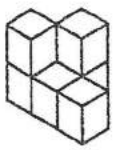
2. 

Name and sketch the polyhedron made from each net.

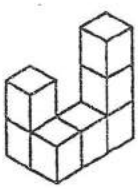
3. 

4. 

Draw the top, front, and side views of each model built with cubes.

5. 

top front side

6. 

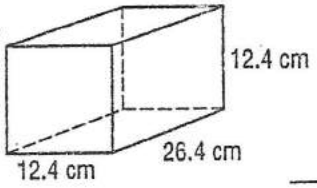
top front side

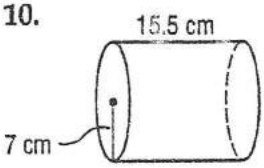
Show any planes of symmetry.

7. 

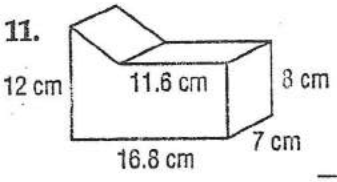
8. 

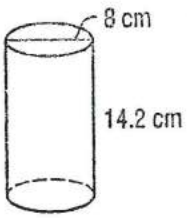
Calculate the surface area.

9. 

10. 

Calculate the volume.

11. 

12. 

13. Brian's mass at birth was 4026 g. At one year of age his mass was 10 433 g. How many times greater was his mass at one year? Write your answer to the nearest tenth.

14. A container has the shape of a rectangular prism. Its inside dimensions are 10 cm by 8 cm by 14 cm.

a) Find the volume of water, in cubic decimetres, the container holds.

b) Find the mass of water, in kilograms, the container holds.

c) Find the capacity, in litres, of the container.

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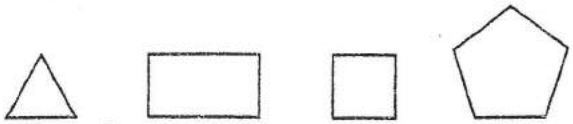
Extension CHAPTER 8: Three-Dimensional Geometry

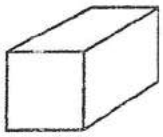
MATHPOWER™ *Eight*, pp. 265–301

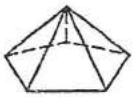
Each of the shapes is worth the given value.

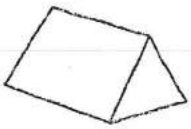


equilateral triangle	rectangle	square	regular pentagon
$1.50	$2.75	$3.00	$5.25

Calculate the cost of constructing each of the following solids.

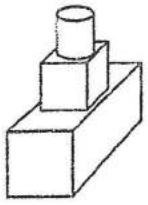
1. 

2. 

3. 

4. Name the Platonic Solids and calculate the cost of constructing each one.

5. A rectangle, a square, and a cylinder are used to form this figure. Sketch the figure as it would be seen from the following views.



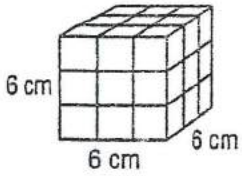
a) top

b) front

c) side

d) bottom

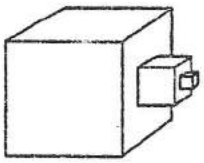
6. The outside surfaces of a cube are painted blue. The cube is cut into 27 congruent cubes.

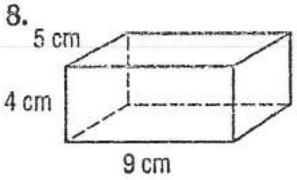


a) Calculate the surface area of the painted surfaces of the small cubes.

b) Calculate the surface area of the unpainted surfaces of the small cubes.

7. The side lengths of each cube in the diagram are 3 times longer than the cube to its right. The volume of the middle cube is 27 cm^3. What is the volume of the other 2 cubes?



8. 

The dimensions of the rectangular prism are shown. Predict, then calculate the answer to each of the following.

a) What is the effect on the volume of the prism if the length is increased by 1 cm?

b) What is the effect on the surface area of the prism if the length is increased by 1 cm?

c) What is the effect on the volume of the prism if the width is increased by 1 cm?

d) What is the effect on the surface area of the prism if the width is increased by 1 cm?

e) What is the effect on the volume of the prism if the height is increased by 1 cm?

f) What is the effect on the surface area of the prism if the height is increased by 1 cm?

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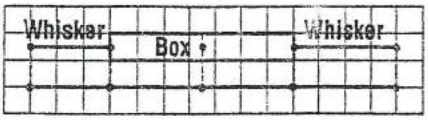
9.9 Box-and-Whisker Plots

MATHPOWER™ *Eight*, p. 326

A **box-and-whisker** plot is a diagram that shows how the data in a set are distributed.

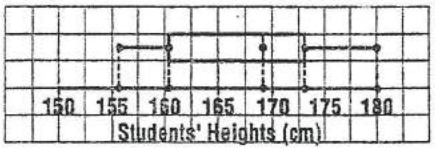


About 50% of the data lie within the box. Each whisker contains about 25% of the data.

To construct a box-and-whisker plot, you need to know the highest value, the lowest value, the median, the upper quartile, and the lower quartile.
The **upper quartile** refers to the median of the values that are greater than the median of the set of data.
The **lower quartile** refers to the median of the values that are less than the median of the set of data.

---

1. The heights of 26 grade 8 students are shown on the box-and-whisker plot.



a) What is the median height of the students?

b) About how many students were taller than 173 cm?

2. The number of medals won by several countries at the 1992 Summer Olympics is given.

Country	Number of Medals
China	54
Cuba	31
Hungary	30
South Korea	29
France	29
Australia	27
Spain	22
Britain	20
Italy	19
Canada	18

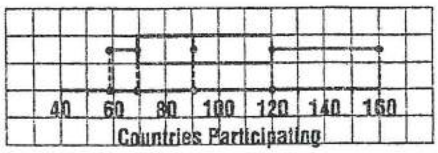
Display the data on a box-and-whisker plot.

3. The maximum speeds for some animals are given, in kilometres per hour.

Animal	Speed (km/h)	Animal	Speed (km/h)
Cheetah	113	Elephant	40
Wildebeest	80	Hyena	64
Elk	72	Greyhound	63
Giraffe	51	Zebra	64
Coyote	69	Grizzly Bear	48

Display the data on a box-and-whisker plot.

4. The number of countries participating in 11 Summer Olympics is shown on the box-and-whisker plot.



a) What is the median number of countries?

b) About how many games had fewer than 70 countries participating?

c) About how many games had more than 120 countries participating?

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Name _____

9.10 Possible Outcomes

Possible outcomes refer to all the possible results of an experiment.
When you flip a coin, the possible outcomes are head and tail.

The possible outcomes are sometimes called the **sample space**.

Equally likely outcomes have the same chance of occurring.

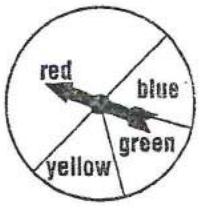
You can use a **tree diagram** to help you list the possible outcomes.

In questions 1 to 5, list the possible outcomes of each experiment. If the outcomes are not equally likely, circle the most likely outcome.

1. 

Spin the spinner.

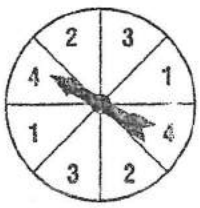
2. Toss a coin and roll a die.

3. 

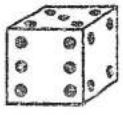
Spin the spinner.

4. Choose one letter without looking.

O	U	T	C	O	M	E

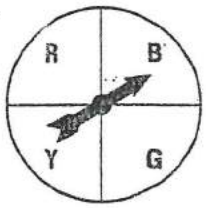
5. 

Spin the spinner and roll a die.

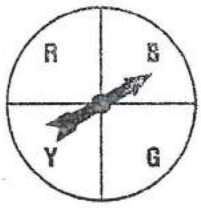


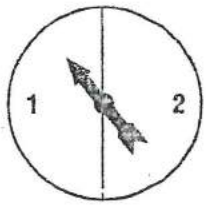
6. Draw a tree diagram to find the possible outcomes.

a) Spin each spinner.



b) Toss a quarter and spin each spinner.





7. a) List the possible outcomes when you roll 2 dice.

b) How many possible outcomes are there?

c) How many possible outcomes total 5?

d) What total happens most often? In how many ways does it happen?

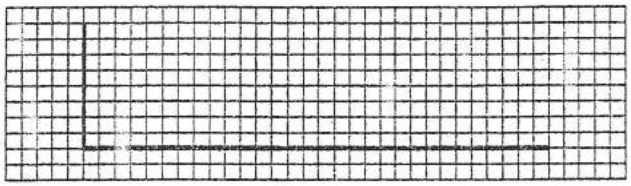
e) What totals happen least often?

Test One CHAPTER 9: Statistics and Probability

1. The chart shows the amount of protein in a single serving of several foods.

Food	Protein (g)
Cottage Cheese	17
Spinach	3
Pumpkin Pie	6
Chicken Pie	23
Tomato Soup	7
2% Partly Skimmed Milk	15
Potato Salad	5
Liver	15

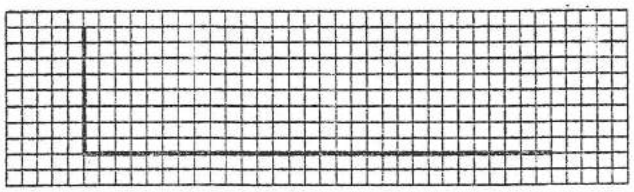
Display these data on a horizontal bar graph.



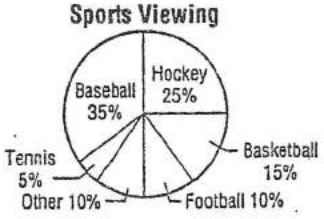
2. The chart shows the average daily temperatures one week in London, Ontario.

Day	Temperature (°C)	Day	Temperature (°C)
Mon.	15	Fri.	20
Tues.	12	Sat.	18
Wed.	17	Sun.	16
Thurs.	21		

Display these data on a broken-line graph.



3. The circle graph shows the results of a survey that asked students for their favourite sport to watch on television.



In a school population of 420 students, how many chose each sport?

a) Baseball _____ b) Hockey _____

c) Football _____ d) Basketball _____

e) Tennis _____ f) Other _____

4. Find the mean, median, and mode of each set of values.

a) 29, 27, 23, 28, 30, 23, 28

Mean: _____ Median: _____

Mode: _____

b) 67, 49, 83, 60, 79, 49

Mean: _____ Median: _____

Mode: _____

c) 43, 74, 75, 57, 85, 32

Mean: _____ Median: _____

Mode: _____

5. The list shows the heights, in centimetres, of the students in a grade 8 class.
157, 162, 159, 164, 157, 171, 173, 158, 181, 176, 154, 165, 152, 163, 174, 167, 157, 160, 150, 156, 173, 175, 162, 159, 161, 161

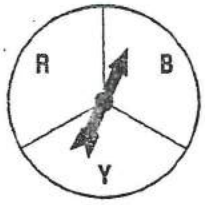
a) Construct a stem-and-leaf plot.

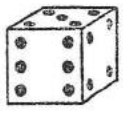
b) Find the median height. _____

c) What is the mode? _____

d) What is the range? _____

6. Spin the spinner and roll the die.





a) List all the possible outcomes.

_____

_____

b) Find $P(B, 6)$. _____

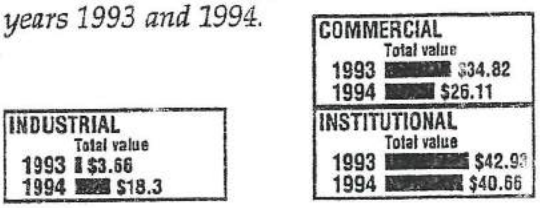
c) Find $P(R, \text{even number})$. _____

d) Find $P(B \text{ or } Y, \text{odd number})$. _____

Extension CHAPTER 9: Statistics and Probability

MATHPOWER™ *Eight*, pp. 305–343

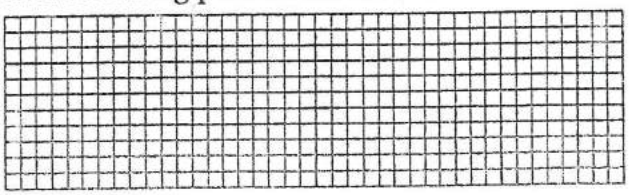
The graphs show the value, in millions of dollars, of the commercial, industrial, and institutional building permits in one city for the years 1993 and 1994.



1. By how much did each type of building permit increase or decrease from 1993 to 1994?

_____

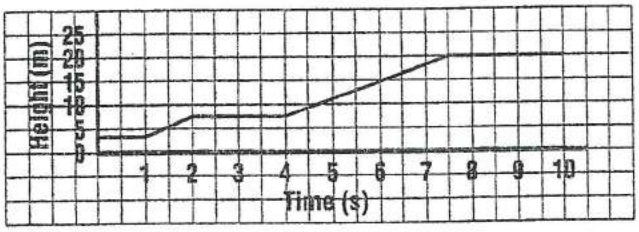
2. The value of residential building permits in 1993 was \$86.71 million and in 1994 was \$72.9 million. Draw a graph to show the total value of all building permits for 1993 and 1994.



3. To the nearest hundredth, what percent of the 1993 total value is the 1994 total value?

_____

The graph shows the path followed by a flag being raised on a flagpole.



4. Explain what is happening at 0 s.

_____

5. Describe in your own words what is happening to the flag as shown in the graph.

_____

6. What is the height of the flagpole?

_____

7. What is the average speed at which the flag is raised?

_____

8. Find the mean of each set of numbers.

a) 0.35, 3.5, 35 b) $\frac{1}{4}, \frac{2}{3}, \frac{5}{6}$ c) $0.5, \frac{3}{4}, 1.25, 2\frac{3}{10}$

_____ _____ _____

9. Write the median number between each pair.

a) 20 and 36 b) 0.6 and 2.4 c) $\frac{1}{4}$ and $\frac{5}{12}$

_____ _____ _____

10. The mean of two numbers is 15. One number is –4. What is the other number?

_____

11. Write 9 numbers with a mean and median of 4.

_____

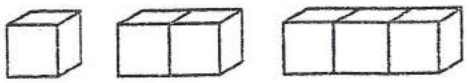
12. Bushra used letter cards to make the word PROBABILITY. She laid them face down on the table. If Bushra turned over 1 card at a time, what is the probability that she would turn over

a) a B? _____ b) a P? _____

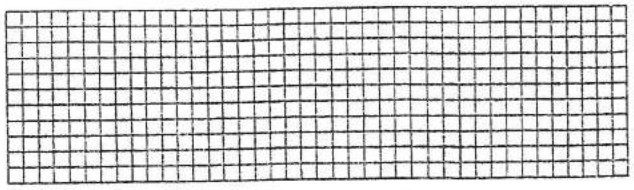
c) a vowel? _____ d) a consonant? _____

If 2 cards were turned over at once, what is the probability of turning over

e) the same 2 letters? _____

13.  . . .

a) Construct a broken-line graph to show the surface area when 1-cm linking cubes are joined side by side as shown.



b) Use your graph to predict the surface area of 25, 50, and 100 cubes.

_____ _____ _____

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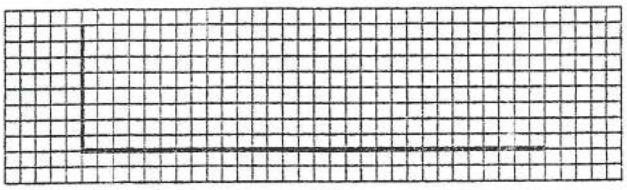
Test Two CHAPTER 9: Statistics and Probability

MATHPOWER™ *Eight*, pp. 305–343

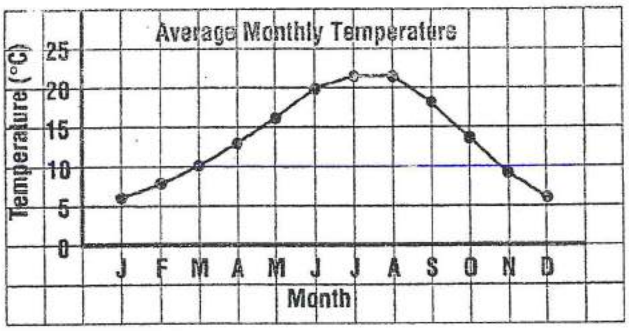
1. The chart shows the number of calories in a single serving of several foods.

Food	Calories
Brown Rice	100
Pea Soup	145
Skimmed Milk	90
Orange Juice	110
Egg	80
Pancake	60
Roast Turkey	200

Display this information on a bar graph.



2. The broken-line graph shows the average monthly temperature one year in Victoria, British Columbia.



a) What was the highest average temperature?

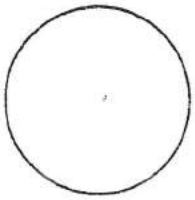
_____

b) What was the lowest average temperature?

_____

c) How much greater was the average temperature in July than the average temperature in October? _____

3. Jarrod spent last Saturday doing the following activities. Sleeping: 10 h, Eating: 2 h, Shopping: 2.5 h, Reading: 1.5 h, Watching TV: 3 h, Doing Homework: 2 h, Playing Outside: 3 h
Display these data on a circle graph.



4. Find the mean, median, and mode of each set of values.

a) 119, 123, 107, 112, 99, 120, 107

Mean: _____ Median: _____

Mode: _____

b) 34, 41, 40, 38, 43, 40, 41, 34

Mean: _____ Median: _____

Mode: _____

c) 149, 206, 164, 158, 197, 191

Mean: _____ Median: _____

Mode: _____

5. The list shows the average number of wet days per year in several Canadian cities.

120, 121, 113, 108, 120, 156, 137, 156, 102, 107, 133, 103, 121, 131, 152, 104

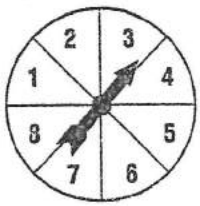
a) Construct a stem-and-leaf plot.

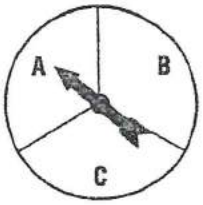
b) Find the mean, median, and mode.

_____

_____

6. Spin each spinner.





a) List all the possible outcomes.

_____

_____

b) Find $P(4, C)$. _____

c) Find P(even number, vowel). _____

d) Find P(odd number, consonant).

_____

e) Find $P(9, A)$. _____

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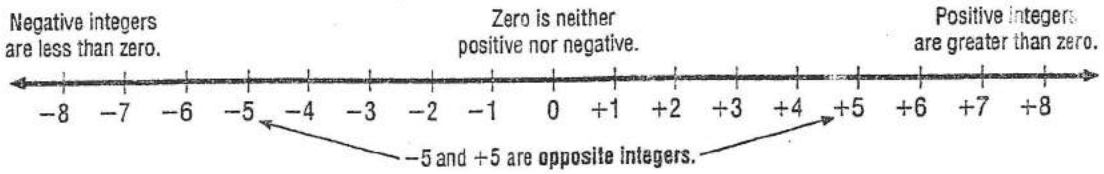
10.1 Integers

MATHPOWER™ *Eight*, pp. 348–349

Integers include positive whole numbers, negative whole numbers, and zero.

Integers can be represented on a number line.



Write in symbols.

1. positive seven _____
2. negative eleven _____
3. negative one _____
4. zero _____
5. positive thirty _____

State the opposite of each integer.

6. −4 _____ 7. +6 _____
8. +17 _____ 9. −9 _____
10. −1 _____ 11. +48 _____

Write as an integer.

12. going up four floors

_____

13. a profit of forty-five dollars

_____

14. a loss of eighteen kilograms

_____

15. eight strokes below par

_____

16. two hundred metres below sea level

_____

17. fifteen degrees above zero

_____

Write the integers that are shown on each number line.

18. 

_____

19. 

_____

20. 

_____

Show the following integers on a number line.

21. −4, −3, −2, 0, +1, +3

22. −2, 0, +2, +4

23. −3, −1, 0, +1, +3

24. The temperature at 09:00 was −3°C. Over the next 6 h, the temperature dropped 2°C, rose 3°C, rose 2°C, dropped 1°C, rose 4°C, and dropped 2°C. What was the temperature at 15:00?

_____

25. An elevator started in the basement, rose 11 floors, descended 5 floors, descended 2 floors, rose 9 floors, rose 2 floors, and descended 10 floors. At what floor did the elevator stop? Assume the basement to be floor 0.

_____

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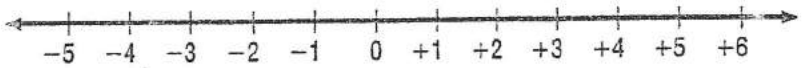
10.2 Comparing and Ordering Integers

MATHPOWER™ *Eight*, pp. 352–353

Integers on a number line increase in value from left to right.



$-4 < -2$ $-2 > -5$ $-1 < +2$ $+4 > +1$

Circle the integer that is smaller.

1. +7, +3
2. −7, +1
3. −4, −13
4. −18, +12
5. +2, −7
6. −48, −11

Circle the integer that is larger.

7. +3, −3
8. +12, +8
9. −13, 0
10. −4, −10
11. −16, +4
12. 0, +4

Insert > or < between each pair of integers.

13. +5 ☐ +3
14. −2 ☐ +1
15. −4 ☐ −2
16. +4 ☐ −7
17. +2 ☐ 0
18. −1 ☐ 0
19. −8 ☐ −3
20. +3 ☐ −4
21. 0 ☐ −6

Write all the integers between each pair.

22. −6, +2 _____
23. +8, −1 _____
24. −7, +1 _____
25. −9, −2 _____

Write the next four smaller integers.

26. −2 _____
27. +3 _____
28. 0 _____
29. +1 _____

Write the integers in order from smallest to largest.

30. +4, −2, −5, +1, 0

_____

31. −10, +1, −7, +6, −11

_____

32. −1, +3, −9, +2, −14

_____

33. 0, −6, −11, +5, −21

_____

34.

E	G	T	V	N	A	I	E
−7	+4	−2	−4	+11	+1	−3	+8

a) Which letter has the least value?

_____

b) Which letters have opposite values?

_____

c) Which letters have values greater than zero?

_____

d) Which letter is closest to zero?

_____

e) What word is formed when the letters are arranged from largest to smallest?

_____

Write the next 3 integers.

35. −8, −5, −2, _____, _____, _____

36. −1, −5, −9, _____, _____, _____

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Name _____

10.3 Adding Integers

MATHPOWER™ *Eight*, pp. 356–357

Adding integers.

$(+4) + (+2) = +6$
$(-4) + (-2) = -6$
$(+4) + (-2) = +2$
$(-4) + (+2) = -2$

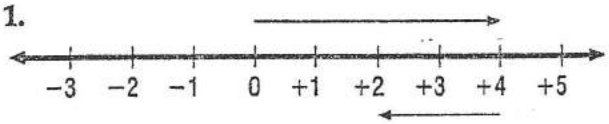
Adding integers on a number line.

$(+5) + (-3)$

$(+5) + (-3) = +2$

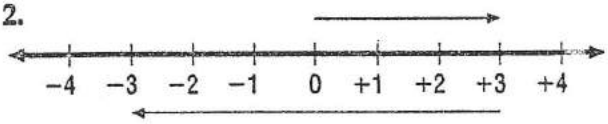
Write the addition statement.

1.



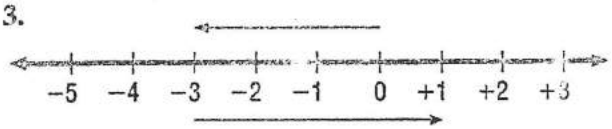
_____

2.



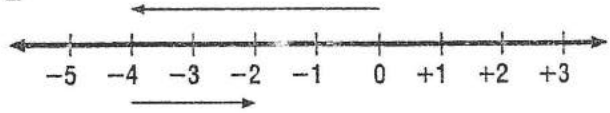
_____

3.



_____

4.



_____

Add.

5. $(+5) + (-3)$

_____

6. $(+7) + (-7)$

_____

7. $(-4) + (+10)$

_____

8. $(-3) + (-2)$

_____

9. $(+1) + 0$

_____

10. $(-8) + (+6)$

_____

11. $(+3) + (+5)$

_____

12. $(-2) + (-1)$

_____

Show each addition on a number line. Write each addition statement.

13. $(+4) + (-3)$

_____

14. $(-2) + (-3)$

_____

15. $(+2) + (+4)$

_____

16. $(-6) + (+2)$

_____

Add.

17. $(+5) + (-2) + (-1)$ _____

18. $(-7) + (-6) + (-2)$ _____

19. $(+11) + (-9) + (-4)$ _____

20. $(+4) + (-8) + (+6)$ _____

Fill in the missing integer in each addition.

21. $(-5) + \square = -10$ **22.** $\square + (+3) = -7$

23. $(+5) + \square = -3$ **24.** $(-2) + \square = +5$

25. $\square + (-8) = +11$ **26.** $(+8) + \square = +2$

27. $\square + (-3) = -14$ **28.** $(-7) + \square = 0$

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10.4 Subtracting Integers

MATHPOWER™ *Eight*, pp. 358–359

To subtract an integer, add its opposite.
First, rewrite each subtraction statement as an addition statement.

$(+3) - (+5)$	$(-2) - (-4)$	$(+7) - (-2)$	$(-3) - (+4)$
$= (+3) + (-5)$	$= (-2) + (+4)$	$= (+7) + (+2)$	$= (-3) + (-4)$
$= -2$	$= +2$	$= +9$	$= -7$

Complete each statement.

1. $(+4) - (-1) = (+4) +$ _____ $=$ _____
2. $(-1) - (-8) = (-1) +$ _____ $=$ _____
3. $(+7) - (+9) = (+7) +$ _____ $=$ _____
4. $(-6) - (+5) = (-6) +$ _____ $=$ _____

Write the addition statement and simplify.

5. $(+7) - (+3) =$ _____ $=$ _____
6. $(-2) - (+6) =$ _____ $=$ _____
7. $(-4) - (-3) =$ _____ $=$ _____
8. $(+8) - (-6) =$ _____ $=$ _____
9. $(+5) - (+11) =$ _____ $=$ _____
10. $(-1) - (-4) =$ _____ $=$ _____

Subtract.

11. $(-12) - (-5)$ _____

12. $(+6) - (-9)$ _____

13. $(+3) - (+8)$ _____

14. $(-8) - (+8)$ _____

15. $(-3) - (+7)$ _____

16. $(+9) - (+5)$ _____

17. $(+12) - (-4)$ _____

18. $(-4) - (-4)$ _____

Fill in the missing integer in each subtraction.

19. $(-2) - \square = -3$

20. $(+6) - \square = +10$

21. $\square - (+3) = +5$

22. $\square - (-6) = -2$

23. $(-9) - \square = -3$

24. $(+7) - \square = +4$

25. $(+6) - \square = -3$

26. $\square - (-2) = -9$

27. The first Ancient Olympic games were held in 776 B.C. The Ancient games were abolished in 393 A.D. The first Modern Olympics were held in 1896 A.D.

a) How many years were there between the first Ancient games and the year they were abolished?

_____

b) How many years were there between the first Ancient games and the first Modern games?

_____

Complete the table.

	−	+2	−3	+5	−9
28.	−6	−8			
29.	+1				
30.			−2		
31.		−2			
32.					+13
33.				−8	

34. A team of 4 golfers scored 69, 73, 70, and 74 on the first round on a par 72 course. They reduced their team score by 3 on the second round.

a) How many strokes above or below par was the team score on the first round?

_____

b) How many strokes above or below par was the team score on the second round?

_____

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Name _____

10.5 Multiplying Integers

MATHPOWER™

The sign rules for multiplying integers are summarized in the chart.

×	+	−
+	+	−
−	−	+

$(+4) \times (+3) = +12$
$(+3) \times (-2) = -6$
$(-4) \times (+2) = -8$
$(-5) \times (-2) = +10$

State whether each answer is positive or negative.

1. $(+3) \times (-4) =$ ☐ 12
2. $(-6) \times (-5) =$ ☐ 30
3. $(-3) \times (+8) =$ ☐ 24
4. $(+2) \times (+5) =$ ☐ 10
5. $(+6) \times (-7) =$ ☐ 42
6. $(-2) \times (-10) =$ ☐ 20

Multiply.

7. $(-8) \times (+5)$ _____
8. $(+7) \times (+4)$ _____
9. $(-3) \times (-11)$ _____
10. $(+5) \times (-4)$ _____
11. $(+6) \times (-9)$ _____
12. $(-3) \times (-9)$ _____
13. $(+2) \times (+10)$ _____
14. $(-6) \times (+6)$ _____
15. $(-8) \times (-7)$ _____
16. $(+10) \times (0)$ _____

Fill in the missing integer in each multiplication.

17. $(+3) \times$ ☐ $= +6$
18. $(-4) \times$ ☐ $= +4$
19. ☐ $\times (-7) = +28$
20. ☐ $\times (+4) = -24$
21. ☐ $\times (+3) = -18$
22. $(-6) \times$ ☐ $= +48$
23. $(-9) \times$ ☐ $= -99$
24. ☐ $\times (-8) = -64$

Simplify.

25. $(-2)^2$ _____
26. $(-4)^3$ _____
27. $(-2)^3$ _____
28. $(-1)^6$ _____
29. $(-1)^5$ _____
30. $(-3)^4$ _____

Multiply.

31. $(-3) \times (+5) \times (-1)$ _____
32. $(-5) \times (-4) \times (-2)$ _____
33. $(+4) \times (-2) \times (+2)$ _____
34. $(+2) \times (-1) \times (0)$ _____
35. $(+6) \times (+3) \times (-1)$ _____
36. $(+2) \times (-6) \times (-4)$ _____

37. A hot air balloon is descending at a rate of 350 m/min. How much higher was the balloon 5 min ago?

_____

38. One morning, the outside temperature was –3°C. Two days later, the outside temperature was three times colder. What was the new temperature?

_____

39. The sum of 2 integers is −1. Their product is −12. What are the integers?

_____

40. The sum of 2 integers is +2. Their product is −24. What are the integers?

_____

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10.6 Dividing Integers

MATHPOWER™

Each multiplication fact has two related division facts.

$(+7) \times (-3) = (-21)$

So $(-21) \div (+7) = (-3)$

and $(-21) \div (-3) = (+7)$

The sign rules for dividing integers are summarized in the chart.

÷	+	−
+	+	−
−	−	+

State whether each answer is positive or negative.

1. $(-14) \div (-2) = \square\ 7$
2. $(+22) \div (-2) = \square\ 11$
3. $(+45) \div (+9) = \square\ 5$
4. $(-42) \div (+6) = \square\ 7$
5. $(-24) \div (-4) = \square\ 6$
6. $(+55) \div (-11) = \square\ 5$

Write two related division facts for each multiplication fact.

7. $(-3) \times (-6) = +18$ _____ _____
8. $(-5) \times (+4) = -20$ _____ _____
9. $(+7) \times (-3) = -21$ _____ _____
10. $(+8) \times (+6) = +48$ _____ _____

Divide.

11. $\frac{-18}{+6}$ _____
12. $\frac{+24}{+12}$ _____
13. $\frac{+26}{-2}$ _____
14. $\frac{-60}{-15}$ _____

Divide.

15. $(-42) \div (-7)$ _____
16. $(-16) \div (+4)$ _____
17. $(+25) \div (-5)$ _____
18. $(+28) \div (+7)$ _____
19. $(-12) \div (+3)$ _____
20. $(+36) \div (-9)$ _____
21. $(-65) \div (-13)$ _____
22. $(-56) \div (+8)$ _____
23. $(+27) \div (-9)$ _____
24. $(-169) \div (-13)$ _____

Fill in the missing integer in each division.

25. $(-18) \div \square = +3$
26. $(+40) \div \square = -10$
27. $\square \div (-3) = -5$
28. $\square \div (+7) = -2$
29. $(+72) \div \square = +12$
30. $(-51) \div \square = +17$
31. $\square \div (-9) = +1$
32. $(+52) \div \square = -4$

33. The average temperatures for the months of September to December in Medicine Hat, Alberta, one year were 15°C, 8°C, 1°C, and −8°C. What was the average temperature for the four months?

_____

34. Determine 2 different pairs of integers that satisfy each description.

a) The product is (−54); the quotient is (−6).

_____ _____

b) The product is (+36); the quotient is (+4).

_____ _____

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10.7 Integers in Standard Form

MATHPOWER™ *Eight*, p. 368

The **sign of quality** indicates whether an integer is positive or negative.
The **sign of operation** tells us to add or subtract.

$(-6) - (+4) = -10$

sign of quality sign of operation

For integers in standard form, only negative signs of quality are necessary. It is not necessary to write the positive sign of quality. If a negative number follows a sign of operation, the negative number must be enclosed with brackets.

$3 + (-4) = -1$ $-2 - 6 = -8$ $-3 \times 7 = -21$ $48 \div (-4) = -16$

Write each statement in standard form and simplify.

1. $(+7) + (-3) =$ _____ = _____
2. $(-9) - (+4) =$ _____ = _____
3. $(-4) \times (-7) =$ _____ = _____
4. $(+14) \div (-7) =$ _____ = _____
5. $(-12) + (+6) =$ _____ = _____
6. $(+13) - (-3) =$ _____ = _____
7. $(+3) \times (+7) =$ _____ = _____
8. $(-32) \div (-4) =$ _____ = _____
9. $(-16) + (+24) =$ _____ = _____
10. $(-33) \div (-3) =$ _____ = _____

Simplify.

11. $8 + (-3)$ _____

12. $-13 + 7$ _____

13. $-14 - (-7)$ _____

14. $24 - (-3)$ _____

15. $6 \times (-7)$ _____

16. -9×6 _____

17. $-72 \div (-8)$ _____

18. $52 \div (-4)$ _____

Write each of the following in standard form and simplify.

19. negative twelve plus negative six

_____

20. positive four times negative seven

_____

21. positive forty-eight divided by positive sixteen

_____

22. negative eight times negative twenty

_____

23. positive eight minus negative six plus positive three

_____

24. negative eighteen divided by positive three times positive twelve

_____

Complete each number statement in standard form.

25. $-32 \div \square = 16$ 26. $3 \times \square = -18$

27. $\square + (-5) = 12$ 28. $\square \times 7 = -35$

29. $42 \div (-14) = \square$ 30. $-34 + \square = 48$

31. $-30 \times \square = 90$ 32. $-11 \times (-6) = \square$

33. $\square - (-10) = -15$ 34. $-60 \div (-12) = \square$

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10.8 Integers on a Calculator

MATHPOWER™ *Eight*, p. 369

Calculators display integers in standard form.

The [+/−] key is used to enter negative numbers.

Record the display following each calculator sequence.

1. [C] [+/−] 7 _____
2. [C] 6 4 [+/−] _____
3. [C] 6 [+/−] 7 _____
4. [C] 5 [+/−] 8 [+/−] _____
5. [C] 8 [+/−] _____
6. [C] [+/−] 6 7 _____

Write the calculator sequence that calculates the correct answer to each of the following.

7. $6 - (-4)$

_____

8. -5×11

_____

9. $-64 \div (-16)$

_____

10. $-8 \times (-12) \times 3$

_____

Estimate, then use your calculator to simplify.

11. $32 + (-28)$

_____ _____

12. $-22 - (-68)$

_____ _____

13. $-14 \times (-62)$

_____ _____

14. $168 \div (-14)$

_____ _____

15. $-135 - 73$

_____ _____

16. $48 \times (-23)$

_____ _____

17. $-300 + 87$

_____ _____

18. $-255 \div 17$

_____ _____

19. $-11 \times (-14)$

_____ _____

20. $62 - (-49)$

_____ _____

Write the calculator sequence to calculate the following.

21. 6^3 _____

22. $(-4)^5$ _____

Simplify using your calculator.

23. 5^3 _____ 24. $(-11)^3$ _____ 25. $(-14)^4$ _____

26. $(-7)^6$ _____ 27. 3^4 _____ 28. $(-12)^3$ _____

Simplify using your calculator.

29. $2^2 - 6$ _____ 30. $(-3)^3 - (-5)$ _____

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10.9 Order of Operations with Integers

MATHPOWER™ *Eight*, pp. 370–371

Use the acronym BEDMAS to help you remember the order.

B	E	DM	AS
Brackets	Exponents	Divide and multiply in order from left to right.	Add and subtract in order from left to right.

Simplify.

1. $7 - 2 \times 3$ _____

2. $-8 + 14 \div (-2)$ _____

3. $-6 + (-3) \times 4$ _____

4. $48 \div (-12) + 3$ _____

5. $16 \div (-2) - 3$ _____

6. $-11 \times 4 \div (-2)$ _____

7. $60 - 6 \div 6 + (-8)$ _____

8. $20 \times (-4) \div 8 + (-3)$ _____

9. $12 - 16 - 24 - (-6)$ _____

10. $-9 \times 6 + 7 \times (-3)$ _____

Simplify.

11. $-3 \times 2^3 + 12$ _____

12. $4^2 \div (-8) + 7$ _____

13. $7 \times (-3) - (-3)^3$ _____

14. $3 - (-2)^3 + 7$ _____

15. $8^2 - 8 \times 9$ _____

16. $(-3)^2 + (-10)^3$ _____

17. $6 \times 5 - (-2)^5$ _____

18. $3 \times (-3)^2 \div 3^3$ _____

19. $(-8)^2 \div 2^3 - 3 \times 4^2$ _____

20. $12^2 - (-6)^2 + (-3)^3$ _____

Simplify.

21. $(-4)^3 \times 2 \div 8 + (-14)$ _____

22. $6(3 - 4) - 7 \times (-2)^3$ _____

23. $32 \div 2(3 - 7)$ _____

24. $2(7 - 9) - 6(9 \div 3)$ _____

25. $4 \times 2(3 + 5)$ _____

26. $7(4 + (-8)) \div (-2)^2$ _____

27. $\dfrac{-6 \times 3}{-1}$ _____

28. $\dfrac{7 - 4 \times 2}{(-1)^3}$ _____

29. $\dfrac{18 \div 9 \times 4}{4 - 6}$ _____

30. $\dfrac{-6 + (-9)}{7 - 2^2}$ _____

Combine the 4 integers to write expressions that equal the following answers.

−3	5	15	−9

31. _____ _____ _____ _____ $= -9$

32. _____ _____ _____ _____ $= 8$

33. _____ _____ _____ _____ $= 9$

34. _____ _____ _____ _____ $= -7$

35. Combine the 4 integers in 2 other ways and solve each expression.

_____

_____

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10.10 Scientific Notation: Large Numbers
10.11 Scientific Notation: Small Numbers

Scientific notation is used as a short form for very large numbers and very small numbers.

$350\,000 = 3.5 \times 100\,000$
$= 3.5 \times 10^5$

$0.000\,96 = 9.6 \times 0.000\,1$
$= 9.6 \times 10^{-4}$

Complete each of the following with the appropriate power of 10.

1. $600 = 6 \times$ _____
2. $1800 = 1.8 \times$ _____
3. $45\,000 = 4.5 \times$ _____
4. $270\,000 = 2.7 \times$ _____
5. $20\,700 = 2.07 \times$ _____
6. $60\,000 = 6 \times$ _____
7. $4\,200\,000 = 4.2 \times$ _____
8. $78\,000\,000 = 7.8 \times$ _____

Write in scientific notation.

9. 3200 _____
10. 16 000 _____
11. 720 _____
12. 840 000 _____
13. 2 100 000 _____
14. 50 000 _____
15. 73 000 000 _____
16. 5100 _____
17. 2 420 000 _____
18. 801 000 _____

Write in standard form.

19. 4.1×10^4 _____
20. 1.8×10^2 _____
21. 7×10^6 _____
22. 5.75×10^4 _____
23. 3.2×10^5 _____
24. 6.8×10^6 _____

Complete each of the following with the appropriate power of 10.

25. $0.007 = 7 \times$ _____
26. $0.04 = 4 \times$ _____
27. $0.000\,09 = 9 \times$ _____
28. $0.0032 = 3.2 \times$ _____
29. $0.0041 = 4.1 \times$ _____
30. $0.000\,006 = 6 \times$ _____

Write each of the following numbers in scientific notation.

31. 0.000 04 _____
32. 0.035 _____
33. 0.0007 _____
34. 0.000 62 _____
35. 0.000 078 _____
36. 0.0054 _____
37. 0.003 _____
38. 0.000 68 _____

Write each of the following numbers in standard form.

39. 6×10^{-2} _____
40. 1.6×10^{-4} _____
41. 7.2×10^{-5} _____
42. 8×10^{-6} _____
43. 3.02×10^{-3} _____
44. 6.2×10^{-7} _____
45. 5.18×10^{-6} _____
46. 4×10^{-5} _____

Name _____

10.12 Rational Numbers

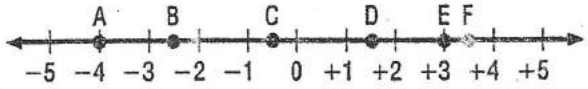
MATHPOWER™ *Eight*, pp. 376–377

Rational numbers are numbers that can be written as the quotient of two integers, that is, in the form $\frac{a}{b}$, where a is any integer, and b is any integer except 0. Rational numbers include all fractions, mixed numbers, integers, and terminating and repeating decimals.

Rational numbers can be written in many equivalent forms.

i.e., -4 can be written as $\frac{-4}{1}$, $\frac{8}{-2}$, $\frac{4}{-1}$, $-\frac{-4}{-1}$, and so on.

Match each rational number to a point on the number line.



1. $\frac{-1}{2}$ _____ 2. $3\frac{1}{2}$ _____

3. -4 _____ 4. 1.5 _____

5. 3 _____ 6. $-2\frac{1}{2}$ _____

Express in an equivalent form.

7. 5 _____ 8. $\frac{-1}{3}$ _____

9. $\frac{3}{-5}$ _____ 10. $\frac{-2}{-3}$ _____

11. -3 _____ 12. $\frac{1}{7}$ _____

Graph the rational numbers on a number line.

13. 5, −3, 0, −2, 3, −6

14. 3.5, −2.5, −4, 1.3, −4.5

15. $\frac{3}{4}, \frac{-5}{8}, \frac{-1}{4}, \frac{3}{8}, \frac{1}{8}$

Write each of the following as the quotient of 2 integers in lowest terms.

16. $3\frac{1}{4}$ _____ 17. −0.6 _____

18. −3.2 _____ 19. $-1\frac{1}{2}$ _____

20. 0.375 _____ 21. −0.5 _____

Insert <, >, or = to make each statement true.

22. $\frac{1}{4} \square \frac{2}{5}$ 23. $\frac{-1}{5} \square \frac{3}{-10}$

24. $\frac{-2}{-5} \square \frac{2}{5}$ 25. $-2\frac{1}{3} \square \frac{-7}{3}$

26. $\frac{-2}{3} \square \frac{7}{-9}$ 27. $1\frac{2}{5} \square \frac{7}{-5}$

Write a rational number for each situation.

28. an increase of 5.5 kg _____

29. a temperature rise of 4.2°C _____

30. an average of $8\frac{1}{4}$ points _____

31. a loss in value of $10.75 _____

32. a price increase of $6.50 _____

33. Write an example of a rational number

a) with a numerator of 1 and a denominator less than 4 _____

b) with a numerator less than −2 and a denominator greater than 3 _____

c) with a numerator of 5 and a denominator less than zero _____

34. Order your rational numbers from question 33 in order from smallest to largest.

_____

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Test One CHAPTER 10: Integers

MATHPOWER™ *Eight*, pp. 345–383

Insert > or < between each pair of integers to make each statement true.

1. $-3 \square -7$
2. $0 \square -3$
3. $4 \square 7$
4. $-6 \square 2$
5. $-4 \square 0$
6. $-2 \square 4$
7. $-12 \square -14$
8. $-9 \square -6$

Rewrite the integers in order from largest to smallest.

9. $-1, 5, -8, 2, -5$ _____
10. $-15, 0, 12, -11, -7$ _____
11. $-4, -12, -9, 1, -8$ _____
12. $-2, 11, -19, 6, 13$ _____
13. $-2, -6, 5, 0, 2$ _____

Add.

14. $(-7) + 3$ _____
15. $9 + (-11)$ _____
16. $(-3) + (-8)$ _____
17. $7 + (-3)$ _____
18. $(-2) + 2$ _____

Subtract.

19. $(-3) - 3$ _____
20. $4 - 7$ _____
21. $(-6) - (-7)$ _____
22. $8 - (-6)$ _____
23. $(-10) - 13$ _____
24. $(-5) - (-2)$ _____

Multiply.

25. $(-6) \times 3$ _____
26. $8 \times (-7)$ _____
27. $(-7) \times (-4)$ _____
28. 5×10 _____

Divide.

29. $(-34) \div 17$ _____
30. $42 \div (-6)$ _____
31. $(-27) \div (-9)$ _____
32. $(-16) \div 8$ _____

Simplify.

33. $14 - (-4) + (-9)$ _____
34. $-17 + 6 - (-2)^3$ _____
35. $8 \times (-3) - 12$ _____
36. $11 - 21 \div (-7)$ _____
37. $(-2)^5 - 6^2$ _____
38. $\dfrac{24 \div 4 \times 3 - 6}{(-1)^3}$ _____

Write in scientific notation.

39. 17 600 _____
40. 5 400 000 _____
41. 0.000 74 _____
42. 0.000 009 _____

Write in standard form.

43. 6.3×10^3 _____
44. 8.61×10^{-4} _____
45. 2.08×10^{-2} _____
46. 9.55×10^5 _____

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Test Two CHAPTER 10: Integers

MATHPOWER™ *Eight*, pp. 345–383

Insert > or < between each pair of integers to make each statement true.

1. $-5 \square -9$
2. $7 \square -3$
3. $-6 \square 2$
4. $0 \square -2$

Rewrite the integers in order from largest to smallest.

5. $-5, -6, 2, 7, -2$ _____
6. $8, -4, 1, -10, -7$ _____
7. $-2, 2, 6, -7, -3$ _____

Add.

8. $8 + (-2)$ _____
9. $-7 + 4$ _____
10. $13 + (-18)$ _____
11. $-12 + (-15)$ _____
12. $-7 + (-2)$ _____
13. $17 + (-21)$ _____

Subtract.

14. $-13 - (-8)$ _____
15. $14 - (-8)$ _____
16. $24 - (-27)$ _____
17. $-14 - 15$ _____
18. $-7 - (-22)$ _____
19. $-16 - 8$ _____

Multiply.

20. $-12 \times (-4)$ _____
21. $8 \times (-10)$ _____
22. -4×12 _____
23. $-2 \times (-13)$ _____

Divide.

24. $-64 \div (-4)$ _____
25. $40 \div (-2)$ _____
26. $-121 \div 11$ _____
27. $81 \div (-9)$ _____

Simplify.

28. $3^3 - 7 \times (-3)$ _____
29. $-24 + (-3) \times (-2)$ _____
30. $88 \div (-8) - (-15)$ _____
31. $-2 \times (-14) \div (-7)$ _____
32. $(-1)^5 - 8^2$ _____
33. $\dfrac{36 \div 9 \times 2 + 10}{(-1)^2}$ _____

Write in scientific notation.

34. 19 000 _____
35. 23 400 000 _____
36. 0.000 04 _____
37. 0.000 39 _____

Write in standard form.

38. 3.6×10^8 _____
39. 4.7×10^{-3} _____
40. 1.42×10^6 _____
41. 2.04×10^{-7} _____

42. When travelling at 40 km/h, an air temperature of −7°C feels like −26°C. What is the difference between the two temperatures?

_____

43. The sum of 2 integers is +5. Their product is −36. What are the integers?

_____

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11.1 Variables in Expressions

MATHPOWER™ *Seven*, pp. 370–371

The value of an expression is found by substituting a value for the variable.

Calculate $2x$ for $x = 5$.

$2x = 2 \times 5$

$= 10$

Calculate $4y - 2$ for $y = 3$.

$4y - 2 = 4 \times 3 - 2$

$= 12 - 2$

$= 10$

Evaluate the following.

1. $x + 3, x = 6$

2. $y - 7, y = 9$

3. $7p, p = 3$

4. $8 + n, n = 0$

5. $4m + 5, m = 4$

6. $7x - 4, x = 5$

7. $19 - 3y, y = 2$

8. $11 + 3z, z = 4$

Find the value of each expression for $x = 3$.

9. $6x$

10. $12x$

11. $3x + 5$

12. $4x - 6$

13. $15 - x$

14. $7 + 5x$

15. $24 \div x$

16. $27 \div 3x$

Evaluate the expressions for $m = 6$ and $n = 2$.

17. $7m$

18. $6n$

19. mn

20. $3m - 6$

21. $5n - 3$

22. $m + n$

23. $4(m - n)$

24. $2mn$

25. $6n - m$

26. $5mn - 19$

Given $x = 0.2$ and $y = 0.6$, evaluate the expressions.

27. $30x$

28. $20y$

29. $2xy$

30. $20x + 10y$

31. $5y - 10x$

32. $12 - 4x - 3y$

33. $7x - y$

34. $8 + 2x + 2y$

Evaluate these expressions for $x = 8$ and $y = 12$.

35. $\frac{y}{3}$

36. $\frac{x}{2}$

37. $\frac{xy}{6}$

38. $\frac{y}{6} + \frac{x}{4}$

39. $\frac{24}{x} - 1$

40. $\frac{y + 2}{7}$

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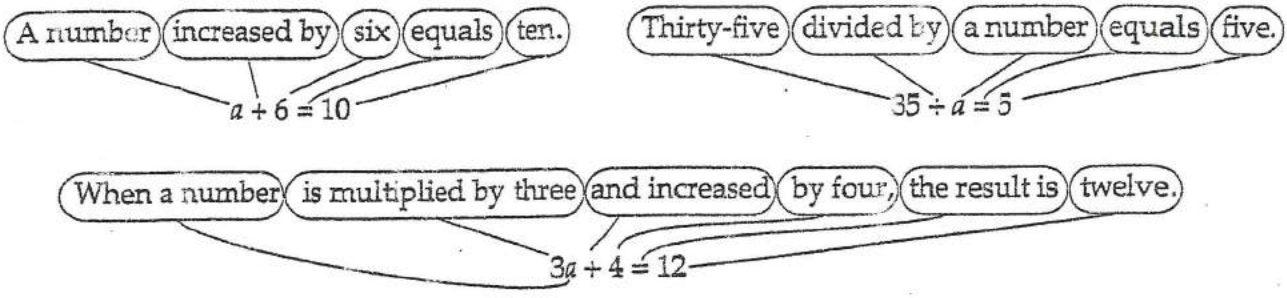
11.2 Words and Symbols

MATHPOWER™ *Seven*, pp. 372–373



Write an expression to represent each statement.

1. a number decreased by 5 _____
2. the sum of 6 and a number _____
3. a number increased by 3 _____
4. 4 divided by a number _____
5. 7 multiplied by a number _____
6. a number divided by 2 _____
7. a number subtracted from 10 _____

The variable y represents a number. Write the words than can be represented by each expression.

8. $y - 2$

_____

9. $y + 3$

_____

10. $9y$

_____

11. $\frac{y}{5}$

_____

12. $8 + y$

_____

13. $\frac{4}{y} - 1$

_____

Write each of the following using symbols.

14. x multiplied by 9 _____
15. 12 divided by n _____
16. 11 increased by z _____
17. y decreased by 5 _____

Write an expression for each of the following.

18. Maurice's height decreased by six centimetres

_____

19. eight times the number of horses

_____

20. Jayne's age four years from now

_____

21. an amount of money divided by three

_____

22. one-quarter the width of the desk

_____

23. two sizes smaller than Mario's shoe size

_____

24. \$18.00/h for a number of hours worked

_____

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11.3 Solving Equations by Addition
11.4 Solving Equations by Subtraction

MATHPOWER™ *Eight*, pp. 396–397

Solve $x - 8 = 11$.

Add 8 to both sides.

$x - 8 + 8 = 11 + 8$

$x = 19$

Check: L.S. $= 19 - 8$ R.S. $= 11$

$= 11$

The solution is $x = 19$.

Solve $y + 9 = 14$.

Subtract 9 from both sides.

$y + 9 - 9 = 14 - 9$

$y = 5$

Check: L.S. $= 5 + 9$ R.S. $= 14$

$= 14$

The solution is $y = 5$.

Write the number you would add to both sides and solve each equation.

1. $x - 9 = 13$ _____ _____
2. $x - 12 = 8$ _____ _____
3. $y - 4 = 7$ _____ _____
4. $y - 5 = 14$ _____ _____
5. $p - 6 = 21$ _____ _____

Solve and check.

6. $t - 8 = 14$ _____
7. $s - 11 = 9$ _____
8. $y - 6 = 8$ _____
9. $a - 15 = 16$ _____
10. $m - 3 = 8$ _____
11. $n - 16 = 22$ _____
12. $x - 25 = 3$ _____
13. $z - 31 = 16$ _____

Solve and check.

14. $x - 5 = 6.7$ _____
15. $z - 0.7 = 2.4$ _____
16. $m - 2.4 = 6.3$ _____
17. $5.3 = s - 2.4$ _____

Write the number you would subtract from both sides and solve each equation.

18. $x + 5 = 11$ _____ _____
19. $x + 7 = 14$ _____ _____
20. $y + 11 = 22$ _____ _____
21. $y + 6 = 14$ _____ _____
22. $p + 8 = 24$ _____ _____

Solve and check.

23. $m + 5 = 12$ _____
24. $y + 9 = 13$ _____
25. $t + 13 = 23$ _____
26. $n + 17 = 28$ _____
27. $x + 10 = 29$ _____
28. $a + 8 = 14$ _____
29. $s + 7 = 15$ _____
30. $m + 17 = 44$ _____

Solve and check.

31. $x + 3.8 = 7$ _____
32. $a + 3.5 = 4.8$ _____
33. $s + 6.4 = 12.1$ _____
34. $7.2 = m + 4.3$ _____

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11.5 Solving Equations by Division
11.6 Solving Equations by Multiplication

MATHPOWER™ *Eight*, pp. 398–399

Solve $4x = 24$.

Divide both sides by 4.

$$\frac{4x}{4} = \frac{24}{4}$$
$$x = 6$$

Check: L.S. $= 4x$ R.S. $= 24$
$= 4(6)$
$= 24$

The solution is $x = 6$.

Solve $\frac{x}{7} = 4$.

Multiply both sides by 7.

$$7 \times \frac{x}{7} = 7 \times 4$$
$$x = 28$$

Check: L.S. $= \frac{x}{7}$ R.S. $= 4$
$= \frac{28}{7}$
$= 4$

The solution is $x = 4$.

Write the number you would divide both sides by and solve each equation.

1. $7x = 56$ _____ _____
2. $3x = 48$ _____ _____
3. $8x = 64$ _____ _____
4. $13x = 52$ _____ _____

Solve and check.

5. $8x = 40$ _____
6. $4x = 28$ _____
7. $11x = 88$ _____
8. $6x = 54$ _____
9. $3x = 63$ _____
10. $9x = 108$ _____
11. $7x = 91$ _____
12. $5x = 45$ _____

Solve and check.

13. $8x = 25.6$ _____
14. $4x = 5.2$ _____
15. $1.2x = 4.2$ _____
16. $0.5x = 3.2$ _____

Write the number you would multiply both sides by and solve each equation.

17. $\frac{x}{3} = 12$ _____ _____
18. $\frac{x}{8} = 5$ _____ _____
19. $\frac{x}{5} = 7$ _____ _____
20. $\frac{x}{11} = 4$ _____ _____

Solve and check.

21. $\frac{m}{7} = 3$ _____
22. $\frac{t}{6} = 11$ _____
23. $\frac{y}{12} = 20$ _____
24. $\frac{n}{8} = 12$ _____
25. $\frac{a}{7} = 15$ _____
26. $\frac{x}{4} = 23$ _____
27. $\frac{s}{6} = 18$ _____
28. $\frac{z}{3} = 37$ _____

Solve and check.

29. $\frac{x}{3} = 2.6$ _____
30. $\frac{x}{8} = 1.4$ _____
31. $\frac{x}{0.6} = 3.2$ _____
32. $\frac{x}{1.4} = 0.5$ _____

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11.5 Solving Equations by Division
11.6 Solving Equations by Multiplication

MATHPOWER™ *Eight*, pp. 398–399

Solve $4x = 24$.

Divide both sides by 4.

$$\frac{4x}{4} = \frac{24}{4}$$
$$x = 6$$

Check: L.S. $= 4x$ R.S. $= 24$
$= 4(6)$
$= 24$

The solution is $x = 6$.

Solve $\frac{x}{7} = 4$.

Multiply both sides by 7.

$$7 \times \frac{x}{7} = 7 \times 4$$
$$x = 28$$

Check: L.S. $= \frac{x}{7}$ R.S. $= 4$
$= \frac{28}{7}$
$= 4$

The solution is $x = 4$.

Write the number you would divide both sides by and solve each equation.

1. $7x = 56$ _____ _____
2. $3x = 48$ _____ _____
3. $8x = 64$ _____ _____
4. $13x = 52$ _____ _____

Solve and check.

5. $8x = 40$ _____
6. $4x = 28$ _____
7. $11x = 88$ _____
8. $6x = 54$ _____
9. $3x = 63$ _____
10. $9x = 108$ _____
11. $7x = 91$ _____
12. $5x = 45$ _____

Solve and check.

13. $8x = 25.6$ _____
14. $4x = 5.2$ _____
15. $1.2x = 4.2$ _____
16. $0.5x = 3.2$ _____

Write the number you would multiply both sides by and solve each equation.

17. $\frac{x}{3} = 12$ _____ _____
18. $\frac{x}{8} = 5$ _____ _____
19. $\frac{x}{5} = 7$ _____ _____
20. $\frac{x}{11} = 4$ _____ _____

Solve and check.

21. $\frac{m}{7} = 3$ _____
22. $\frac{t}{6} = 11$ _____
23. $\frac{y}{12} = 20$ _____
24. $\frac{n}{8} = 12$ _____
25. $\frac{a}{7} = 15$ _____
26. $\frac{x}{4} = 23$ _____
27. $\frac{s}{6} = 18$ _____
28. $\frac{z}{3} = 37$ _____

Solve and check.

29. $\frac{x}{3} = 2.6$ _____
30. $\frac{x}{8} = 1.4$ _____
31. $\frac{x}{0.6} = 3.2$ _____
32. $\frac{x}{1.4} = 0.5$ _____

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11.7 Like Terms
11.8 The Distributive Property

MATHPOWER™ *Eight*, pp. 402–403

Terms that have the same variable parts are called **like terms**. The terms $2x$, $4x$, and $5x$ are like terms. The terms $6x$, $3x^2$, and $4y$ are **unlike terms**. Only like terms can be combined.

To **expand** an expression with brackets means to remove the brackets by multiplying. This is done using the **distributive property**.

$$\begin{aligned} 4(x-3) &= 4(x-3) \\ &= 4 \times x - 4 \times 3 \\ &= 4x - 12 \end{aligned}$$

Multiply each term inside the brackets by 4.

Simplify.

1. $2x + 7x$ _____

2. $7y - 3y$ _____

3. $4z + 3z + 2z$ _____

4. $6p - 3p + 7p$ _____

5. $12f - 4f - 2f$ _____

6. $x + 3x + 6x$ _____

7. $7d + 8b - 3d + 4b$ _____

8. $3t + 4y + 5y + t$ _____

9. $7 + 5c + 7c - 3c$ _____

10. $z + 2z + x + 3x$ _____

11. $3m + n + 4n - m$ _____

12. $9w - 6w - 2w + u$ _____

Simplify, then evaluate for $x = 3$ and $y = 2$.

13. $8x + 3x - 2x + 3y$ _____

14. $7x - 2y + 5x + 4y$ _____

15. $5x + 6y - 5x - 4y$ _____

16. $4x - 6x + 2y - 6y$ _____

17. $x + 4x - 2x + 9y$ _____

18. $8y - 7x + 2y - x$ _____

Expand.

19. $3(x + 6)$ _____

20. $4(a + 4)$ _____

21. $7(y - 3)$ _____

22. $8(b - 2)$ _____

23. $5(3 + c)$ _____

24. $2(9 + d)$ _____

25. $7(6 - s)$ _____

26. $9(3 - x)$ _____

Expand.

27. $3(4z + 3)$ _____

28. $5(6p - 2)$ _____

29. $-7(3q - 1)$ _____

30. $-2(1 + 6d)$ _____

31. $4(3x - 7y)$ _____

32. $8(7a + 4b)$ _____

33. $4(3x + 7y + 2)$ _____

34. $6(a - 2b + 3)$ _____

35. $-3(3 + 4c + d)$ _____

36. $-8(2 - g - h)$ _____

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11.9 Solving Equations in More Than One Step

MATHPOWER™ *Eight*, pp. 404–405

When you solve equations, the object is to get the variable alone, or to **isolate the variable**, on one side of the equal sign.
Sometimes this requires more than one step.

Solve $3x + 5 = 14$.

$$3x + 5 = 14$$
$$3x + 5 - 5 = 14 - 5 \quad \text{Subtract 5 from both sides.}$$
$$3x = 9$$
$$\frac{3x}{3} = \frac{9}{3} \quad \text{Divide both sides by 3.}$$
$$x = 3 \quad \text{The solution is } x = 3.$$

Check: L.S. $= 3x + 5$
$= 3(3) + 5$
$= 9 + 5$
$= 14$
R.S. $= 14$

Solve and check.

1. $5x + 4 = 34$ _____

2. $6y + 3 = 45$ _____

3. $8z - 7 = 57$ _____

4. $11t - 16 = 39$ _____

5. $2m - 6 = 12 + 4$ _____

6. $3z + 4 = 22 - 3$ _____

Solve and check.

7. $4x + 2 = 14$ _____

8. $7y - 6 = 8$ _____

9. $2x - 9 = 5$ _____

10. $8n - 13 = 3$ _____

11. $3t + 4 = 51 - 8$ _____

12. $2m - 15 = -21 + 8$ _____

Solve and check.

13. $\frac{x}{5} + 3 = 7$ _____

14. $\frac{a}{5} + 6 = 11$ _____

15. $\frac{t}{3} + 9 = 12$ _____

16. $\frac{w}{11} - 2 = 7$ _____

Solve and check.

17. $2x - 3.6 = 4.4$ _____

18. $5y + 1.3 = 21.3$ _____

19. $4y - 1.3 = 8.7$ _____

20. $3x + 2.1 = 11.7$ _____

Solve and check.

21. $4z + 12 = 7z - 9$ _____

22. $8y + 2y = 6y + 16$ _____

23. $10n + 12 - 9 - 7n + 4n = 31$ _____

24. $12 + 2t + 7t + 4t = 64$ _____

Solve and check.

25. $3(x - 5) = 9$ _____

26. $9(n + 2) = n + 26$ _____

27. $3 + 6s = 4(s - 3) + 19$ _____

28. $4(d - 4) + 2 = 3(d + 1)$ _____

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11.10 Writing Equations

MATHPOWER™ *Eight*, pp. 406–407

Write an equation for each statement.

1. Three added to a number is twelve.

_____

2. A number decreased by six is four.

_____

3. A number divided by three is eight.

_____

4. A number multiplied by nine is fifty-four.

_____

5. The sum of a number and three less than the number is sixteen.

_____

6. A number multiplied by seven, then increased by nine, is thirty.

_____

7. A number decreased by four, then divided by two, is eight.

_____

8. Six more than three times a number is twenty-four.

_____

Write an equation for each statement.

9. The width decreased by two is nine.

_____

10. Six times the length is seventy-two.

_____

11. The area decreased by twelve is sixty.

_____

12. Half the base times the height is 20.

_____

Write an equation that could be used to solve each problem.

13. Miguel is four years older than Jasmine. The sum of their ages is twenty-eight. How old is Jasmine?

_____

14. Manitoba has twice as many days of thunderstorms in a year as New Brunswick. Together, they have thirty-nine days of thunderstorms. How many days of thunderstorms does New Brunswick have?

_____

15. At Niagara Falls, the American Falls are two metres higher than the Horseshoe Falls. The sum of their heights is 116 m. How high are the Horseshoe Falls?

_____

16. The mass of a bobcat is one-fifth the mass of an Arctic wolf. Their combined mass is forty-eight kilograms. What is the mass of a bobcat?

_____

Write a word problem that could be solved by each equation.

17. $x + 5 = 12$

_____

_____

_____

18. $4y - 2 = 18$

_____

_____

_____

19. $\frac{x}{2} + 5 = 11$

_____

_____

_____

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11.11 Using Equations to Solve Problems

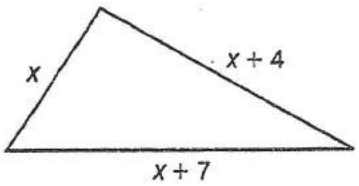
MATHPOWER™ *Eight*, pp. 408–409

Write an equation and solve each problem.

1. When a number is increased by thirty-four, the result is seventy-eight. Find the number.

2. Luanne read the same number of pages in her novel for three days. She finished the book on the fourth day by reading fifty-two pages. If there are one hundred ninety-six pages in the book, how many pages did she read on each of the first three days?

3.



The perimeter of the triangle is 74 cm. Find the length of each side.

4. The width of a rectangle is one-third the length. The perimeter is 48 cm. Find the length and width.

5. The perimeter of a regular hexagon is ninety-six centimetres. Find the length of each side.

6. There were twelve times more children than adults at the matinee performance of the school play. There were 455 people at the play. How many adults and children were there?

7. The sum of three consecutive numbers is 237. What are the three numbers?

8. The sum of three numbers is 81. The second number is 4 times the first. The third number is 3 more than the first. What are the three numbers?

9. A full-grown giraffe is about 6 times heavier than a full-grown lion. A full-grown cheetah is about one-quarter as heavy as a full-grown lion. Together, they are about 450 kg. What is the approximate mass of each animal?

10. Each of the equal sides of an isosceles triangle is 5 cm greater than the base. The perimeter is 46 cm. What is the length of each of the sides of the triangle?

11. Jonathan has $7.00 in nickels, dimes, and quarters. He has twice as many dimes as nickels, and 3 times as many quarters as nickels. He has 42 coins altogether. How many of each coin does he have?

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11.12 Developing and Working with Formulas

MATHPOWER™ *Eight*, pp. 410–411

1. The formula for the area of a parallelogram is $A = b \times h$.

a) Find A when $b = 8$ m and $h = 4$ m.

_____

b) Find b when $A = 42$ cm^2 and $h = 7$ cm.

_____

c) Find h when $A = 56$ m^2 and $b = 7$ m.

_____

2. The formula for the area of a triangle is $A = \frac{1}{2}b \times h$.

a) Find A when $b = 10$ cm and $h = 3$ cm.

_____

b) Find b when $A = 14$ m^2 and $h = 7$ m.

_____

c) Find h when $A = 36$ cm^2 and $b = 12$ cm.

_____

3. a) Complete the table.

Hours (h)	1	2	3	4	5	6
Cost (C)	12	24	36			

b) Write a formula for the pattern.

_____

4. If the perimeter and the width of a rectangle are known, the length can be calculated using $l = \frac{P - 2w}{2}$. Find the length of the following rectangles.

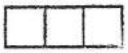
a) $P = 39$ cm, $w = 9$ cm _____

b) $P = 45$ cm, $w = 10.8$ cm _____

c) $P = 28.8$ m, $w = 6.6$ m _____

d) $P = 48.6$ m, $w = 13.7$ m _____

5. a) Complete the table.

Number of Squares	Figure	Perimeter
1		4
2		6
3		8
4		
5		
6		

b) Write a formula for the perimeter in terms of the number of squares.

_____

c) What is the perimeter of the figure made from 24 squares?

_____

d) How many squares are in the figure with a perimeter of 62?

_____

6. The formula for the circumference of a circle is $C = 2\pi r$. Write a formula for calculating the radius when the circumference is known.

_____

7. Use the formula you wrote in question 6 to find the radius of the circles with each of the following circumferences.

a) 47.1 cm _____

b) 37.68 cm _____

c) 78.5 cm _____

d) 157 cm _____

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11.13 Equations with Integer Solutions

Solve and check
$4x - 2 = -6$.

Add 2 to both sides:

$$4x - 2 = -6$$
$$4x - 2 + 2 = -6 + 2$$
$$4x = -4$$

Divide both sides by 4:

$$\frac{4x}{4} = \frac{-4}{4}$$
$$x = -1$$

Check: L.S. $= 4x - 2$
$= 4(-1) - 2$
$= -4 - 2$
$= -6$

R.S. $= -6$

The solution is $x = -1$.

Solve and check.

1. $x + 4 = -2$

2. $x + 10 = 3$

3. $x - 8 = 3$

4. $x - 5 = -8$

5. $7 + x = -11$

6. $-10 + x = 17$

7. $x + 12 = -6$

8. $x - 7 = -12$

9. $x - 4 = -4$

10. $-7 = x - 3$

Solve and check.

11. $7x = -28$

12. $-4y = -20$

13. $\frac{z}{5} = -3$

14. $\frac{p}{-3} = 11$

15. $\frac{w}{-4} = -8$

16. $-9q = 36$

17. $-8b = -32$

18. $\frac{45}{n} = -9$

Solve and check.

19. $4x - 3 = -11$

20. $6y + 4 = -8$

21. $9z - 5 = 22$

22. $6p + 10 = -14$

23. $3q - 3 = -27$

24. $2a + 5 = 1$

Solve and check.

25. $3(y - 2) = -18$

26. $4x + 2(x - 1) = -20$

27. $2(p - 3) + 6 = 4p - 10$

28. $5(w + 2) = 3(w - 4)$

Solve and check.

29. $x + 2.1 = -3.8$

30. $y - 1.7 = -6.5$

31. $z - (-1.4) = -7.2$

32. $p - (-3.2) = 5.9$

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11.14 Solving Inequalities

MATHPOWER™ *Eight*, pp. 416–417

Solve each inequality for whole-number values of the variable.

1. $x + 2 < 6$ _____

2. $2 + y < 9$ _____

3. $z + 3 \leq 7$ _____

4. $4p \leq 32$ _____

Solve each inequality for whole-number values of the variable from 0 to 10.

5. $x - 4 > 2$ _____

6. $1 + y > 3$ _____

7. $3p \geq 6$ _____

8. $z + 2 \leq 10$ _____

Solve each inequality for whole-number values of the variable. Graph the solution.

9. $x \geq 9$ _____

10. $y < 5$ _____

11. $2z \leq 14$ _____

12. $2x > 12$ _____

13. $x + 2 < 12$ _____

Solve each inequality for whole-number values of the variable. Graph the solution.

14. $t + 1 \geq 4$ _____

15. $y - 3 \leq 6$ _____

16. $p - 2 \geq 5$ _____

State an inequality represented by each graph.

17.

_____

18.

_____

19. Stephanie has to save at least $860 this year for a vacation. Write the inequality that can be used to calculate the amount she needs to save each week. Calculate the least amount she must save each week.

_____

_____

20. Find the whole-number values of x that give a triangle a perimeter of no more than 30 cm, given the inequality $x + 10 + 12 \leq 30$.

_____

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Test One CHAPTER 11: Algebra

MATHPOWER™ *Eight*, pp. 385–421

Evaluate for $x = 2$ and $y = 3$.

1. $3x - y$ _____

2. $5x - 2y$ _____

3. $x^2 + 3y$ _____

4. $3(x + y)$ _____

Solve and check.

5. $x + 6 = 11$ _____

6. $y - 5 = 3$ _____

7. $3t = 18$ _____

8. $\frac{m}{4} = 9$ _____

9. $3n - 4 = 11$ _____

10. $4x + 1 = 21$ _____

Simplify.

11. $3x + 5x + 3$ _____

12. $6m - 2 - 3m + 5$ _____

13. $9t + 3 + 6t - 10$ _____

14. $12 - 3a + 6a - 4$ _____

Expand.

15. $3(x + 2)$ _____

16. $4(3a - 3)$ _____

17. $2(6m + 3n)$ _____

18. $5(3s - r)$ _____

Solve and check.

19. $3m + 2 = 11$ _____

20. $3(y + 1) = 21$ _____

21. $4x - 2.5 = 2.3$ _____

22. $5.4 = 2p + 0.6$ _____

23. $2(x + 2) = 3(x - 4)$ _____

24. $4 = 2(y - 5)$ _____

Solve each inequality for whole-number values of the variable. Graph the solution.

25. $3x < 18$ _____

26. $x + 2 \geq 7$ _____

Write an equation for each statement.

27. Nine less than five times a number is fifty-one.

_____

28. Shannon has $15 more than Emil, and together they have $49.

_____

Solve.

29. The length of a rectangle is 3 cm more than the width. The perimeter is 34 cm. Find the length and width.

_____

_____

30. One-fifth of Canada's medals at one Summer Olympics were silver. Canada won two silver medals that year. How many medals did Canada win that year?

_____

31. Angela has $5.00 more than Gino. Together, they have $40.00. How much does each of them have?

_____

_____

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Test Two CHAPTER 11: Algebra

MATHPOWER™ *Eight*, pp. 385–421

Evaluate for $x = 4$ and $y = 1.5$.

1. $3x + 4y$ _____

2. $x^2 - 3y$ _____

3. $3x^2 - (6y)^2$ _____

4. $2xy - 3x$ _____

Solve and check.

5. $x + 7 = 19$ _____

6. $y - 8 = 12$ _____

7. $5n = 40$ _____

8. $\frac{x}{3} = 9$ _____

9. $2t + 3 = 17$ _____

10. $4p - 1 = 15$ _____

Simplify.

11. $6x + 7y + 3x - 4y$ _____

12. $8m - 9 + 3n - 2m$ _____

13. $8a + 5 - 4b - 2b + 3a$ _____

14. $10t - 3s - 2t + 4s$ _____

Expand.

15. $3(x + 5)$ _____

16. $6(2a - 5)$ _____

17. $3(4m + 5n)$ _____

18. $7(3s - t)$ _____

Solve and check.

19. $3m + 2 = 8$ _____

20. $8 + 2z = 24$ _____

21. $20 = 4y - 4$ _____

22. $4t - 1.5 = 7.3$ _____

23. $4(a + 1) = 2(a + 8)$ _____

24. $3(x + 3) = -12$ _____

Solve each inequality for whole-number values of the variable. Graph the solution.

25. $4x < 24$ _____

26. $3x - 2 \geq 12$ _____

Write an equation for each statement.

27. The sum of three consecutive numbers is forty-five.

_____

28. If you multiply a number by nine, then subtract six, the result is fifty-seven.

_____

Solve.

29. Jupiter has eight times as many moons as Mars. Mars has two moons. How many moons does Jupiter have?

_____

30. The sum of three numbers is twenty-nine. The second number is three times the first number, and the third number is four more than the first number. What are the three numbers?

_____

_____

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Extension CHAPTER 11: Algebra

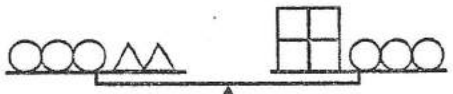
MATHPOWER™ *Eight*, pp. 385–421

1. Complete the table for $x < y$.

x	y	$x + y$	$3x - y$	$x + 4y$	$(x - y)^2$	$(y - x)^3$
−2	6					
−3				5		
	7				64	
0			−4			
		11				125
		9			25	

2. Use the clues to determine which objects must be placed in the right pan of the last seesaw to balance the seesaw. Draw the missing objects in the right pan. The objects in the left pan of the last seesaw cannot be used in the right pan of the last seesaw.

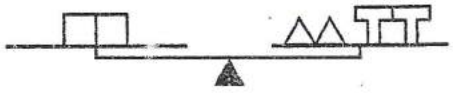
a) If



then

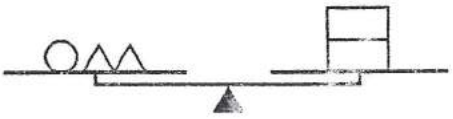
b) If

and



then

c) If



and

then

3. Evaluate the expression $\frac{4x - 3}{2}$ for each of the following values of x.

a) 0.5 _____ b) 1.8 _____

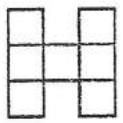
c) 0.75 _____ d) 3.2 _____

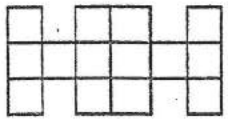
4. Evaluate the expression $4\frac{1}{3} + 5y$ for each of the following values of y.

a) $\frac{1}{2}$ _____ b) $\frac{3}{5}$ _____

c) $\frac{1}{8}$ _____ d) $\frac{3}{4}$ _____

5. The first figure is made up of one H-shape. It has a perimeter of 16 units. The second figure is made up of 2 connected H-shapes. It has a perimeter of 26 units.





a) Complete the table by finding the perimeters of the figures with the given numbers of H-shapes.

Number of H-Shapes	Perimeter
1	16
2	26
3	
4	
5	

b) What is the increase in the perimeter each time an H-shape is added?

_____

c) What is the perimeter of the figure made from 6 H-shapes? 7 H-shapes?

_____ _____

d) Write a formula for the perimeter in the form $P = ▲ \times n + ■$, where n is the number of H-shapes in the figure, and ▲ and ■ represent two different numbers.

_____

6. Solve each inequality for whole-number values of the variable. Graph each solution.

a) $2x + 1 < 11$ _____

b) $6x - 3 \geq 15$ _____

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12.2 Graphing Ordered Pairs

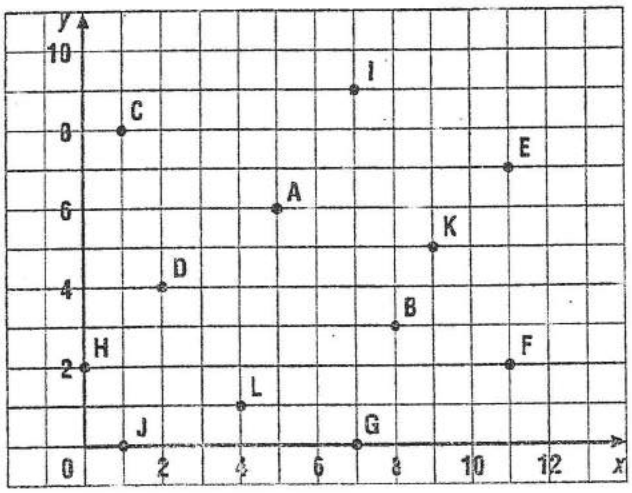
MATHPOWER™ *Eight*, p. 429

When plotting ordered pairs on a grid, the horizontal number line is called the **x-axis**. The vertical number line is called the **y-axis**. The two lines meet at the **origin**.

The first number of an ordered pair is the **x-coordinate**. The second number is the **y-coordinate**.

---

1. State the coordinates of each point.



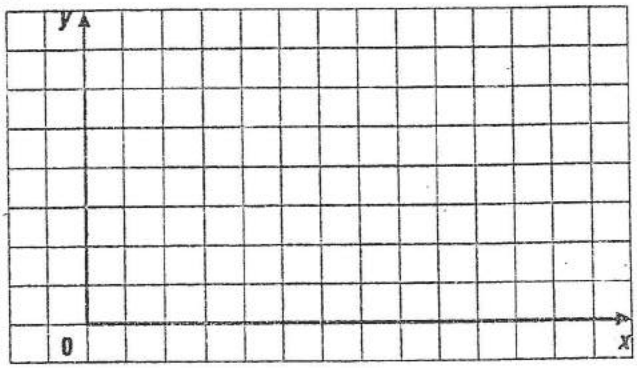
A _____ B _____ C _____

D _____ E _____ F _____

G _____ H _____ I _____

J _____ K _____ L _____

2. a) Plot the points A(2, 2), B(4, 6), C(9, 6), and D(7, 2) on the grid, and join the points in the order given. Join the last point to the first point.



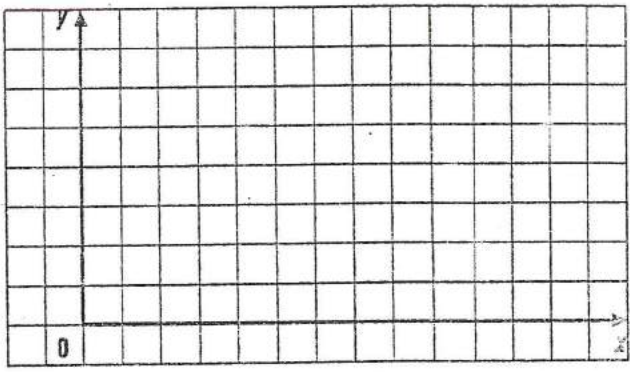
b) Identify the figure and calculate its area, in square units.

_____

_____

3. The points W(1, 3), X(1, 8), and Y(6, 8) are 3 vertices of a square.

a) Plot the points on the grid.



b) Find the coordinates of Z so that WXYZ is a square.

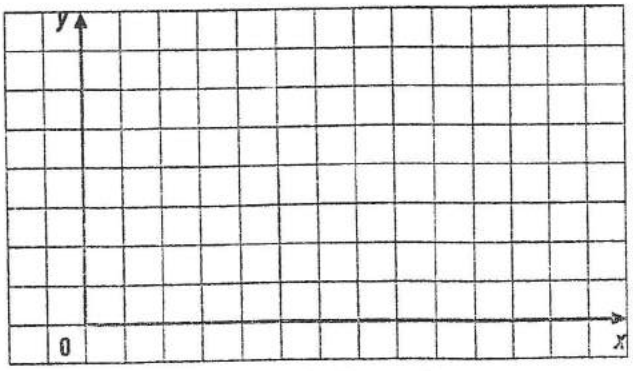
_____

c) Calculate the perimeter and the area of the square.

_____

_____

4. a) Plot the points A(6, 5), B(8, 1), and C(11, 1) on the grid, and join the points in order. Join the last point to the first point.



b) Classify the triangle formed.

_____

c) Calculate its area, in square units.

_____

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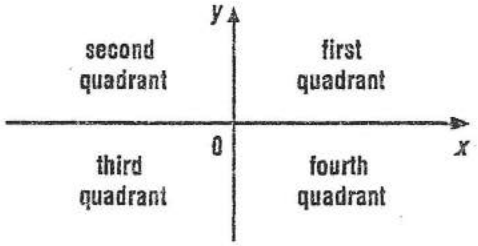
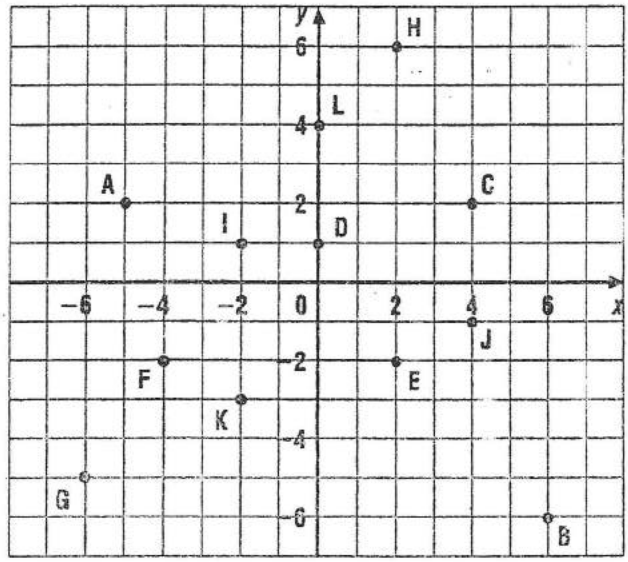
12.3 Graphing on the Coordinate Plane

MATHPOWER™ *Eight*, pp. 430–431

The x- and y-axes divide the coordinate plane into 4 quadrants.



1. a) State the coordinates of each point.



A _____ B _____ C _____

D _____ E _____ F _____

G _____ H _____ I _____

J _____ K _____ L _____

b) Plot each of the following points on the grid in part a).

M(5, −2), N(0, −4), P(−7, 6), Q(−3, −5), R(5, 7), S(−2, 4), T(3, 4), U(−7, −2)

c) Name 3 points on the y-axis.

_____

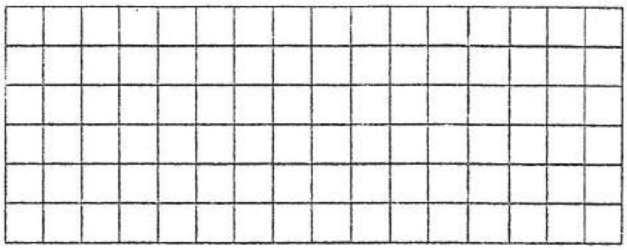
d) Name 3 points in the third quadrant.

_____

e) Name 3 points in the fourth quadrant.

_____

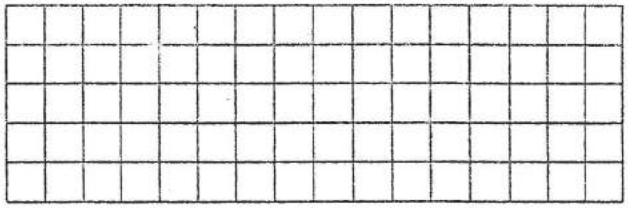
2. a) Plot the points A(2, 3), B(2, −2), C(−1, −2), and D(−1, 3) on the grid.



b) Identify the figure and find its area, in square units.

_____ _____

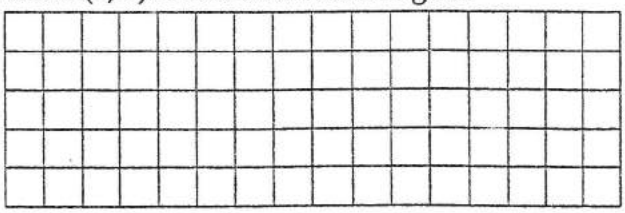
3. a) Plot the points P(−3, −1), Q(−2, 3), R(3, 3), and S(5, −1) on the grid.



b) Identify the figure and find its area, in square units.

_____ _____

4. a) $\triangle XYZ$ has vertices X(−3, 4), Y(4, 4), and Z(4, 0). Plot $\triangle XYZ$ on the grid.



b) Find the lengths of the sides, in units.

_____ _____ _____

c) Calculate the perimeter, in units, and the area, in square units, of the triangle.

_____ _____

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12.1 Relations as Ordered Pairs

MATHPOWER™ *Eight*, pp. 426–428

A set of ordered pairs is known as a **relation**. A relation can also be expressed as an equation, as a table of values, or in words.

Use each of the following equations.
a) *Complete the table of values.*
b) *Describe the relation in words.*
c) *Write the ordered pairs.*

1. $x + y = 4$

a)

x	y
3	
1	
−2	
−5	
−7	

b) _____

_____

c) _____

_____

2. $x - y = 3$

a)

x	y
4	
0	
−1	
−3	
−6	

b) _____

_____

c) _____

_____

3. $y = x + 5$

a)

x	y
3	
1	
−2	
−5	
−7	

b) _____

_____

c) _____

_____

4. $y = 3x - 1$

a)

x	y
3	
2	
0	
−2	
−3	

b) _____

_____

c) _____

_____

5. For the equation $x + y = 7$, find the missing value in each ordered pair.

a) (3, ☐) **b)** (7, ☐) **c)** (☐, 1)
d) (☐, 0) **e)** (−2, ☐) **f)** (−4, ☐)

6. For the equation $y = x - 5$, find the missing value in each ordered pair.

a) (2, ☐) **b)** (6, ☐) **c)** (☐, 1)
d) (0, ☐) **e)** (−3, ☐) **f)** (☐, 3)

7. List 5 ordered pairs of a relation for which the y-value is always 3 less than the x-value.

_____

_____

8. List 5 ordered pairs of a relation for which the x-value is always 4 times the y-value.

_____

_____

9. a) Make up a table of values where there is a relationship between the values of x and y.

x	y

b) Write an equation for the relation.

_____

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12.4 Graphing Relations

MATHPOWER™ *Eight*, pp. 434–435

1. Express each relation in words and draw its graph on the grid.

a)

x	y
−1	9
0	8
1	7
3	5
6	2

b)

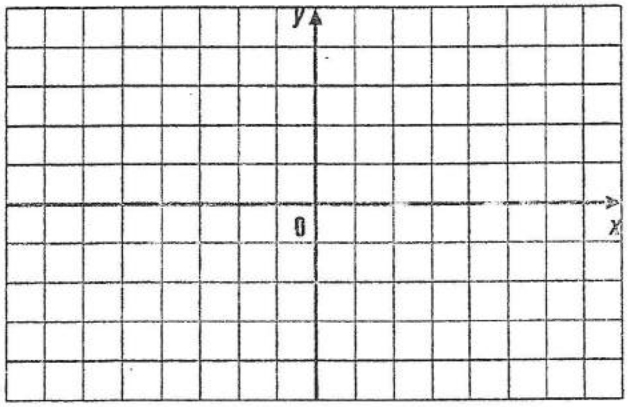
x	y
0	−2
2	0
4	2
8	6
−4	−6

a) _____

_____

b) _____

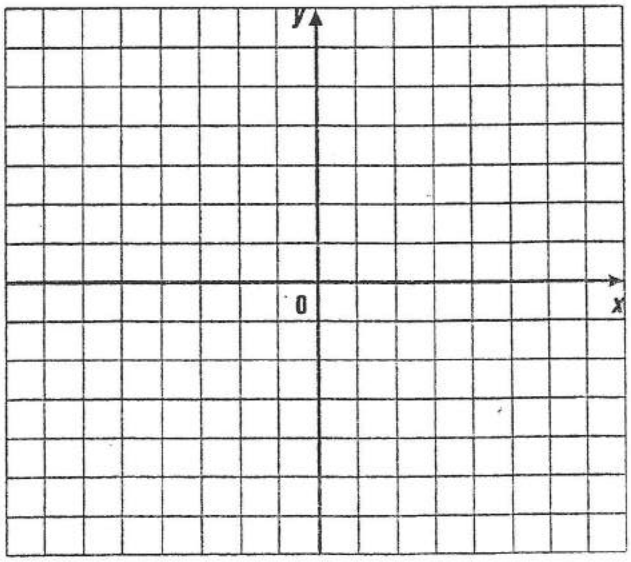
_____



2. Find 5 ordered pairs that satisfy each relation. Draw each graph on the grid.

a) $x - y = 4$ b) $x + y = 5$

c) $y = 3x + 1$ d) $y = x - 1$

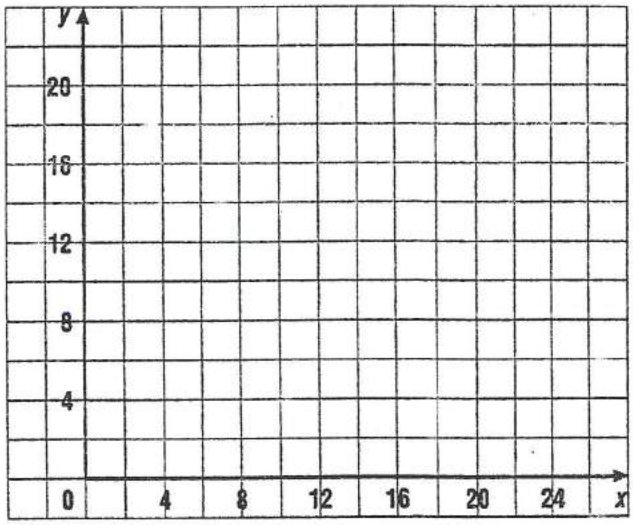


3. The area of a rectangle is 24 cm^2.

a) Complete the table for possible values of the length and width.

Width, w	Length, l	Ordered Pair, (w, l)
1		
2		
3		
4		
6		
8		
12		
24		

b) Graph the relation. Write the coordinates of each point on the grid.



c) What is the perimeter of each possible rectangle?

_____

_____

_____

_____

d) What are the dimensions of the rectangle that has the largest perimeter?

_____

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Test One CHAPTER 12: Relations

MATHPOWER™ *Eight*, pp. 423–443

Use each of the following equations.
a) *Complete the table of values.*
b) *Describe the relation in words.*
c) *Write the ordered pairs.*

1. $x + y = 7$

a)

x	y
3	
2	
1	
0	
−1	

b) _____

_____

_____

c) _____

_____

2. $x - y = 4$

a)

x	y
6	
5	
4	
3	
2	

b) _____

_____

_____

c) _____

_____

3. $y = 2x - 2$

a)

x	y
2	
1	
0	
−1	
−2	

b) _____

_____

_____

c) _____

_____

Write 5 ordered pairs for each relation.

4. $x + y = 6$ _____

_____

5. $x - y = 2$ _____

_____

6. $y = 8 - x$ _____

_____

7. $y = 3x - 2$ _____

_____

8. For the equation $y = x - 2$, find the missing value in each ordered pair.

a) (2, ☐) b) (3, ☐) c) (☐, 2)

d) (☐, 0) e) (−3, ☐) f) (☐, −4)

Write an equation for each relation.

9.

x	y
3	1
2	0
0	−2
−1	−3

_____

10.

x	y
−4	−1
−2	1
0	3
2	5

_____

Name the points on the grid with the following coordinates.

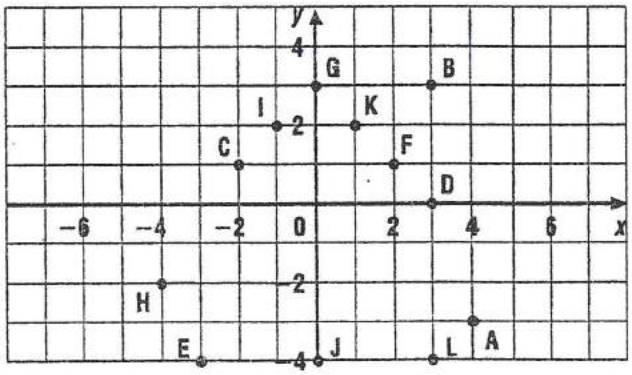
11. (3, 0) _____ **12.** (2, 1) _____

13. (−3, −4) _____ **14.** (4, −3) _____

15. (3, −4) _____ **16.** (−1, 2) _____

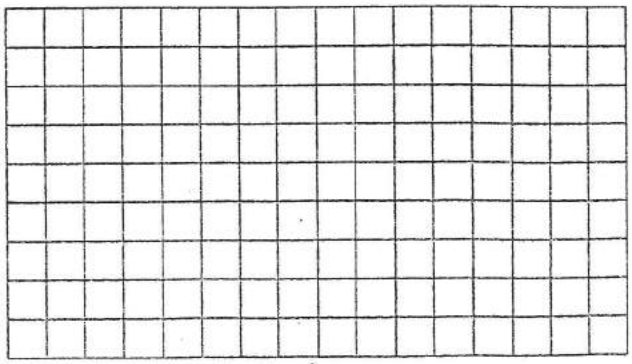
17. (1, 2) _____ **18.** (−4, −2) _____

19. (0, −4) _____ **20.** (−2, 1) _____



Draw a graph of each of the following relations.

21. $x - y = 5$ **22.** $y = 2x - 3$



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Test Two CHAPTER 12: Relations

MATHPOWER™ *Eight*, pp. 423–443

Use each of the following equations.
a) *Complete the table of values.*
b) *Describe the relation in words.*
c) *Write the ordered pairs.*

1. $x - y = 2$

a)

x	y
2	
1	
0	
−1	
−2	

b) _____

_____

_____

c) _____

_____

2. $y = 2x + 3$

a)

x	y
−3	
−2	
−1	
0	
1	

b) _____

_____

_____

c) _____

_____

3. $y = 4x$

a)

x	y
2	
1	
0	
−1	
−2	

b) _____

_____

_____

c) _____

_____

Write 5 ordered pairs for each relation.

4. $3x + y = 2$ _____

_____

5. $x - 2y = 1$ _____

_____

6. $y = 7x + 1$ _____

_____

7. $y = 4x - 2$ _____

_____

8. For the equation $y = x - 6$, find the missing value in each ordered pair.

a) (3, ☐) **b)** (2, ☐) **c)** (☐, 6)

d) (☐, 0) **e)** (−4, ☐) **f)** (☐, −3)

Write an equation for each relation.

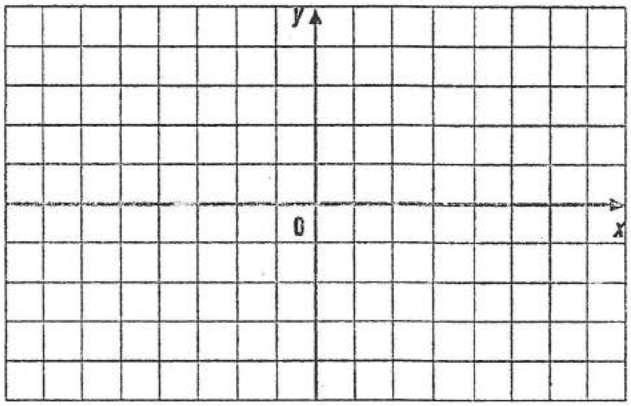
9. (5, 2), (−2, −5), (1, −2), (−4, −7), (0, −3)

_____

10. (−2, 4), (1, 1), (3, −1), (5, −3), (−3, 5)

_____

11. a) Plot the points A(−4, −4), B(−4, 5), C(3, 5), and D(3, −4) on the grid. Join the points in order. Join the last point to the first point.



b) Identify the figure formed.

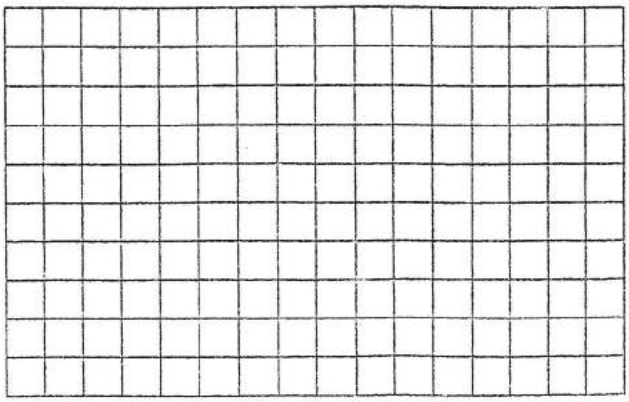
_____

c) Find its area, in square units.

_____

Draw a graph of each of the following relations.

12. $x + y = 6$ **13.** $y = 5 - 3x$



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Name _____

Extension CHAPTER 12: Relations

MATHPOWER™ *Eight*, pp. 423–443

Complete the table, given $y < x$.

	x	y	$x + 2y$	$2x^2 - y$	$12 + y^2$	$5x - 3y$
1.	3	−2				
2.	−1		−9			
3.				8		10
4.			2		16	
5.		−5		37		
6.					21	24

7. The sum of each row, column, and diagonal in the magic square is 9. Determine the value of each expression and complete the magic square using numerical values.

$6x$	$-7 - x$	$x + 4$
$x - 5$	$x^2 - 1$	$4x + 1$
$x - 2$	$9x - 3$	$-3x$

8. Find 5 ordered pairs that satisfy each relation. Graph each relation on the grid.

a) $x^2 = y - 2$

_____

_____

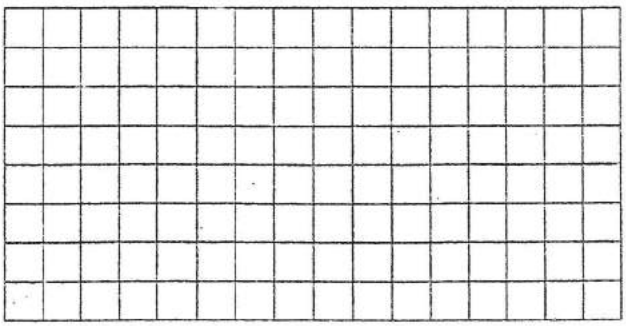
_____

b) $y = 2x + 2$

_____

_____

_____



c) Write 2 sets of coordinates where the graphs intersect.

_____

9. Write an equation for each relation. Graph the relation on the grid.

a)

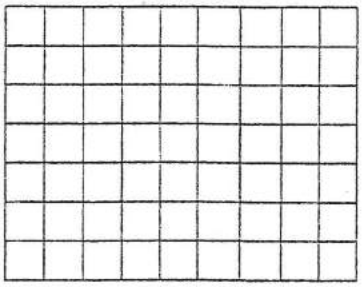
x	y
2	3
−4	−9
−1	−3
6	11
−2	−5

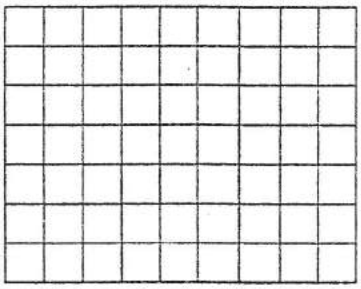
_____

b)

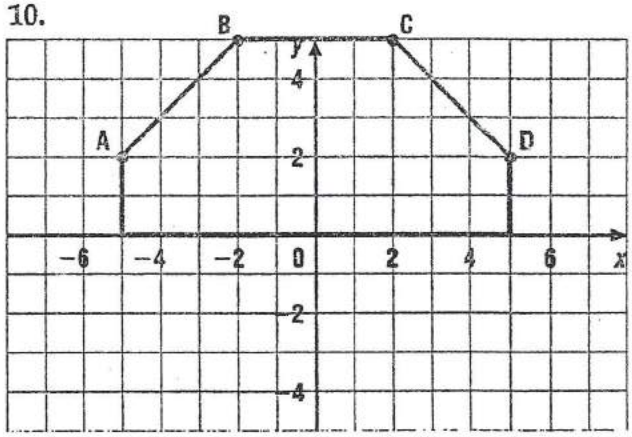
x	y
3	5
−2	0
−4	12
1	−3
2	0

_____





10.



a) State the coordinates of the vertices of the figure ABCD.

A _____ B _____

C _____ D _____

b) Write the coordinates of the points EFGH that complete an octagon that has the x-axis as a line of symmetry. Plot the points on the grid.

E _____ F _____

G _____ H _____

c) Find the area of the octagon, in square units.

_____

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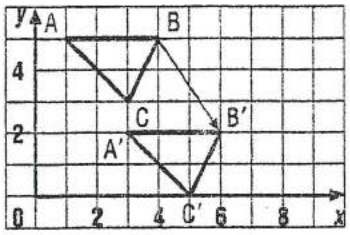
13.1 Translations

MATHPOWER™ *Eight*, pp. 448–449

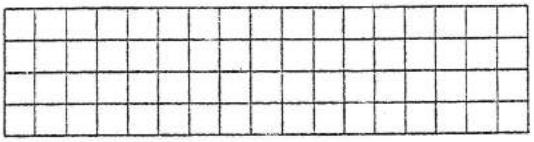
A **translation** is described by a slide.

$\triangle A'B'C'$ is the translation image of $\triangle ABC$.
The translation is 2 units right, 3 units down.
The ordered pair [2, −3] describes the translation.

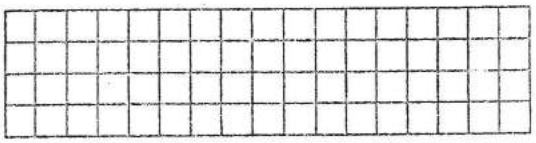


Draw arrows to show the given translations.

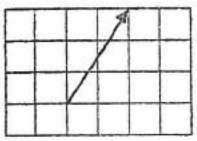
1. 4 units right, 2 units up
2. 3 units down
3. 2 units right, 3 units down

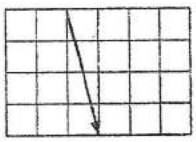


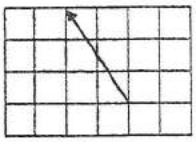
4. 5 units left, 3 units up
5. 4 units right
6. 3 units right, 4 units down

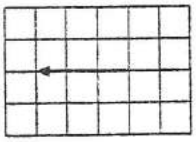


Describe the following translations.

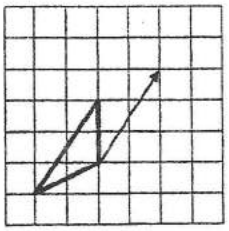
7. 

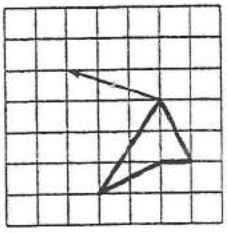
8. 

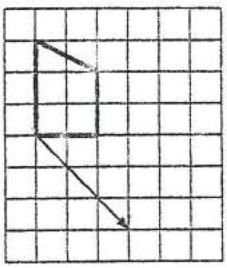
9. 

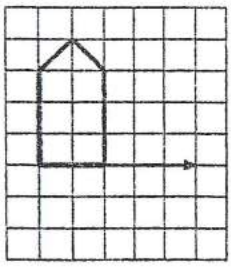
10. 

Draw the translation image for each translation.

11. 

12. 

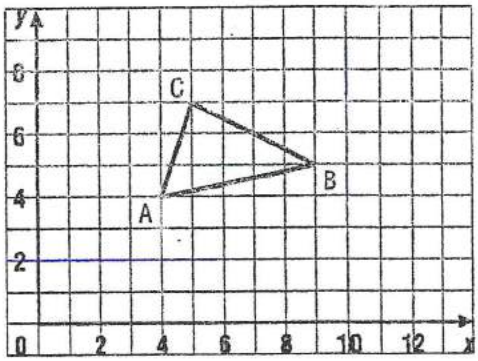
13. 

14. 

Draw the translation image of $\triangle ABC$ under each translation.

15. [4, −1]

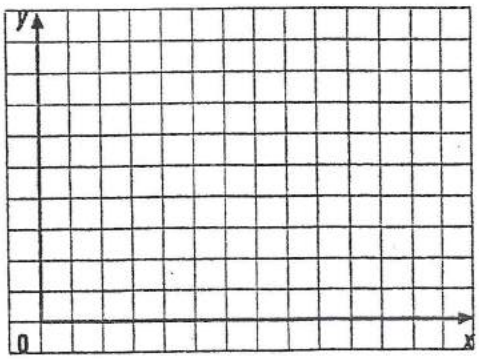
16. [−3, −2]



Draw each triangle on the grid. Then, draw the translation image.

17. A(1, 2), B(1, 5), C(4, 2); translation [3, −2]

18. P(4, 4), Q(7, 4), R(2, 6); translation [−2, −4]



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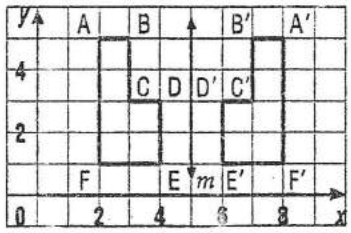
13.2 Reflections

MATHPOWER™ *Eight*, pp. 450–451

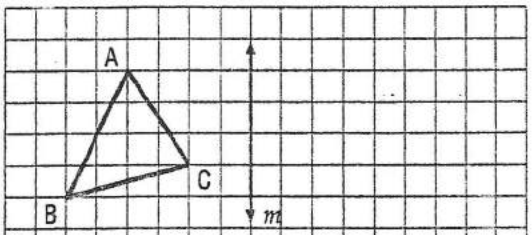
A **reflection** can be described as a flip about a **mirror line** or a **reflection line.**

A′B′C′D′E′F′ is the reflection image of ABCDEF with respect to line *m*.

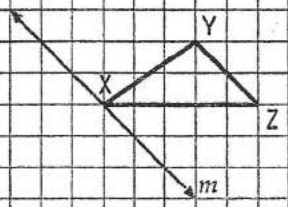


Draw the reflection image of each figure.

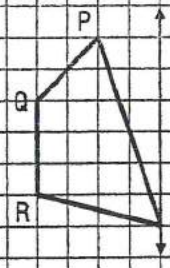
1.



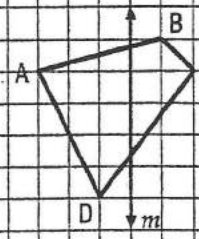
2.



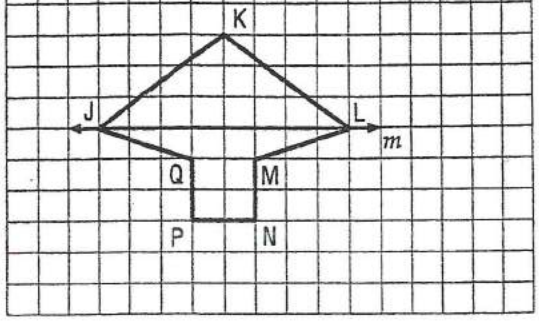
3.



4.

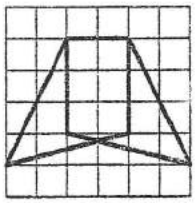


5.

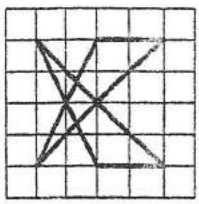


Draw the reflection line for each figure and its reflection image.

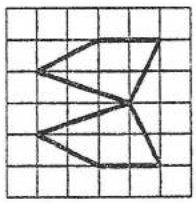
6.



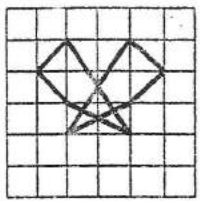
7.



8.

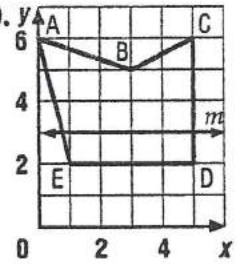


9.

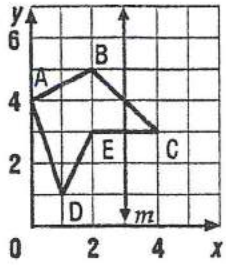


Draw the reflection image of each figure. Write the coordinates of the vertices of the original figure and the image.

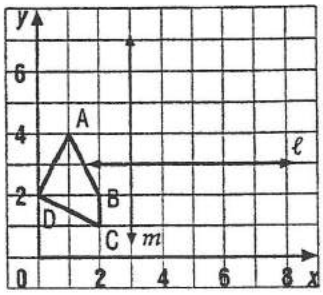
10.



11.



12. a) Draw the reflection image of ABCD in line *m* to give A′B′C′D′.



b) Reflect A′B′C′D′ in line *l* to give A″B″C″D″.

c) Write the coordinates of each figure.

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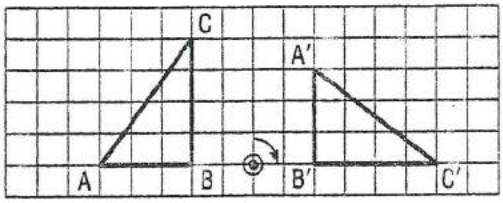
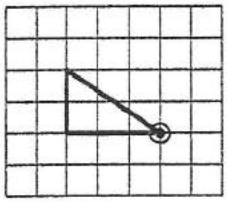
13.3 Rotations

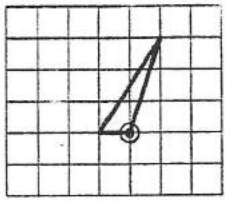
MATHPOWER™ *Eight*, pp. 452–453

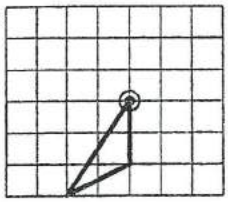
A **rotation** can be described as a turn about a point. This point is called the **turn centre**.

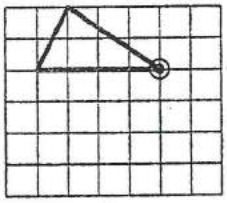


Draw the rotation image of each triangle after the indicated rotation.

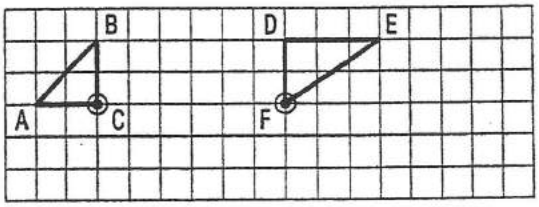
1. 
270° ccw

2. 
90° cw

3. 
180° ccw

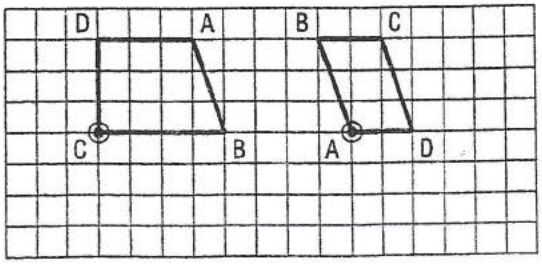
4. 
90° ccw

Draw the rotation image of each triangle for each given rotation.



5. 90° ccw 6. 180° cw 7. 90° cw

Draw the rotation image of each figure for each given rotation.

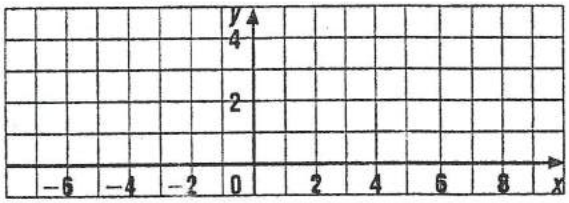


8. 90° cw 9. 180° ccw 10. 270° cw

Draw the figure and the rotation image for each of the following. State the coordinates of each rotation image.

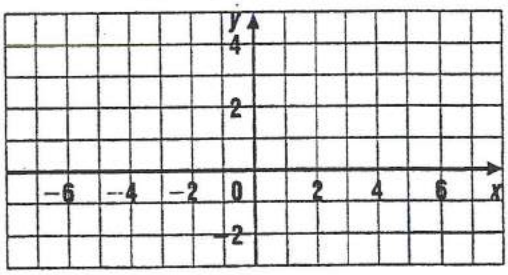
11. △ABC: A(8, 0), B(4, 0), C(5, 5)

Rotation: $\frac{1}{4}$ turn counterclockwise about B



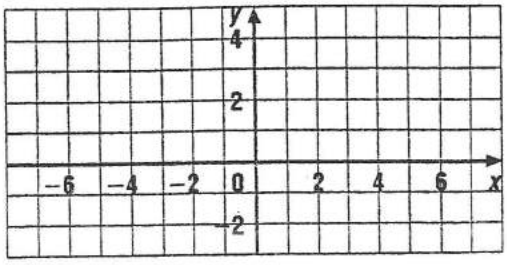
12. ABCD: A(2, 2), B(−2, 2), C(−2, 4), D(2, 4)

Rotation: $\frac{1}{2}$ turn clockwise about C



13. △ABC: A(−4, −1), B(−3, 2), C(0, 2)

Rotation: 90° cw about C



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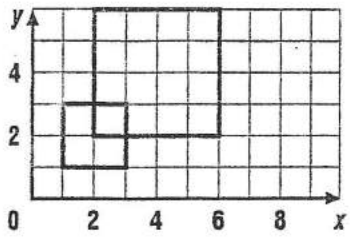
13.4 Dilatations

MATHPOWER™ *Eight*, pp. 458–459

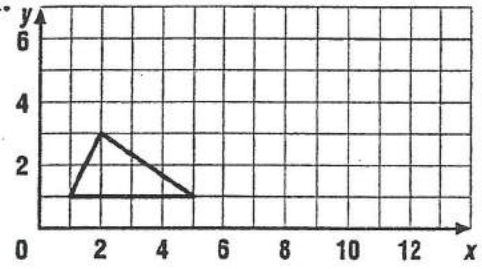
A **dilatation** can be described as a transformation that changes the size of an object.
If the image is larger than the original, the dilatation is an **enlargement**.
If the image is smaller than the original, the dilatation is a **reduction.**

The figure has been enlarged by a scale factor of 2, with a dilatation centre of (0, 0).

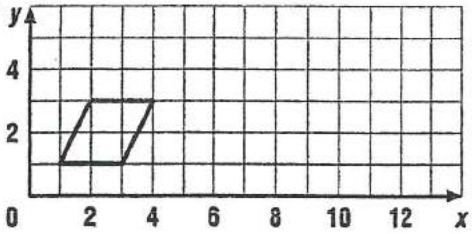


Enlarge each figure by a scale factor of 3, with the dilatation centre (0, 0).

1.

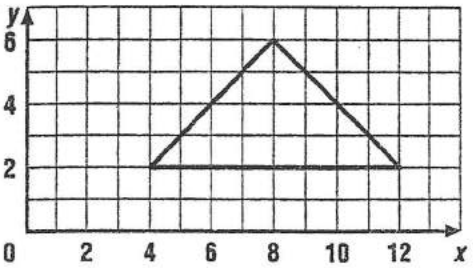


2.

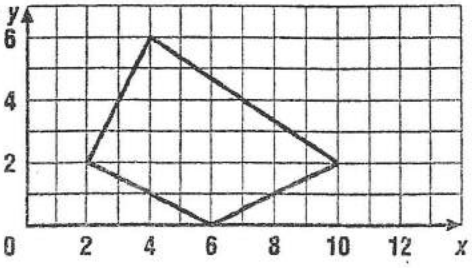


Reduce each figure by a scale factor of $\frac{1}{2}$, with the dilatation centre (0, 0).

3.

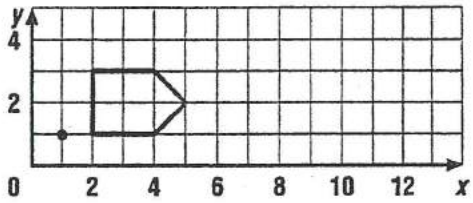


4.

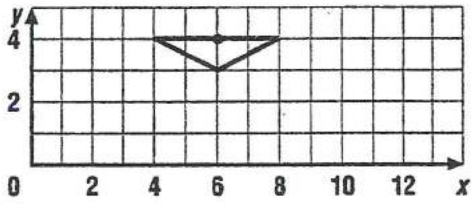


Draw the dilatation image, given the dilatation centre and the scale factor. Write the coordinates of the vertices of each image.

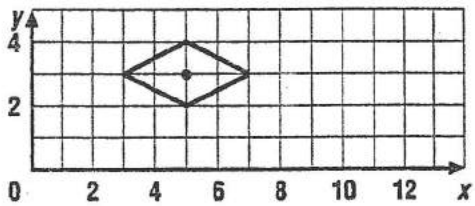
5. scale factor 2



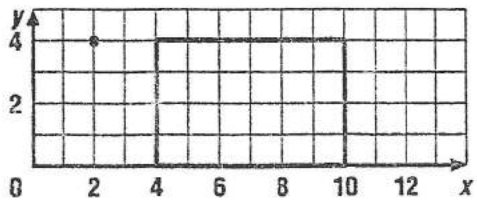
6. scale factor 3



7. scale factor 2



8. scale factor $\frac{1}{2}$



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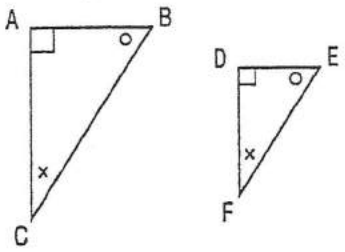
13.5 Similar Figures

MATHPOWER™ *Eight*, pp. 460–461

Similar figures have the same shape, but not necessarily the same size.

$\triangle ABC \sim \triangle DEF$ (~ means "is similar to")

$$\frac{AB}{DE} = \frac{AC}{DF} = \frac{BC}{EF}$$



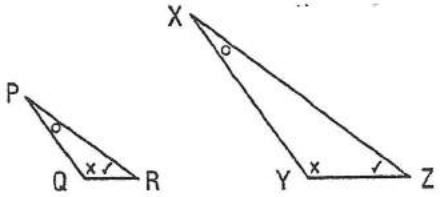
Each pair of triangles is similar.

a) *Name the equal angles.*

b) *Write the proportion for the sides.*

c) *Write a similarity statement.*

1.

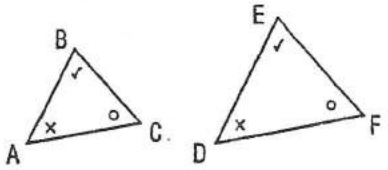


a) _____

b) _____

c) _____

2.



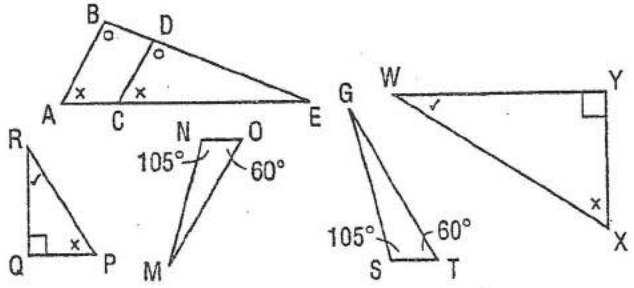
a) _____

b) _____

c) _____

3. Decide which triangles are similar.

a) Write similarity statements for the pairs of similar triangles.



_____

_____

_____

b) Name the equal angles.

_____

_____

_____

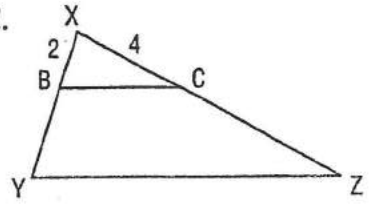
c) Write the proportion for the sides.

_____

_____

_____

4. $\triangle XYZ \sim \triangle XBC$. The ratio of corresponding sides $\frac{XB}{XY}$ is $\frac{1}{4}$.



Find these lengths.

a) XY _____ b) BY _____

c) XZ _____ d) CZ _____

5. When the shadow cast by a 1.2-m fence post was 1.8 m, the shadow cast by a pine tree was 27.6 m and by an oak tree was 45 m. How tall was each tree?

_____ _____

6. The length of each side of a square is 15 cm.

a) Calculate the area and perimeter of the square.

_____ _____

b) Calculate the area and perimeter of a square with sides half the length of the first square.

_____ _____

c) Describe the relationship between the areas and perimeters of the squares.

_____

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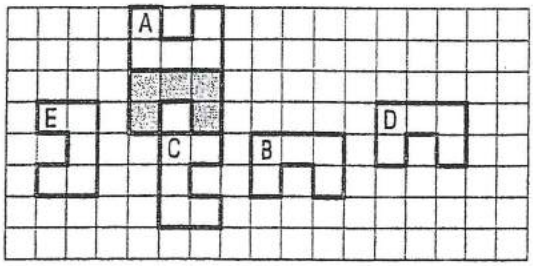
Name _____

Test One CHAPTER 13: Transformations

MATHPOWER™ *Eight*, pp. 445–469

1.



a) Which figures are translation images of the original figure?

_____

b) Which figures are rotation images of the original figure?

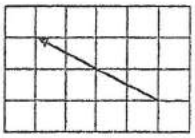
_____

c) Which figures are reflection images of the original figure?

_____

Describe each translation in words.

2.

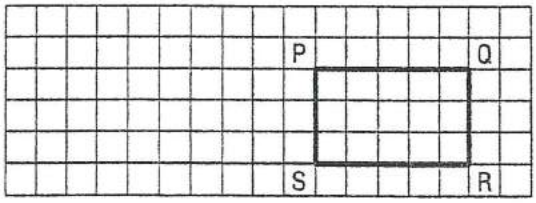


_____

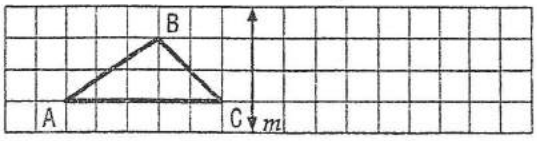
3. [3, −2]

_____

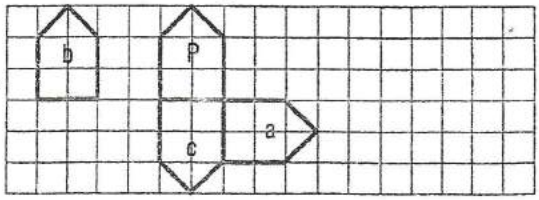
4. Draw the translation image of PQRS translated 4 units left and 2 units up.



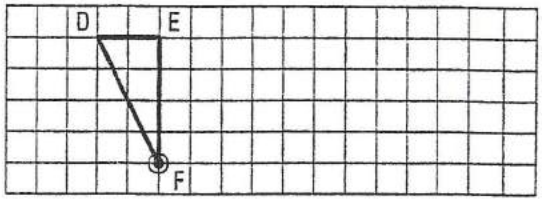
5. Draw the reflection image of △ABC in line *m*.



6. Draw the reflection line between P and each of the other figures.



7. Draw the rotation image of △DEF after a rotation of 90° cw about the indicated turn centre.



8. Name another rotation that will give the same image as each of the following.

a) 1 turn clockwise _____

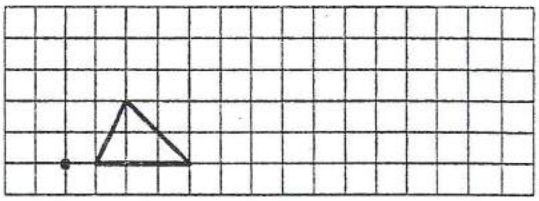
b) 90° clockwise _____

c) $\frac{1}{4}$ turn counterclockwise _____

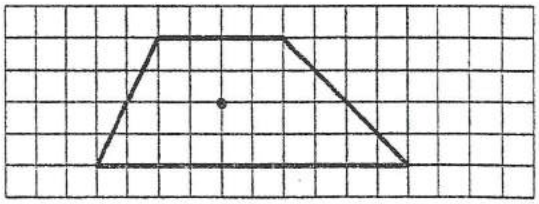
d) $\frac{3}{4}$ turn counterclockwise _____

9. Draw the dilatation image, given the dilatation centre and the scale factor.

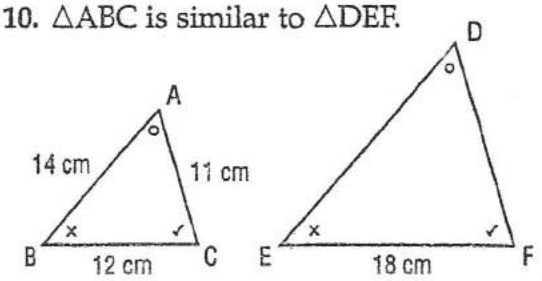
a) scale factor 2



b) scale factor $\frac{1}{2}$



10. △ABC is similar to △DEF.



Find the length of DE and DF.

_____ _____

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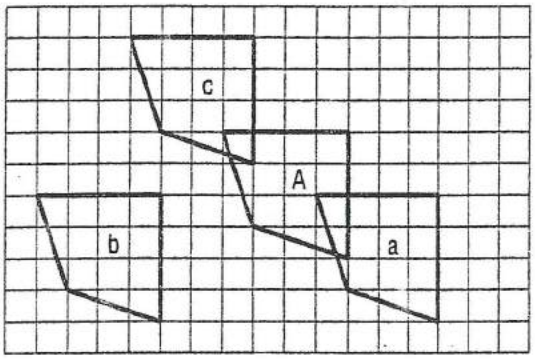
Test Two CHAPTER 13: Transformations

MATHPOWER™ *Eight*, pp. 445–469

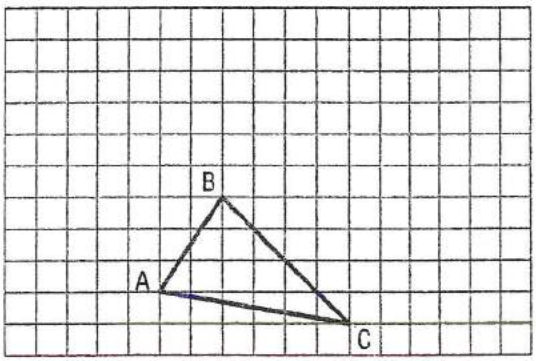
1. Describe the translation that maps A onto each of the other figures.



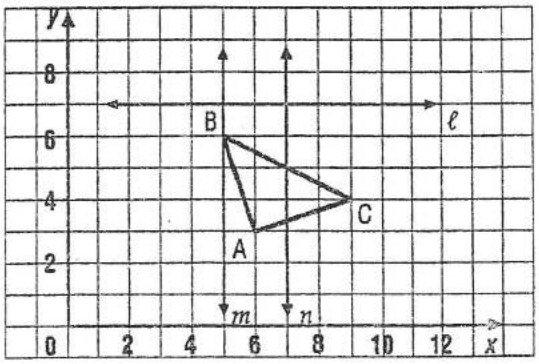
a) _____ b) _____

c) _____

2. Draw the image of $\triangle ABC$ under the translation $[-1, 3]$.



3. a) Draw the reflection image for each reflection line.



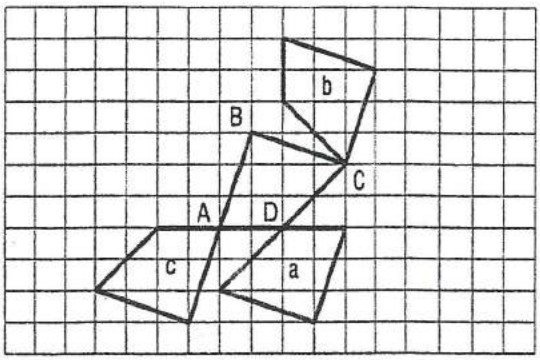
b) State the coordinates of each image.

_____

_____

_____

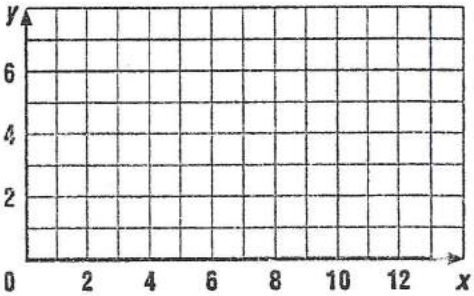
4. Describe the rotation and the turn centre that produces each image.



a) _____ b) _____

c) _____

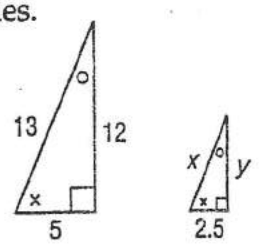
5. a) Draw $\triangle ABC$ on the grid, with A(1, 2), B(2, 1), and C(4, 2).



b) Draw the dilatation image with a scale factor of 2, using (0, 0) as the centre of dilatation.

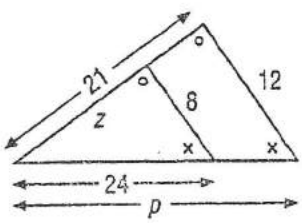
6. The pairs of figures are similar. Find the unknown sides.

a)



_____

b)



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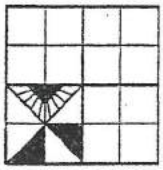
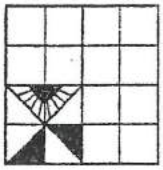
Extension CHAPTER 13: Transformations

MATHPOWER™ *Eight*, pp. 445–469

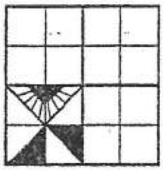
1. a) Use translations of the design to complete the grid.



b) Use reflections of the design to complete the grid.

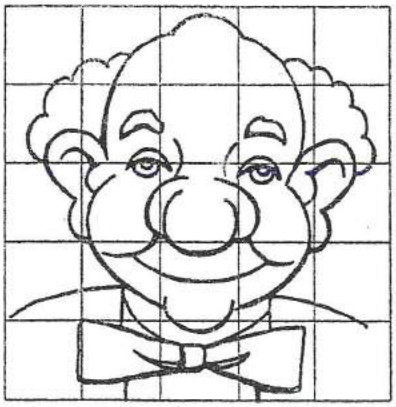


c) Use rotations of the design to complete the grid.

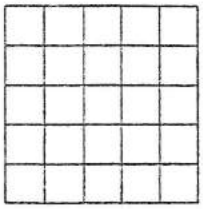


d) Describe in terms of symmetry how the 3 patterns you created are the same and how they are different.

2. a)



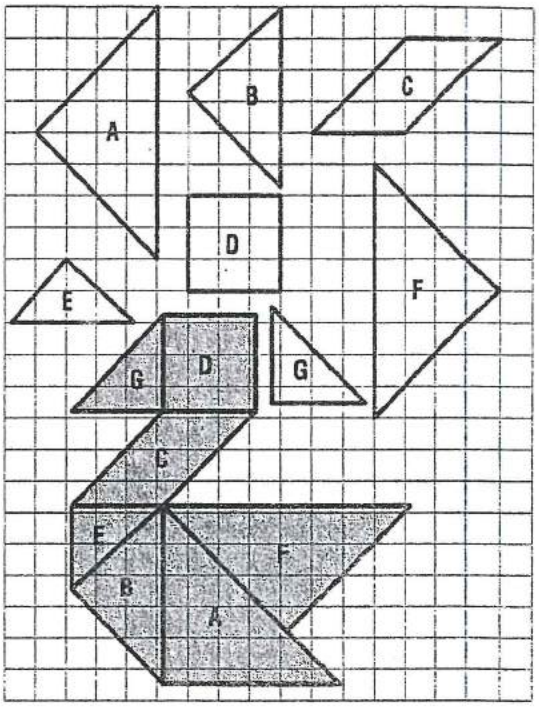
Using the grid lines as a guide, reduce the cartoon character onto the smaller grid .



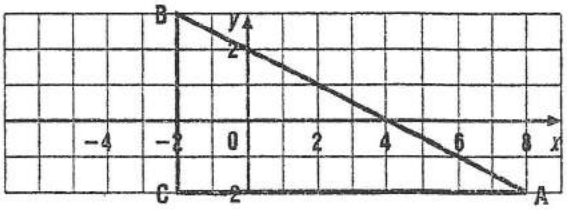
b) By what factor has the picture been reduced?

c) What fraction of the area of the original picture is the area of the reduced picture?

3. The seven tangram pieces are arranged in the shape of a duck. Describe a transformation, or series of transformations, that moves each tan from its location on the grid to the correct location in the figure.



4.



a) What are the coordinates of triangle ABC?

b) Plot point D(4, −2) and E(4, 0). Draw triangle ADE. Write the proportion for the sides of the 2 triangles.

c) Calculate the lengths of the sides of triangle ABC, to the nearest tenth of a unit. Use proportions to calculate the lengths of the sides of triangle ADE.

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27. 49.0549 28. 126.31 29. 42.3 30. 114
31. 229.95

1.9 Multiplying Numbers

1–15. Estimates will vary. 1. 96 2. 297
3. 70.2 4. 74.4 5. 48.3 6. 56.24 7. 2.45
8. 1.626 9. 6.408 10. 1961 11. 458.8
12. 24.07 13. 3.015 14. 54.87 15. 35.412
16. 13 600 17. 2027.5 18. 2777.6 19. 310.78
20. 360 21. 0.0486 22. 4 030 452 23. 1 321 875
24. 11 709.6 25. 2036.08 26. 29.6786
27. 2179.059
28.

$$\begin{array}{r} 648 \\ \times\ 63 \\ \hline 1944 \\ 3888 \\ \hline 40824 \end{array}$$

29.

$$\begin{array}{r} 79 \\ \times\ 37 \\ \hline 553 \\ 237 \\ \hline 2923 \end{array}$$

30. a) \$206.40 b) \$412.80 c) \$361.20
d) \$129.00 31. 2.5 and 7.5

1.10 Dividing Numbers

1. 16 2. 1.9 3. 5.6 4. 1.09 5. 1840 6. 13
7. 13.75 8. 4200 9–20. Estimates may vary.
9. 18 10. 3.6 11. 30.4 12. 4.64 13. 0.25
14. 24 15. 8.6 16. 3.3 17. 4.7 18. 18.7
19. 229.8 20. 1652.7 21. 3.7 m 22. a) 630
b) 6.7 23. 53.4

1.12 Order of Operations

1. 21 2. 18 3. 52 4. 13 5. 2.8 6. 1.9 7. 40
8. 57 9. 9 10. 16 11. 0.4 12. 5 13. 6 14. 4
15. 9.6 16. 2 17. 5.41 18. 12.2 19. 11.3
20. 28 21. < 22. = 23. > 24. <
25. $(8 + 7) \times 3 + 9 = 54$ 26. $8 + 7 \times (3 + 9) = 92$
27. $6.2 - (1.5 \times 0.6 + 2.4) = 29$ 28. $6.2 - 1.5 \times (0.6 + 2.4) = 1.7$ 29. $7 \times 8 \div (14.2 - 4.2) = 5.6$
30. $4 \times (8 + 3 \div 11) = 4$ 31. $x + 76 + 2 \times 88 + 2 \times 92 = 515$; 79

1.13 Problem Solving: Sequence the Operations

1. \$642.35 2. 3 441 000 km^2 3. 10 months; \$15.35 each 4. 411 5. \$187.13 6. 15 days
7. \$18.92 8. \$0.08

Test One Chapter 1: Number Connections

1. five hundred forty-two and sixty-seven hundredths 2. four hundred twenty-eight thousandths 3. 8239 4. 300.208
5. 62 003 042.28 6. $7 \times 100\,000 + 8 \times 10\,000 + 9 \times 1000 + 4 \times 100 + 2 \times 1$
7. $3 \times 10 + 8 \times 1 + 6 \times 0.1 + 8 \times 0.01 + 1 \times 0.001$ 8. 62 400 9. 48.6 10. 346 11. 0.619
12-14. Estimates may vary. 12. 200 13. 500
14. 900 15. 286.2 16. 349 17. 4.816
18. 18.7654 19. 0.016 21 20. 8.734 21. 42
22. 642 000 23. 800 24. 2750.77
25. 143.9 26. 106.8 27. 2240 28. 18.688
29. 7.32 30. 45.36 31. 16 32. 19.2

Test Two Chapter 1: Number Connections

1. 20 000 2. 0.005 3. 4000 4. 0.7 5. one thousand eighty-seven and two tenths
6. two and four hundred sixty-five thousandths 7. 848.033 8. 2003.406
9. 0.389 10. $4 \times 10\,000 + 3 \times 1000 + 6 \times 100 + 2 \times 10 + 3 \times 0.1 + 2 \times 0.01$ 11. $1 \times 10 + 2 \times 1 + 6 \times 0.001$ 12. 110 000 13. 490 14. 81.6
15. 0.083 16–18. Estimates may vary.
16. 1100 17. 200 18. 850 19. 1.349 20. 8.0006
21. 74 820 22. 630 23. 1200 24. 0.021 25. 977
26. 18.87 27. 124.72 28. 11 859 29. 1788
30. 173.42 31. 138 32. 48.3 33. 16 34. 7.5

Extension Chapter 1: Number Connections

1. a) 6829.013 b) 537 014 c) 5 000 361.4
d) 98 200.52 e) 1 643 075 2. a) 7 285 479.933
b) 91 371.507 c) 4 993 532.387 d) 7 180 450.4
3. a) 2056.3 b) 38.2 4. 78 550.66 5. a) 820.4
b) 13.2 6. 62.2 7. 0.0628 8. 0.0225 9. 1417
10. 44 11. 180 12. 48 13. 27.3 14. 4.7
15. 37.9 16. 8 17. 11.4 18. 17.6 19. No brackets needed. 20. $(12.5 \times 6.7 \div 5 + 12.2) \times 6.4 = 185.28$
21. $12.5 \times (6.7 \div 5 + 12.2) \times 6.4 = 1083.2$

CHAPTER 2: Number Theory

2.1 Exponents

	Power	Base	Exponent	Standard Form
1.	2^4	2	4	16
2.	3^3	3	3	27
3.	7^3	7	3	343
4.	6^2	6	2	36
5.	8^2	8	2	64
6.	10^4	10	4	10 000

7. 4^5 8. 3^7 9. 7^5 10. 10^2 11. 10^6 12. 10^4
13. 10^3 14. 4^9 15. 9^4 16. 2^7 17. 6^{13}
18. 5 19. 3 20. 5 21. 12 22. 3^4 23. 4^7 24. 6^5
25. 11 26. 4 27. 3 28. 8 29. 8 30. 5^5 31. 2^7

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Answers

CHAPTER 1: Number Connections

1.1 Choosing a Calculation Method

1. approximate 2. exact 3. approximate
4. approximate 5. exact 6–9. Answers may vary.
6. mental math 7. calculator 8. paper and pencil
9. computer 10. 50 11. 43.01 12. 606 13. 28 077
14. Answers will vary.

1.2 Place Value and Ordering

1. sixteen million forty-two thousand six hundred thirty-one 2. fourteen and thirty-two hundredths 3. four hundred thirty-nine thousandths 4. sixty-five thousand three hundred twenty-four and seven hundred eighty-three thousandths 5. 2000 6. 0.04 7. 80 000 000
8. 800 042 9. 74 000 363.4 10. 4032.45
11. 1 203 431 12. 4082.068 13. 0.0203
14. $6 \times 10 + 7 \times 1 + 7 \times 0.01 + 3 \times 0.001$
15. $1 \times 10\,000\,000 + 2 \times 1\,000\,000 + 3 \times 100\,000 + 7 \times 10\,000 + 9 \times 1000 + 2 \times 1$
16. $2 \times 0.1 + 4 \times 0.01 + 6 \times 0.001$ 17. $<$
18. $>$ 19. $<$ 20. $>$ 21. 36.027, 36.072, 36.207, 36.270, 36.702, 36.720

1.3 Rounding Numbers: Mental Math

1. 74 283.63 2. 74 283.6 3. 74 284 4. 74 280
5. 74 300 6. 74 000 7. 70 000 8. 4; 17 000
9. 8; 74 10. 6; 0.85 11. 1; 205 480 12. 5; 439.6
13. 7; 2.399 14. nearest one
15. nearest thousand 16. nearest tenth
17. nearest thousandth 18. nearest ten
19. 0, 1, 2, 3, 4 20. 5, 6, 7, 8, 9 21. 5, 6, 7, 8, 9
22. 0, 1, 2, 3, 4 23. 900 000 24. 1920 25. 315
26. 3954 27. 0.03 28. 2000

1.4 Problem Solving: Look for a Pattern

1. 20, 24, 28 2. 8, 4, 2 3. r, p, n 4. c, x, d
5. 23, 16, 8 6. 12, 15, 18 7. 7, 9, 11 8. 17, 26, 37
9. a) abc, acb, bac, bca, cab, cba b) 24 ways c) 120 ways d) Answers will vary. 10. a) 14 b) 22 c) 32 11. The first and last digits of thesecond multiplier form the first and last digits of the product. The middle digit of the product is the sum of the first and last digits. 12. a) 561 b) 396 c) 693 d) 792 e) 297 f) 891
13. The pattern is the same, but the sum of the two digits in the multiplier results in a carry of 1 which must be added to the first digit of the product.
14. a) 836 b) 957 c) 1045 d) 638 e) 517 f) 704

1.5 Estimating Sums and Differences: Mental Math

Estimates may vary. 1. Rounding: 1000; Compatible Numbers: 950; Front-End Estimation: 700; Clustering: 1000 2. 1500
3. 300 4. 40 5. 100 6. 29 7. 80 8. 200
9. 2000 10. $16 11. 100 12. $110 13. 2100
14. 2500 15. 30 16. 240 17. less than
18. greater than, 410 19. greater than, 301.5
20. less than, 62 21. less than, 289.59
22. greater than

1.6 Adding and Subtracting

1. 83 781 2. 28.5 3. 1532.44 4. 153 5. 35 615
6. 434 7. 24.73 8. 64.51 9. 139 242 10. 1442.775
11. 33 700 12. 25.15 13. 475.05
14.

Number	Number	Sum	Difference
106 249	83 976	190 225	22 273
47.053	137.65	184.703	90.597
1262.06	951.38	2213.44	310.68
401.028	579.803	980.831	178.775
8.0619	12.198	20.2599	4.1361

15. 5288 16. 18 845 17. 57.759 18. 166.56
19. 126 years 20. a) 1 679 764 b) 48 428

1.7 Multiplying and Dividing by Powers of Ten: Mental Math

1. 327.1 2. 2.41 3. 634.2 4. 40 000
5. 2 700 000 6. 2025.1 7. 1045.2 8. 0.0623
9. 6.2245 10. 3.29 11. 12.0873 12. 0.7
13. 24.167 14. 34.2 15. 44.01 16. 0.030 263
17. 69.333 18. 0.0023 19. 35.9 20. 0.64
21. 133.2 22. 430 23. 34 290 24. 400
25. 287 000 26. 132.04 27. 0.823
28. 9.203 132 29. 362.8 30. 72 800
31. 64 550 32. 6.209 33. 230 cm 34. 34 cm
35. 4.87 km 36. 0.00 462 km 37. $\div 100\,000$

1.8 Estimating Products and Quotients: Mental Math

1–26. Answers will vary. 1. 3600 2. 140
3. 800 4. 4000 5. 480 6. 1000 7. 700 8. 150
9. 8 10. 7 11. 11 12. 7 13. 15 14. 90 15. 3
16. 2 17. 6 18. 11 19. 6 20. 45 21. $3
22. $2 23. $150 24. $9 25. $3 26. $2

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32. 7^8 33. 9^6 34. 3^5 35. 4^5 36. 6 37. 10^9 38. 64
39. 1 40. 625 41. 729 42. 64 43. 256

2.2 Squares and Square Roots

1. 11 2. 15 3. 13 4. 9 5. 1.4 6. 1.6 7. 0.7
8. 2.5 9. 256, 900, 1.96, 361, 0.49, 1024
10–15. Answers will vary. 16. 5, 6 17. 4, 5
18. 8, 9 19. 8, 9 20. 10, 11 21. 6.3 22. 9.2
23. 13.7 24. 28.6 25. 41.2 26. 0.7 27. 0.2
28. a) 7.3 cm b) 10.4 m c) 12.2 cm 29. a) 3
b) 9, 81 c) 9, 81

2.3 Problem Solving: Solve a Simpler Problem

1. 325 2. 165 3. 2200 4. 78
5. approximately 1.2 m 6. 153 7. 200
8. 50 000 9. 101 10. 45 11. 28 12. 210

2.4 Order of Operations

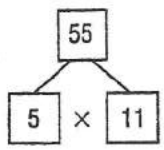
1. 69 2. 98.6 3. 7.28 4. 2.72 5. 34.24 6. 16
7. 1 8. 23 9. 1.96 10. 64 11. 4.16 12. 13.23
13. 4.03 14. 36.849 15. $5.5 + 4.8 \times (13.1 - 9.5) = 22.78$ 16. $(6^2 + 8^2) \div 4 - 11.6 = 13.4$ 17. $2.2 \times (2^2 + 2^2 \times 2^2) = 44$ 18. $7.4^2 \div (3.2 + 0.8) = 13.69$
19. > 20. > 21. 9 22. 51 23. 4 24. 8
25. ALWAYS FOLLOW BEDMAS

2.5 Factors and Divisibility

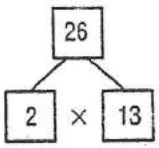
1. 8 2. 22 3. 10 4. 12 5. 3, 5 6. 3, 7 7. 3, 11
8. 2, 11 9. 1, 2, 3, 4, 6, 9, 12, 18, 36 10. 1, 2, 3, 6, 9, 18, 27, 54 11. 1, 3, 7, 9, 21, 63 12. 1, 5, 19, 95
13. 1, 89 14. 1374, 1842 15. 3780, 4984
16. 3330, 47 172, 2778 17. 6312 18. 2, 3
19. 5, 5 20. 2, 8; 4, 4 21. 2, 12; 3, 8; 4, 6 22. 4
23. 3, 7 24. 0, 2, 4, 6, 8 25. 0, 5 26. 2, 5, 8
27. Answers will vary. Any odd number.

2.6 Composite and Prime Numbers

1. 11, 29, 31, 7, 47, 73, 67, 89, 17, 23
2.



3.



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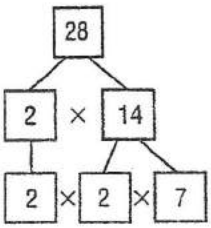
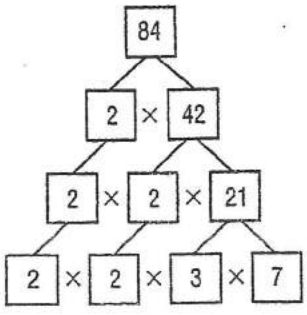
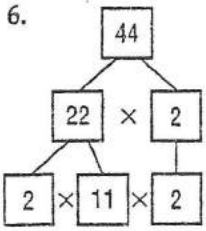


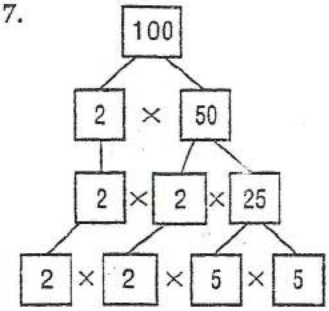
5.



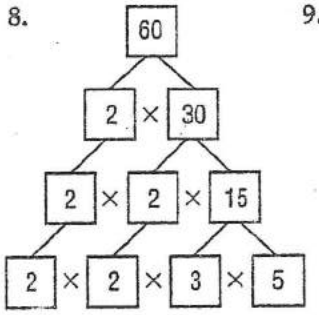
6.



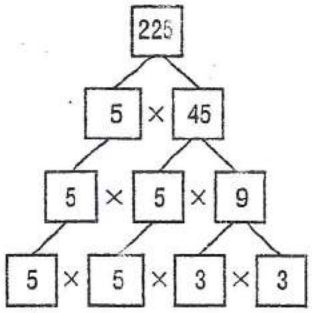
7.



8.



9.



10. $2 \times 3 \times 7$ 11. $2 \times 5 \times 11$ 12. $3 \times 5 \times 5 \times 7$
13. $2 \times 2 \times 5 \times 3 \times 3$ 14. $2 \times 7 \times 3 \times 3$ 15. $3 \times 3 \times 7 \times 7$ 16. $2 \times 2 \times 3 \times 3 \times 11$ 17. $2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 5$ 18. 3 19. 5 20. 7 21. 11 22. 5
23. 1001 24. 77, 91, 143

2.7 Greatest Common Factor

1. 1, 2, 4, 8; 1, 2, 3, 4, 6, 12; GCF = 4 2. 1, 3, 9; 1, 2, 3, 6, 9, 18; 1, 3, 7, 21; GCF = 3 3. 1, 2, 4, 8, 16; 1, 2, 4, 8, 16, 32; 1, 2, 4, 5, 8, 10, 20, 40; GCF = 8 4. 1, 3, 5, 15; 1, 2, 3, 5, 6, 10, 15, 30; 1, 2, 5, 10, 25, 50; GCF = 5 5. 6 6. 13 7. 5
8. 9 9. 5 10. 9 11. 7 12. 36 13. 24 14. 17
15. 11 16. 13 17. 14 18. 6 19. 9 20. 7
21. Answers will vary. 14, 28, 42 22. 27, 54; 27, 81; 54, 81 23. Answers will vary. 25, 50, 75
24. a) 9 b) 13

2.8 Problem Solving: Work Backward

1. 14 2. 10 3. 49 4. $513.80 5. 07:40
6. a) Avenue B and 3rd Street b) Avenue I and 2nd Street; Avenue D and 3rd Street
7. 40 years 8. $460.61

2.9 Multiples and the Lowest Common Multiple

1. 8: 8, 16, (24), 32, 40, 48, 56, 64, 72, 80; 6: 6, 12, 18, (24), 30, 36, 42, 48, 54, 60 2. 3: 3, 6, 9, 12, (15), 18, 21, 24, 27, 30; 5: 5, 10, (15), 20, 25, 30, 35, 40, 45, 50
3. 4: 4, 8, 12, 16, 20, 24, (28), 32, 36, 40; 7: 7, 14, 21, (28), 35, 42, 49, 56, 63, 70 4. 12 5. 10 6. 42
7. 20 8. 24 9. 18 10. 55 11. 36 12. 56, 32; 224
13. 144, 108; 432 14. 30 15. 56 16. 56
17. 72 18. 75 19. 168 20. 60 21. 180 22. 63

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23. 180 24. a) 24 b) 6 petunias, 4 impatiens, 3 marigolds 25. every 60 s

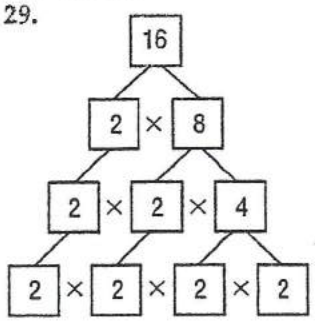
2.10 Problem Solving: Make Assumptions

1. 10, 12, 14 2. 10, 7, 4 3. 48, 96, 192 4. 27, 9, 3
5. 14, 20, 27 6. g, j, i 7. a) 1.875 h
b) assuming constant speed 8. a) 10 m
b) assuming a post at each corner
9. a) \$232.44 b) assuming the price of bread remains the same all year 10. a) \$901.20
b) assuming the same amount of gas is used each month; not a reasonable assumption since the amount of gas used usually increases in the winter if the home has a gas furnace 11. a) \$1300
b) 2262 L c) assuming the price of gasoline stays the same and the amount of gasoline used is constant each week; not reasonable assumptions

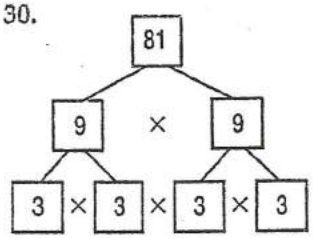
Test One Chapter 2: Number Theory

1. 5^4; 625 2. 4^7; 16 384 3. 2^8; 256 4. 3^9 5. 10^5
6. 5 7. 7^8 8. 9^7 9. 5 10. 3 11. 4 12. 1 13. 81
14. 1 15. 14 16. 1.2 17. 6.6 18. 2.6 19. 16, 9, 21, 39 20. 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79
21. 68 22. 0 23. 49.98 24. 25 25. 1, 2, 4, 7, 8, 14, 28, 56 26. 1, 2, 31, 62 27. 1, 2, 4, 5, 10, 20, 25, 50, 100 28. 1, 37

29.



30.



31. 8 32. 13 33. 12 34. 14 35. 40 36. 28 37. 60
38. 120 39. 5 dimes, 2 quarters

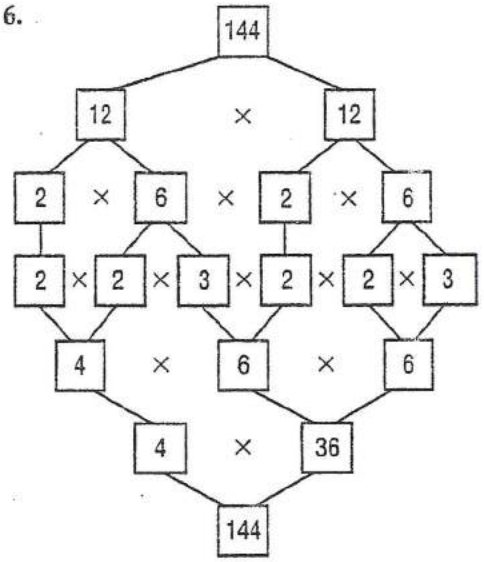
Test Two Chapter 2: Number Theory

1. 3^9 2. 5^9 3. 6^{12} 4. 9 5. 4^9 6. 7^5 7. 3^5 8. 8^7
9. 6561 10. 256 11. 15 625 12. 1296 13. 12
14. 1.5 15. 5, 6 16. 8, 9 17. 10, 11 18. 13.2
19. 7.9 20. 0.3 21. 64 22. 3 23. 0.56 24. 29
25. 3, 7 26. 5, 11 27. 1, 2, 3, 4, 6, 8, 12, 24
28. 1, 2, 4, 8, 11, 22, 44, 88 29. 1, 31 30. 19, 2, 53
31. 9 32. 14 33. 12 34. 8 35. 21 36. 12 37. 30
38. 252 39. 60th day

Extension Chapter 2: Number Theory

1. 84 375 2. 729 3. 2500 4. 3072 5. 770; 10, 14, 22, 35 are some other factors

6.

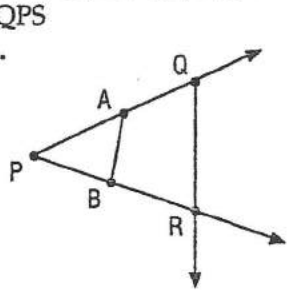


7. a) 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 b) 20 160, 10 080, 6720, 5040, 4032, 3360, 2880, 2520, 2240, 2016
8. a) 1, 3, 5, 7, 9, 11 b The difference is the sum of the bases. 9. a) 13 b) 19 c) 29 d) 35
e) 47 f) 59 10. 196 11. 17 12. 23 13. 9
14. 20 15. 90 16. 28 17. 60 18. 120
19. 150 20. a) 358, 385, 538, 583, 835, 853
b) 358, 538 c) 385 d) 853 e) 495; 3, 3, 5, 11

CHAPTER 3: Geometry

3.1 Terms in Geometry

1. ray XY 2. point P 3. line AB 4. line segment MN 5. line n 6. angle XYZ 7. a) $\overrightarrow{AD}$, $\overrightarrow{BD}$, $\overrightarrow{CD}$, $\overrightarrow{DA}$, $\overrightarrow{DB}$, $\overrightarrow{DC}$, $\overrightarrow{AB}$, $\overrightarrow{AC}$, $\overrightarrow{BA}$, $\overrightarrow{BC}$, $\overrightarrow{CB}$, $\overrightarrow{CA}$ b) AB, AC, AD, BC, CD, BD, DB, CB, DA, CA, BA, DC
8. ∠ABD, ∠ABE, ∠ABC, ∠DBE, ∠DBC, ∠EBC
9. T, S, R, Q, P 10. $\overrightarrow{TR}$, $\overrightarrow{SP}$, $\overrightarrow{PS}$, $\overrightarrow{QP}$ 11. $\overleftarrow{SP}$
12. SR, TS, SP, QP, RQ 13. ∠PSR, ∠SRQ, ∠RQP, ∠QPS
14.



g) ∠APB, ∠PAB, ∠PBA, ∠AQR, ∠BRQ, ∠ABR, ∠BAQ

3.2 Measuring, Drawing, and Classifying Angles

1. 112°, obtuse 2. 70°, acute 3. 143°, obtuse
4. 132°, obtuse 5. 88°, acute 6. 37°, acute
7. 12°, acute 8. 155°, obtuse 9. 95°, obtuse

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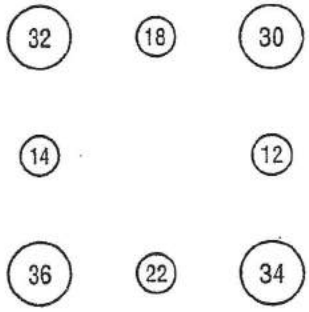
10. 87°, acute 11. acute 12. acute 13. obtuse
14. right 15. reflex 16. straight
17–20. Estimates will vary. 17. 53° 18. 120°
19. 47° 20. 95° 21. Answers should include 4 of ∠ABF, ∠ABE, ∠FBE, ∠FBD, ∠EBD, ∠EBC, ∠DBC
22. ∠ABD, ∠FBC 23. ∠ABC

3.3 Problem Solving: Guess and Check

1. towel: $7.00, goggles: $7.00, swimsuit: $36.45 2. 27 and 95 3. a) 248 + 59 = 307
b) 489 × 25 = 12 225 c) 245 − 98 = 147
d) 984 + 52 = 1036 e) 852 × 94 = 80 088
f) 985 − 24 = 961 4. 3 dimes, 15 quarters
5. 8 cm by 24 cm
6. Answers may vary.



7. 22 8. 17 and 31 9. a) 5 cards of beads, 2 boxes of laces, 4 buttons b) 10 cards of beads, 3 boxes of laces, 6 buttons

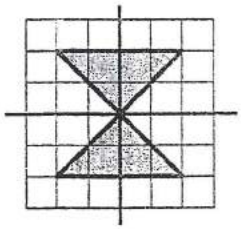
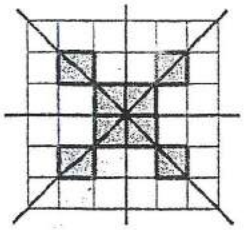
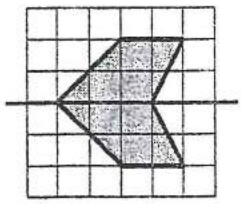
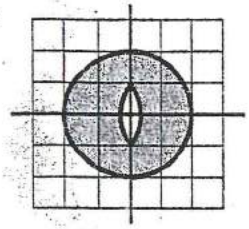
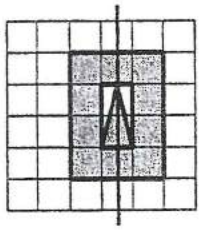
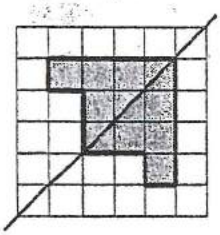
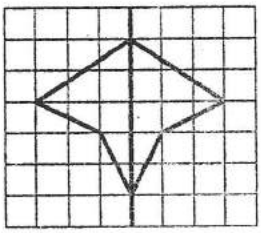
3.4 Angle Relationships

1. 42° 2. 71° 3. 25° 4. 77° 5. 45° 6. 38°
7. 139° 8. 84° 9. 55° 10. 100° 11. 20°
12. 90° 13. ∠XYA and ∠AYB; ∠AYB and ∠BYC; ∠BYC and ∠CYZ 14. ∠PTS = 113°, ∠PTR = 67°, ∠RTQ = 113° 15. $\angle a = 20°$, $\angle b = 160°$, $\angle c = 20°$ 16. $\angle p = 132°$, $\angle q = 48°$, $\angle r = 42°$, $\angle s = 90°$ 17. $\angle a = 62°$, $\angle b = 58°$, $\angle c = 32°$, $\angle d = 62°$, $\angle e = 28°$, $\angle f = 58°$
18. $\angle m = 61°$, $\angle n = 56°$, $\angle p = 124°$

3.5 Parallel and Perpendicular Lines

1. AB and EF, CD and EF 2. AB and CD
3. ∠AHG and ∠DGH, ∠BHG and ∠FGH
4. ∠JHB and ∠HGD, ∠EHG and ∠FGK
5. ∠EHG and ∠FGH, ∠BHG and ∠DGH
6. ∠d 7. alternate angles 8. ∠g
9. Answers will vary. ∠d, ∠h is one possible answer. 10. $\angle a = 62°$; $\angle b = 118°$, $\angle c = 62°$ 11. $\angle a = 25°$, $\angle b = 90°$, $\angle c = 65°$, $\angle d = 25°$ 12. $\angle a = 65°$, $\angle b = 115°$, $\angle c = 115°$
13. $\angle b = 48°$, $\angle c = 132°$, $\angle d = 132°$
14. $\angle a = 56°$, $\angle b = 56°$, $\angle c = 68°$
15. $\angle a = 110°$, $\angle b = 55°$, $\angle c = 55°$, $\angle d = 55°$

3.6 Lines of Symmetry

1. 
2. 
3. 
4. 
5. 
6. 
7. 
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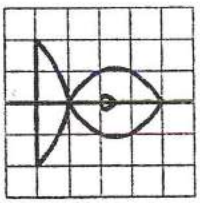
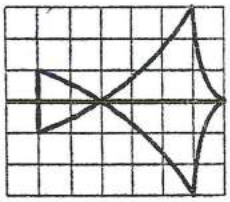
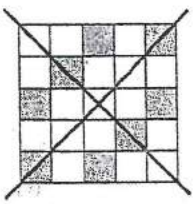
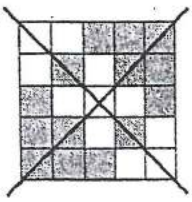
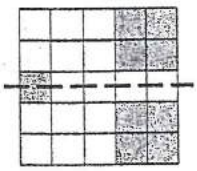
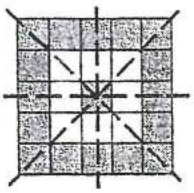
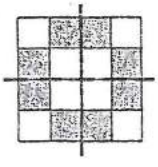
9. 
10. 
11. 
12. 
13. 
14. 
15. 
16. 

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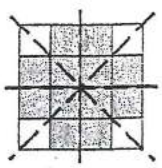
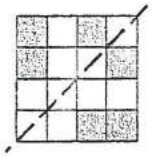
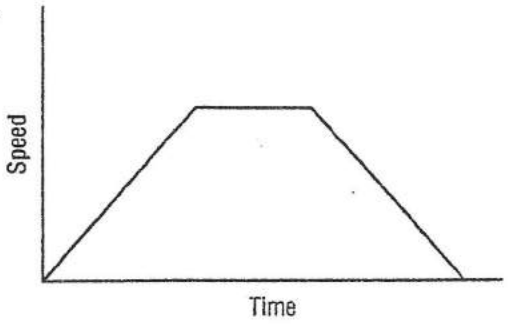
17. 

18. 

19. Answers will vary.

3.7 Problem Solving: Draw and Read Graphs

1. a) car is travelling at a constant speed
b) car is travelling at a constant, but slower speed than between P and Q c) car is stopped
d) car is again travelling at a constant speed
2. a) tub is filling with water b) Terry gets in tub
c) Terry sits in tub d) Terry gets out of tub
e) water drains out of tub 3. Answers will vary.
4.



3.8 Triangles and Angles

1. acute, scalene 2. right, isosceles
3. obtuse, isosceles 4. acute, equilateral
5. isosceles, acute 6. scalene, right
7. equilateral, acute 8. isosceles, right
9. 55° 10. 82° 11. 51° 12. 141° 13. $\angle x = 24°$, $\angle y = 156°$ 14. $\angle a = 73°$, $\angle b = 73°$, $\angle c = 107°$
15. $\angle a = 96°$, $\angle b = 84°$, $\angle c = 48°$, $\angle d = 132°$
16. $\angle p = 62°$, $\angle q = 28°$, $\angle r = 152°$ 17. $\angle a = 60°$, $\angle b = 60°$, $\angle c = 60°$, $\angle d = 120°$, $\angle e = 30°$, $\angle f = 30°$ 18. $\angle a = 64°$, $\angle b = 64°$, $\angle c = 53°$, $\angle d = 53°$, $\angle e = 74°$, $\angle f = 27°$

3.9 Polygons

1. 720° 2. 1080° 3. 540° 4. 1440°
5. triangle 6. heptagon 7. nonagon
8. dodecagon 9. 93° 10. 104° 11. 113°
12. 135° 13. 150° 14. 90° 15. 140° 16. a) 10
b) 28 c) 144°

3.10 Using Angle Relationships

1. $\angle a = 63°$, $\angle b = 75°$, $\angle c = 63°$, $\angle d = 42°$
2. $\angle w = 132°$, $\angle x = 66°$, $\angle y = 66°$, $\angle z = 114°$
3. $\angle p = 116°$, $\angle q = 64°$, $\angle r = 116°$, $\angle s = 64°$, $\angle t = 116°$ 4. $\angle x = 128°$, $\angle y = 62°$, $\angle z = 66°$, $\angle s = 118°$ 5. $\angle a = 58°$, $\angle b = 58°$, $\angle c = 122°$
6. $\angle w = 53°$, $\angle x = 53°$, $\angle y = 90°$, $\angle z = 37°$
7. $\angle a = 55°$, $\angle b = 60°$, $\angle c = 125°$, $\angle d = 55°$
8. $\angle p = 105°$, $\angle q = 42°$, $\angle r = 68°$, $\angle s = 112°$, $\angle t = 68°$ 9. $\angle a = 41°$, $\angle b = 32°$, $\angle c = 58°$, $\angle d = 65°$, $\angle e = 57°$, $\angle f = 56°$, $\angle g = 80°$

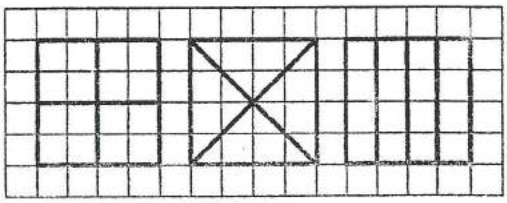
3.11 Problem Solving: Use a Diagram

1. a) ● ▲ b) ○ ●

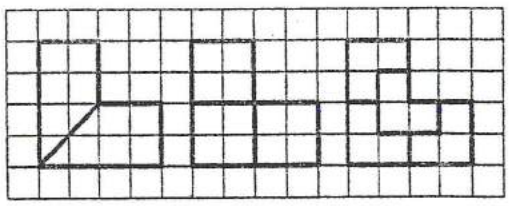
2. 12 3. 8 4. 56 5. a) 25 b) 89 c) 27 6. 10 (assuming a post in each corner) 7. 15th floor

3.12 Congruent Polygons

1. B, T; C, I; D, R; E, L; F, K; G, P; H, J; M, N; O, Q; S, V 2. AB = DE, BC = EF, AC = DF, $\angle A = \angle D$, $\angle B = \angle E$, $\angle C = \angle F$ 3. XY = PQ, YZ = QR, XZ = PR, $\angle X = \angle P$, $\angle Y = \angle Q$, $\angle Z = \angle R$ 4. DG = VY, DE = VW, EF = WX, GF = YX, $\angle D = \angle V$, $\angle G = \angle Y$, $\angle E = \angle W$, $\angle F = \angle X$ 5. AB = CB, AF = CD, FE = DE, BE = BE, $\angle A = \angle C$, $\angle F = \angle D$, $\angle ABE = \angle CBE$, $\angle FEB = \angle DEB$
6.



7.



3.13 The Pythagorean Theorem

1. $x^2 + y^2 = z^2$ 2. $f^2 + g^2 = h^2$ 3. $s^2 + t^2 = r^2$
4. $m^2 + n^2 = o^2$ 5. 20 6. 5 7. 25 8. 34 9. 10.6
10. 8.1 11. 8.7 12. 13.4 13. 15.6 14. 15.7
15. 29.3 16. 36.7

3.14 Using the Pythagorean Theorem

1. 11.6 m 2. 3.9 m 3. 15.4 m 4. a) 15.6 cm
b) 7.7 cm 5. 50 cm 6. 29.7 m 7. 5, 5, 7.1; 10, 10, 14.1; 7.1, 7.1, 10; 10, 5, 11.2

3.15 Conditions for Congruent Triangles

1. SSS 2. SAS 3. ASA 4. yes, SSS;
$\angle A = \angle L$, $\angle B = \angle N$, $\angle C = \angle M$, AB = LN, AC = LM, BC = NM 5. no 6. yes, SAS;
AB = DE, AC = DF, BC = EF, $\angle A = \angle D$, $\angle B = \angle E$, $\angle C = \angle F$ 7. yes, ASA; QP = ML, QR = MN, PR = LN, $\angle Q = \angle M$, $\angle P = \angle L$,

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$\angle R = \angle N$ 8. DF = 9 cm, DE = 14 cm, EF = 12 cm, $\angle FDE = 58°$, $\angle DEF = 40°$, $\angle EFD = 82°$

Test One Chapter 3: Geometry

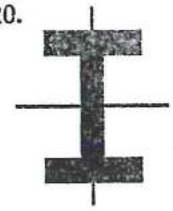
1. A, B, C, D **2.** $\overrightarrow{AC}$, $\overrightarrow{AB}$, $\overrightarrow{AD}$, $\overrightarrow{CD}$, $\overrightarrow{DA}$ **3.** $\overrightarrow{AD}$ **4.** AD, AB, AC, BC DC are 5 possible segments: **5.** $\angle DAC$, $\angle CAB$, $\angle ABC$, $\angle BCA$, $\angle ACD$, $\angle ADC$ are 6 possible angles. **6.** acute **7.** reflex **8.** obtuse **9.** reflex **10.** right **11.** acute **12.** 53° **13.** 49° **14.** 62° **15.** Sum: 540°, Angle measure: 108° **16.** Sum: 1440°, Angle measure: 144° **17.** $\angle p = 50°$, $\angle q = 130°$, $\angle r = 50°$ **18.** $\angle a = 70°$, $\angle b = 110°$, $\angle c = 70°$ **19.** $\angle a = 68°$, $\angle b = 44°$, $\angle c = 112°$ **20.** 133° **21.** 11.4 cm **22.** 12.3 cm **23.** AB = EF, AC = EG, CD = GH, BD = FH, $\angle A = \angle E$, $\angle C = \angle G$, $\angle B = \angle F$, $\angle D = \angle H$

Test Two Chapter 3: Geometry

1. A, B, C, D **2.** $\overrightarrow{AB}$, $\overrightarrow{AD}$, $\overrightarrow{AC}$, $\overrightarrow{DC}$, BC are 5 possible answers **3.** $\overrightarrow{BC}$, $\overrightarrow{CD}$ **4.** AB, BC, CD, DA, AC **5.** $\angle BAC$, $\angle DAC$, $\angle ABC$, $\angle ADC$, $\angle BCA$, $\angle DCA$ **6.** 30° centre **7.** 90° right **8.** 120° obtuse **9.** obtuse 165° **10.** 180° straight **11.** 90° right **12.** 41° **13.** 12° **14.** 133° **15.** 48° **16.** $\angle p = 139°$, $\angle x = 49°$, $\angle y = 90°$, $\angle z = 41°$ **17.** $\angle w = 58°$, $\angle x = 58°$, $\angle y = 60°$, $\angle z = 60°$ **18.** $\angle a = 23°$, $\angle b = 23°$, $\angle c = 44°$, $\angle d = 46°$

19.

20.



21. pentagon **22.** octagon **23.** SAS; XY = WV, $\angle Y = \angle V$, $\angle X = \angle W$

Extension Chapter 3: Geometry

1. a) star **2. a)** square **b)** rectangles, triangles **c)** square **3.** AFEC **4.** BFEC **5. a)** 60° **b)** 120° **c)** 60° **d)** 30° **6. a)** triangle **b)** $\triangle CED$ **c)** SAS; BF = CE, BG = CD, FG = ED, $\angle BGF = \angle CDE$, $\angle FBG = \angle ECD$, $\angle BFG = \angle CED$ **7.** H **8.** W **9–11.** Answers will vary.

CHAPTER 4: Perimeter and Area

4.1 Perimeter

1. 10 cm **2.** 7.3 cm **3.** 7.4 cm **4.** 8.2 cm **5.** 25.2 cm **6.** 36 cm **7.** 39.8 cm **8.** 50 cm **9.** 117 cm **10.** 63.2 cm **11.** 4.7 cm **12.** 2.6 m **13.** 16.2 cm **14.** 11.2 cm

	a	b	c	P
15.	11.4	8.6	6.8	26.8
16.	6.2	11.5	14.4	32.1
17.	8.1	5.7	7.6	21.4
18	23	7.8	17.6	48.4

	a	b	c	d	P
19.	8.9	33.1	12.8	7.6	62.4
20.	11.6	17.8	8.5	12.3	50.2
21.	26.2	11.7	27.2	18.4	83.5
22.	11	2.4	6.8	12.7	32.9

4.2 Perimeters of Polygons

1. 75 cm **2.** 43.4 cm **3.** 80.1 cm **4.** 122.4 cm **5.** 10.5 cm **6.** 9 cm **7.** 3.84 cm **8.** 11.5 cm **9.** 7.85 cm **10.** 36.6 cm **11.** 17.8 cm **12.** 42 cm

	l	w	P
13.	8	4	24
14.	3.6	4	15.2
15.	10	8	36
16.	7.1	6.2	26.6

17. 69.4 m **18.** 109.6 m **19.** 3419.8 m **20.** 281 m

4.3 Circumference of a Circle

1. $d = 3.0$ cm, $C = 9.4$ cm **2.** $d = 2.2$ cm, $C = 6.9$ cm **3.** $d = 2.7$ cm, $C = 8.5$ cm **4.** 29.83 cm **5.** 87.92 cm **6.** 42.704 cm **7.** 21.352 m **8.** 55.892 cm **9.** 45.53 cm **10.** 19.5 cm **11.** 75.046 mm **12.** 18 mm **13.** 11.618 m **14.** 76.7 m

4.4 Problem Solving: Use a Formula

1. $h = 4s$ **2. a)** 288 m **b)** 188 m **c)** 108 m **d)** 144 m **3. a)** 21°C **b)** 40.5°C **c)** 75°C **d)** 51°C **4. a)** 6.2 s **b)** 10.6 s **c)** 3.3 s **5. a)** 200 km **b)** 320 km **c)** 480 km **d)** 440 km

4.5 Area of a Rectangle and Square

1. 44.8 m^2 **2.** 144.48 cm^2 **3.** 65.96 cm^2 **4.** 50.41 cm^2 **5.** 169 m^2

	l	w	A
6.	2.4	1.8	4.32
7.	14.4	6.2	89.28
8.	4.3	6.7	28.81

	s	A
9.	4.5	20.25
10.	18	324
11.	17.2	295.84

12. 300 m^2 **13.** 1.44 m^2 **14.** 50 m
15. a) 21 cm^2 **b)** 28 cm^2 **c)** 35 cm^2 **d)** 35 cm^2

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4.6 Area of a Parallelogram

1. 6.12 cm^2 2. 4.68 cm^2 3. 410.8 cm^2 4. 16.32 cm^2
5. 26.4 cm^2 6. 62.22 cm^2

	b	h	A
7.	12.5	6.4	80
8.	2.4	13.5	32.4
9.	1.15	26.4	30.36
10.	18	7.6	136.8

11. 6.4 cm 12. 16 cm 13. 12.5 m 14. a) 14.1 m^2 b) 145.7 m^2

4.7 Area of a Triangle

1. 150 cm^2 2. 150 cm^2 3. 75 cm^2 4. 75 cm^2
5. 13.5 cm^2 6. 67.1 cm^2 7. 17.55 cm^2 8. 44.1 cm^2
9. 115.26 cm^2

	b	h	a
10.	4.6	10	23
11.	7	8.4	29.4
12.	6.5	5.2	16.9
13.	14.4	10.5	75.6
14.	17	9.8	83.3

15. a) 18 m^2 b) 132 m^2

4.8 Problem Solving: Use Logic

1. Shawn, Aisha, Emily, Armand, Ferhan, Brian
2. Miguel: 14; JoAnne: 13; David: 9
3. Diana: cat; Colin: hamster; Hannah: parrot; Paulo: dog 4. quarter, penny, dollar, dime, nickel
5. Sue: boat; Marcie: taxi; Anthony: plane; Alexis: bus 6. 20

4.9 Area of a Circle

1. 314 cm^2 2. 63.6 cm^2 3. 30.2 cm^2 4. 490.6 cm^2
5. 113.0 m^2 6. 84.9 m^2 7. 124.6 cm^2 8. 459.7 cm^2
9. 2550.5 m^2 10. 346.2 m^2 11. 181.4 cm^2
12. 563.8 cm^2 13. 401.92 cm^2 14. 628 cm^2
15. 303.795 cm^2 16. 452.16 cm^2 17. 31.2 cm^2
18. 196 cm^2

4.10 Area of Composite Figures

1. 253.6 cm^2 2. 125 cm^2 3. 231.75 m^2 4. 70 cm^2
5. 2313 cm^2 6. 22.44 m^2 7. 83.2 cm^2 8. 87.48 cm^2
9. 26.8 m^2 10. 62.5 cm^2

4.11 Working with Perimeter and Area

1. a) 28 338.5 cm^2 b) 596.6 cm c) $17.34
2. a) 330 cm by 220 cm b) 1100 cm
c) 72 600 cm^2 3. 154 cm^2 4. 2100 cm^2
5. a) 210.52 cm b) 2632.68 cm^2 6. a) 187.8 cm
b) 2189.48 cm^2 7. a) 1256 cm^2 b) 344 cm^2

4.12 Problem Solving: Use a Table

1. a) 18 years b) 7.5 c) grizzly bear d) bobcat
2. $17 3. 1–25: $5.50; 26–50: $5.25; 51–75: $5.00; 76–100: $4.75; 101–125: $4.50; 126–150: $4.25; 151–175: $4.00; 176–200: $3.75; 201–225: $3.50; 226 and up: $3.25 4. a) $380 b) $637.50 c) $712.50 d) $975
5.

Team	Won	Lost	Tied	Points
Armstrong	3	0	0	6
Berkley	0	1	2	2
Castlewiev	1	1	1	3
Dunsmore	0	2	1	1

Test One Chapter 4: Perimeter and Area

1. 19.3 cm 2. 68.8 m 3. 38.936 cm 4. 27.04 cm^2
5. 103.18 m^2 6. 26.52 m^2 7. 33 cm^2 8. 78.5 cm^2
9. P = 70 cm, A = 219 cm^2 10. 40.9 m^2

Test Two Chapter 4: Perimeter and Area

1. 52.4 cm 2. 23.9 m 3. 23.3 cm 4. 49 cm^2
5. 459.7 m^2 6. 2.3 cm^2 7. 55.0 cm^2 8. 5.6 m^2
9. P = 68.4 cm, A = 129.38 cm^2 10. 247.74 m^2

Extension Chapter 4: Geometry

1. 18 units 2. Answers will vary.
3. a) Answers will vary. 0.5 m by 0.5 m, 0.25 m by 0.75 m are 2 possibilities b) Answers will vary. 0.25 m^2, 0.1875 m^2 4. 14.13 m 5. 3 rolls
6. a) 113.04 cm^2 b) 72 cm^2 c) 192 cm^2
d) 2448.96 cm^2 7. a) A: 7 cm by 7 cm; B: 7 cm by 12 cm; C: 7 cm by 14 cm; D: 7 cm by 19 cm
b) 14 cm by 26 cm; Area = 364 cm^2

CHAPTER 5: Fractions

5.1 Fractions and Mixed Numbers

1. $\frac{11}{24}$ 2. $\frac{7}{16}$ 3. $\frac{7}{10}$ 4. $\frac{7}{15}$ 5. $2\frac{5}{6}$, $\frac{17}{6}$ 6. $1\frac{3}{8}$, $\frac{11}{8}$
7. $3\frac{1}{4}$, $\frac{13}{4}$ 8. $\frac{9}{10}$ 9. $1\frac{5}{6}$ 10. $3\frac{2}{3}$ 11. $3\frac{2}{7}$ 12. $4\frac{1}{4}$
13. $5\frac{1}{2}$ 14. $3\frac{4}{5}$ 15. $2\frac{4}{9}$ 16. $3\frac{1}{4}$ 17. $\frac{19}{6}$ 18. $\frac{7}{4}$ 19. $\frac{37}{8}$
20. $\frac{20}{7}$ 21. $\frac{13}{2}$ 22. $\frac{17}{9}$ 23. Answers will vary.
Diagram will show $\frac{7}{10}$. 24. $\frac{37}{60}$ 25. $\frac{79}{12}$, $6\frac{7}{12}$

5.2 Equivalent Fractions

1. $\frac{2}{3}$, $\frac{4}{6}$ 2. $\frac{1}{2}$, $\frac{4}{8}$ 3. $\frac{3}{4}$, $\frac{12}{16}$ 4–7. Answers will vary.

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4. $\frac{2}{8}, \frac{3}{12}$ 5. $\frac{6}{10}, \frac{9}{15}$ 6. $\frac{4}{14}, \frac{6}{21}$ 7. $\frac{4}{6}, \frac{6}{9}$ 8. 12 9. 9

10. 28 11. 11 12. 18 13. 81 14. $\frac{2}{3}$ 15. $\frac{5}{9}$ 16. $\frac{3}{5}$

17. $\frac{2}{3}$ 18. $1\frac{1}{3}$ 19. $2\frac{1}{6}$ 20. $\frac{5}{8}, \frac{3}{4}, \frac{8}{7}, \frac{9}{4}, \frac{7}{2}$ 21. $\frac{7}{9}, 1\frac{1}{6}$,

$1\frac{2}{9}, \frac{4}{3}, 1\frac{2}{3}$ 22. a) $\frac{4}{6}, \frac{10}{15}, \frac{14}{21}, \frac{6}{9}, \frac{8}{12}, \frac{12}{18}$ b) $\frac{9}{15}, \frac{21}{35}, \frac{12}{20}$,

$\frac{18}{30}, \frac{24}{40}, \frac{6}{10}$ c) $\frac{8}{14} = \frac{4}{7}, \frac{4}{10} = \frac{2}{5}, \frac{15}{20} = \frac{3}{4}, \frac{12}{15} = \frac{4}{5}$

5.3 Adding Fractions

1. $\frac{2}{5} + \frac{1}{2} = \frac{9}{10}$ 2. $\frac{3}{4} + \frac{3}{8} = 1\frac{1}{8}$ 3. $\frac{1}{4} + \frac{1}{6} = \frac{5}{12}$ 4. $\frac{2}{3}$

5. $\frac{3}{4}$ 6. 1 7. $\frac{2}{3}$ 8. $1\frac{1}{6}$ 9. $\frac{7}{8}$ 10. $1\frac{1}{12}$ 11. $\frac{5}{6}$ 12. $1\frac{7}{20}$

13. $1\frac{4}{9}$ 14. $4\frac{1}{3}$ 15. $7\frac{4}{5}$ 16. 3 17. $9\frac{1}{3}$ 18. $3\frac{1}{4}$

19. $3\frac{19}{24}$ 20. $7\frac{11}{14}$ 21. $4\frac{7}{12}$ 22. $8\frac{7}{15}$ 23. $4\frac{23}{24}$

24. $1\frac{7}{24}$ 25. $2\frac{2}{3}$ 26. $4\frac{7}{8}$ 27. $5\frac{3}{4}$

28. a)

$\frac{1}{4}$	$\frac{4}{5}$	$1\frac{1}{20}$
$\frac{1}{3}$	$\frac{1}{2}$	$\frac{5}{6}$
$\frac{7}{12}$	$1\frac{3}{10}$	$1\frac{53}{60}$

b)

$2\frac{1}{2}$	$\frac{1}{3}$	$2\frac{1}{6}$	5
$2\frac{5}{6}$	5	$\frac{5}{12}$	$8\frac{1}{4}$
$1\frac{1}{3}$	$3\frac{1}{12}$	$1\frac{5}{6}$	$6\frac{1}{4}$
$6\frac{2}{3}$	$8\frac{5}{12}$	$4\frac{5}{12}$	$19\frac{1}{2}$

5.4 Subtracting Fractions

1. $\frac{1}{2}$ 2. $\frac{4}{5}$ 3. $\frac{2}{5}$ 4. $\frac{1}{6}$ 5. $\frac{1}{9}$ 6. $\frac{5}{8}$ 7. $\frac{1}{2}$ 8. $\frac{1}{12}$ 9. $\frac{1}{24}$

10. $\frac{4}{15}$ 11. $3\frac{3}{7}$ 12. $2\frac{4}{9}$ 13. $3\frac{2}{5}$ 14. $2\frac{1}{3}$ 15. $1\frac{1}{4}$

16. $2\frac{2}{5}$ 17. $3\frac{1}{10}$ 18. $3\frac{1}{3}$ 19. $2\frac{5}{12}$ 20. $1\frac{1}{30}$ 21. $3\frac{1}{6}$

22. $\frac{1}{2}$ 23. $1\frac{5}{6}$ 24. $1\frac{1}{8}$ 25. $2\frac{11}{12}$ 26. $\frac{13}{24}$

27. a)

$\frac{5}{6}$	$\frac{1}{3}$	$\frac{1}{2}$
$\frac{5}{12}$	$\frac{1}{4}$	$\frac{1}{6}$
$\frac{5}{12}$	$\frac{1}{12}$	$\frac{1}{3}$

b)

$3\frac{2}{3}$	$1\frac{5}{6}$	$1\frac{5}{6}$
$1\frac{3}{5}$	$1\frac{1}{3}$	$\frac{4}{15}$
$2\frac{1}{15}$	$\frac{1}{2}$	$1\frac{17}{30}$

c)

$6\frac{1}{2}$	$3\frac{1}{3}$	$3\frac{1}{6}$
$2\frac{1}{4}$	$1\frac{5}{6}$	$\frac{5}{12}$
$4\frac{1}{4}$	$1\frac{1}{2}$	$2\frac{3}{4}$

28. Answers will vary. $\frac{17}{20}, \frac{1}{4}$ and $\frac{14}{15}, \frac{1}{3}$ are 2 possibilities.

5.5 Multiplying Fractions

1. $\frac{1}{8}$ 2. $\frac{2}{15}$ 3. $\frac{3}{5}$ 4. $\frac{7}{15}$ 5. $\frac{1}{16}$ 6. $\frac{1}{7}$ 7. 3 8. $4\frac{1}{2}$

9. $\frac{2}{25}$ 10. $\frac{2}{5}$ 11. $4\frac{1}{2}$ 12. $4\frac{1}{2}$ 13. $12\frac{1}{2}$ 14. 7 15. $4\frac{2}{3}$

16. $3\frac{31}{48}$ 17. $10\frac{3}{25}$ 18. $13\frac{8}{9}$ 19. $5\frac{10}{21}$ 20. $12\frac{1}{4}$

21. $\frac{1}{4}$ 22. $1\frac{3}{5}$ 23. $5\frac{5}{14}$ 24. $32\frac{1}{12}$ 25. $1\frac{1}{3}$ 26. $\frac{2}{3}$

27. $3\frac{1}{2}$ 28. $\frac{6}{13}$ 29. $\frac{7}{23}$ 30. $\frac{4}{17}$ 31. 1 32. $1\frac{1}{3}$ 33. $\frac{2}{7}$

34. $\frac{1}{8}$ 35. $1\frac{1}{3}$ 36. $\frac{1}{6}$

5.6 Dividing Fractions

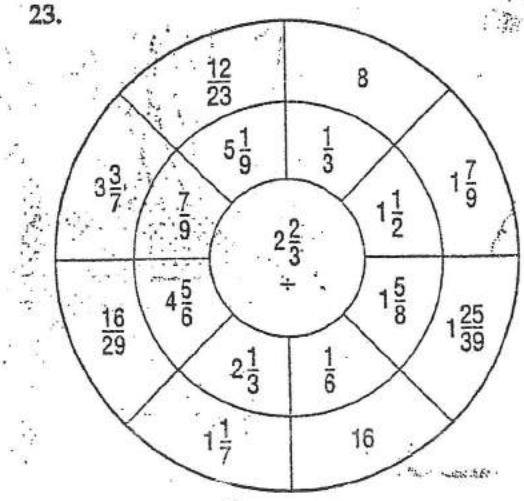
1. $3\frac{1}{3}$ 2. $1\frac{1}{5}$ 3. 3 4. $1\frac{1}{2}$ 5. 20 6. 6 7. $\frac{1}{6}$ 8. $\frac{1}{14}$

9. $2\frac{13}{25}$ 10. $25\frac{2}{3}$ 11. $6\frac{7}{8}$ 12. $10\frac{5}{6}$ 13. $\frac{1}{6}$ 14. $\frac{7}{40}$

15. $\frac{4}{15}$ 16. $\frac{24}{133}$ 17. $\frac{11}{14}$ 18. $1\frac{8}{11}$ 19. $1\frac{13}{16}$ 20. $3\frac{17}{77}$

21. $2\frac{2}{11}$ 22. $2\frac{1}{7}$

23.



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24. $18\frac{3}{4}$ 25. 56 km/h 26. 65 km/h 27. 80 km/h

28. $\frac{1}{5}$ 29. $\frac{3}{8}$ 30. $1\frac{2}{7}$ 31. $2\frac{7}{10}$

5.7 Fractions and Decimals

1. $0.\overline{43}$ 2. $0.\overline{7}$ 3. $0.1\overline{6}$ 4. $0.3\overline{61}$ 5. $5.6\overline{78}$
6. $9.2\overline{39}$ 7. 0.8 8. $0.\overline{5}$ 9. 0.12 10. $0.4\overline{6}$

11. $0.1\overline{85}$ 12. $3.\overline{6}$ 13. 2.3125 14. $1.\overline{72}$ 15. $\frac{5}{9}$

16. $\frac{23}{99}$ 17. $\frac{4}{11}$ 18. $\frac{5}{6}$ 19. $2\frac{2}{15}$ 20. $3\frac{74}{999}$ 21. >

22. < 23. = 24. $\gtrdot$ 25. $\lessdot$ 26. $\lesssim$ 27. > 28. =
29. a) $0.\overline{1}$, $0.\overline{4}$, $0.\overline{7}$ b) The decimal consists of the numerator repeated an infinite number of times.
c) $0.\overline{2}$, $0.\overline{5}$, $0.\overline{8}$, $1.\overline{4}$ 30. a) \$14.40 b) \$8.38
c) \$25.83 d) \$12.47

5.8 Order of Operations

	a	b	$a+b$	$a-b$	$a\times b$	$a\div b$
1.	$\frac{3}{5}$	$\frac{1}{4}$	$\frac{17}{20}$	$\frac{7}{20}$	$\frac{3}{20}$	$2\frac{2}{5}$
2.	$\frac{7}{8}$	$\frac{2}{3}$	$1\frac{13}{24}$	$\frac{5}{24}$	$\frac{7}{12}$	$1\frac{5}{16}$
3.	$1\frac{1}{6}$	$\frac{1}{2}$	$1\frac{2}{3}$	$\frac{2}{3}$	$\frac{7}{12}$	$2\frac{1}{3}$
4.	$1\frac{3}{4}$	$1\frac{1}{3}$	$3\frac{1}{12}$	$\frac{5}{12}$	$2\frac{1}{3}$	$1\frac{5}{16}$
5.	$2\frac{1}{2}$	$1\frac{4}{5}$	$4\frac{3}{10}$	$\frac{7}{10}$	$4\frac{1}{2}$	$1\frac{7}{18}$

6. $\frac{1}{3}\div\frac{3}{4}$; $\frac{41}{90}$ 7. $\frac{1}{5}\times\frac{1}{4}\div\frac{2}{3}$; $\frac{11}{40}$ 8. $\left(\frac{3}{5}+\frac{2}{3}\right)$; $\frac{19}{90}$
9. $\frac{2}{3}\div\frac{1}{4}$; $2\frac{113}{120}$ 10. $\frac{1}{48}$ 11. $\frac{25}{576}$ 12. 324 13. $7\frac{29}{100}$
14. $39\frac{1}{16}$ 15. $\frac{55}{72}$ 16. $2\frac{3}{4}$ 17. $1\frac{11}{100}$ 18. $\frac{8}{9}$ 19. $\frac{3}{8}$
20. $2\frac{7}{19}$ 21. $1\frac{37}{56}$ 22. $3\frac{1}{2}$ 23. $4\frac{17}{30}$ 24. $3\frac{1}{4}$
25. $\left(\frac{1}{2}+\frac{2}{3}-\frac{1}{4}\times\frac{2}{5}\right)\div\frac{1}{6}=6\frac{2}{5}$ 26. $\frac{1}{2}+\frac{2}{3}-\frac{1}{4}\times\frac{2}{5}\div\frac{1}{6}=\frac{17}{30}$ 27. $\frac{1}{2}+\left(\frac{2}{3}-\frac{1}{4}\times\frac{2}{5}\right)\div\frac{1}{6}=3\frac{9}{10}$

Test One Chapter 5: Fractions

1. $4\frac{3}{5}$ 2. $4\frac{5}{6}$ 3. $4\frac{3}{4}$ 4. $7\frac{2}{3}$ 5. $\frac{8}{5}$ 6. $\frac{33}{8}$ 7. $\frac{23}{10}$ 8. $\frac{32}{9}$
9. 15 10. 12 11. 3 12. 7 13. $\frac{1}{8}$, $\frac{3}{5}$, $\frac{7}{10}$, $\frac{3}{4}$ 14. $\frac{1}{3}$, $\frac{2}{5}$, $\frac{4}{9}$, $\frac{9}{15}$ 15. $\frac{3}{4}$, $\frac{5}{6}$, $1\frac{1}{2}$, $1\frac{7}{12}$, $1\frac{2}{3}$ 16. $\frac{7}{12}$ 17. $\frac{11}{18}$ 18. $\frac{1}{4}$
19. $\frac{7}{8}$ 20. $3\frac{7}{12}$ 21. $1\frac{7}{30}$ 22. $1\frac{13}{15}$ 23. $10\frac{1}{2}$ 24. $\frac{25}{42}$
25. $1\frac{1}{12}$ 26. $\frac{7}{36}$ 27. $2\frac{1}{2}$ 28. $\frac{13}{36}$ 29. $4\frac{5}{8}$ 30. $1\frac{2}{3}$
31. $2\frac{7}{9}$ 32. $0.1\overline{6}$ 33. 0.625 34. $0.\overline{73}$ 35. 0.45
36. $0.\overline{4}$ 37. 0.68 38. $\frac{8}{25}$ 39. $\frac{9}{10}$ 40. $1\frac{1}{4}$ 41. $\frac{7}{9}$
42. $\frac{3}{50}$ 43. $2\frac{11}{20}$ 44. $\frac{3}{11}$ 45. $3\frac{1}{3}$

Test Two Chapter 5: Fractions

1. $\frac{11}{4}$ 2. $\frac{40}{9}$ 3. $\frac{23}{12}$ 4. $\frac{31}{8}$ 5. $6\frac{1}{2}$ 6. $3\frac{2}{3}$ 7. $4\frac{5}{8}$
8. $4\frac{1}{6}$ 9. 63 10. 60 11. 35 12. 81 13. $\frac{2}{3}$, $\frac{7}{11}$, $\frac{3}{5}$, $\frac{4}{9}$
14. $\frac{11}{12}$, $\frac{13}{15}$, $\frac{5}{6}$, $\frac{3}{4}$ 15. $\frac{19}{24}$ 16. $\frac{4}{15}$ 17. $\frac{11}{48}$ 18. $5\frac{1}{2}$
19. $4\frac{1}{10}$ 20. $2\frac{11}{24}$ 21. $5\frac{4}{7}$ 22. $\frac{26}{27}$ 23. $1\frac{11}{25}$ 24. 12
25. $1\frac{3}{4}$ 26. $3\frac{1}{12}$ 27. $\frac{1}{18}$ 28. $2\frac{1}{4}$ 29. $6\frac{17}{24}$ 30. $3\frac{9}{35}$
31. 0.375 32. $0.\overline{63}$ 33. $0.4\overline{6}$ 34. 0.5625 35. $\frac{3}{125}$
36. $3\frac{13}{40}$ 37. $\frac{7}{9}$ 38. $\frac{13}{50}$ 39. 24

Extension Chapter 5: Fractions

1. a) $\frac{5}{6}$, $\frac{7}{12}$, $\frac{5}{12}$, $\frac{7}{16}$, $\frac{8}{15}$ b) $\frac{5}{2}$, $\frac{5}{4}$, $\frac{7}{2}$, $\frac{7}{6}$, $\frac{7}{4}$, $\frac{8}{2}$, $\frac{8}{4}$, $\frac{8}{6}$, $\frac{9}{2}$ $\frac{9}{6}$, $\frac{9}{4}$, $\frac{10}{6}$, $\frac{10}{2}$, $\frac{10}{4}$ c) $\frac{5}{12}$, $\frac{7}{15}$, $\frac{8}{15}$, $\frac{7}{12}$, $\frac{5}{6}$ d) $2\frac{1}{2}$, $1\frac{1}{2}$, $3\frac{1}{2}$, $1\frac{1}{6}$, $1\frac{3}{4}$, 4, 2, $1\frac{1}{3}$, $4\frac{1}{2}$, $1\frac{1}{2}$, $2\frac{1}{4}$, $1\frac{2}{3}$, $2\frac{1}{2}$, 5 2. $2\frac{2}{5}$, 3, $3\frac{3}{5}$
3. $\frac{1}{12}$, $\frac{1}{24}$, $\frac{1}{48}$ 4. $4\frac{4}{7}$, $9\frac{1}{7}$, $18\frac{2}{7}$ 5. $5\frac{1}{2}$, 4, $2\frac{1}{2}$ 6. a) $\frac{1}{2}+\frac{1}{3}$ b) $\frac{1}{2}+\frac{7}{12}$, $\frac{3}{4}+\frac{1}{3}$ c) $\frac{1}{2}-\frac{1}{3}$, $\frac{3}{4}-\frac{7}{12}$ d) $\frac{3}{5}\times\frac{5}{6}$ e) $\frac{1}{3}\div\frac{5}{6}$

7. a)

$\frac{1}{3}$	$\frac{7}{12}$	$\frac{1}{6}$
$\frac{1}{12}$	$\frac{5}{12}$	$\frac{3}{4}$
$\frac{2}{3}$	$\frac{1}{4}$	$\frac{1}{3}$

b)

$\frac{3}{2}$	$\frac{7}{4}$	$\frac{1}{2}$
$\frac{1}{4}$	$\frac{5}{4}$	$\frac{9}{4}$
2	$\frac{3}{4}$	1

c) Yes, each term is multiplied by the same factor. All sums will be 3 times larger. 8. a) $\frac{2}{9}$, $\frac{2}{5}$, $\frac{2}{7}$, $\frac{2}{4}$,

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$\frac{2}{3}, \frac{7}{9}, \frac{3}{7}, \frac{3}{9}, \frac{3}{5}, \frac{3}{4}, \frac{5}{7}, \frac{5}{9}, \frac{4}{7}, \frac{4}{9}, \frac{4}{5}$ **b)** $\frac{2}{4} = \frac{1}{2}$, $\frac{3}{9} = \frac{1}{3}$ **c)** $\frac{9}{2}, \frac{5}{2}, \frac{7}{2}, \frac{2}{1}, \frac{3}{2}, \frac{9}{7}, \frac{7}{3}, \frac{3}{1}, \frac{5}{3}, \frac{4}{3}, \frac{7}{5}, \frac{9}{5}, \frac{7}{4}, \frac{9}{4}, \frac{5}{4}$ **d)** $0.\overline{2}$, 0.4, $0.\overline{285\,714}$, 0.5, $0.\overline{6}$, $0.\overline{7}$, $0.\overline{428\,571}$, 571, $0.\overline{3}$, 0.6, 0.75, $0.\overline{714\,285}$, $0.\overline{5}$, $0.\overline{571\,428}$, 0.4, 0.8

CHAPTER 6: Ratio and Rate

6.1 Ratio

1. 7:4, 7 to 4, $\frac{7}{4}$ **2.** 16:7, 16 to 7, $\frac{16}{7}$ **3.** 5:16, 5 to 16, $\frac{5}{16}$ **4.** 5:7, 5 to 7, $\frac{5}{7}$ **5.** 4:5, 4 to 5, $\frac{4}{5}$
6. quarters to nickels **7.** dimes to quarters
8. nickels to dimes **9.** quarters to all coins
10. nickels to all coins **11.** 3:4 **12.** 4:2 or 2:1
13. 9:1 **14.** 4:5 **15.** 2 to 3 **16.** 1:3 **17.** $\frac{3}{4}$ **18.** $\frac{7}{2}$
19. 2 to 9 **20.** 1 to 2 **21.** 25 to 1 **22.** 73 to 5

6.2 Three-Term Ratios

1. 3:7:4 **2.** 7:3:14 **3.** 14:4:7 **4.** 4:14:7 **5.** 3:4:1
6. 1:2:3 **7.** 2:1:3 **8.** 2:3:6 **9.** 1:3:5 **10.** 7:3:4
11. 3:4:10 **12.** 6:3:7 **13.** 27:7:5 **14. a)** 8:4:1
b) 17:15:16 **15. a)** 5:3:2 **b)** 2:3:4 **16. a)** 12:5
b) 12:5:34

6.3 Equivalent Ratios and Proportions

1. yes **2.** no **3.** no **4.** yes **5.** no **6.** yes **7.** no
8. yes **9.** 8 **10.** 4 **11.** 9 **12.** 7 **13.** 70 **14.** 15
15. 35 **16.** 11 **17.** 6 **18.** 45 **19.** 132 **20.** 52
21. 18 **22.** 15 years **23. a)** 3:5, 6:10, 9:15
b) 5:4, 10:8, 15:12 **24.** 16 cm **25.** 1:5
26. a) 12 cm **b)** 21 cm **c)** 31.2 cm **d)** 44.4 cm
27. 540

6.4 Rate

1. 9 **2.** 8 **3.** 3 **4.** 4 **5.** 2 **6.** 7 **7.** 12 **8.** 80 **9.** 40
10. 12 **11.** 20¢/roll **12.** 6 m/s **13.** $349/ticket
14. $7.65/h **15.** 1.4¢/g **16.** $0.82/L
17. 85 km/h **18.** $27.50 **19. a)** 3000 km
b) 6750 km **c)** 4125 km **d)** 5437.5 km
20. $354.00 **21.** 96 **22.** 216 **23. a)** 300 km
b) 525 km **c)** 75 km **d)** 900 km **24.** $6.35/h

6.5 Comparing Unit Rates and Unit Prices

1. 99.8¢/L **2.** 29.8¢/kg **3.** 75.1¢/kg
$15.50/kg **5.** 16.6¢/bun **6.** 25¢/can
7. 0.4¢/g **8.** 0.9¢/g **9.** 0.4¢/g **10.** 0.8¢/mL
11. 36.6¢/can **12.** 32.3¢/bar **13.** 450 sheets for $3.99 **14.** 150 tissues for $0.79 **15.** 425 g for $3.99
16. $15.00 for 10 tickets **17.** Carmen by $0.25/h
18. Mark Tewksbury by 0.16 m/s
19. about 4¢/dish **20.** 20¢

6.6 Scale Drawings

1. 1:3 **2.** 1:4 **3.** 2:1 **4.** 9:1 **5.** 100:1 **6.** 1:200
7. 1:150 **8.** 1:400 **9.** 1:200 **10.** 10:3
11. 1:20 000 000 **12.** 1:25 000 000 **13.** 2:1
14. 1:10 000 000 **15. a)** 21 cm **b)** 4200 cm
16. 11.5 cm **17.** 1:9000 **18.** 0.3 cm **19.** 6.45 cm by 1.8 cm **20.** 58.8 m **21.** 1:2944

6.7 Maps and Scales

1. 2000 km **2.** 2.5 cm **3.** 4.88 cm **4.** 800 km
5. 4.25 cm **6.** 1260 km **7.** 600 km **8.** 1660 km
9. 540 km **10.** 720 km **11.** 1840 km

Test One Chapter 6: Ratio and Rate

1. 4:5 **2.** 5:4 **3.** 1:1 **4.** 4:5:5 **5.** 5:14 **6.** 4:5:14
7. 2:3 **8.** 7:3 **9.** $\frac{1}{4}$ **10.** $\frac{7}{1}$ **11.** 2 to 1 **12.** 13 to 18
13. 2 to 35 **14.** 3 to 10 **15.** 9 to 40 **16.** 1 to 12
17. 4 to 1 **18.** 78 km/h **19.** 4 **20.** 77 **21.** 15
22. 3 **23.** 20 **24.** 10 **25.** 25 cards for $7.50
26. 375 km **27.** 12 cm **28. a)** 3 to 8 **b)** 40 to 18 to 15 **c)** 3 to 2 **d)** 12 to 5 **e)** 87

Test Two Chapter 6: Ratio and Rate

1. 3 to 8 **2.** 4 to 9 **3.** 3 to 7 **4.** 6 to 1 **5.** 3 to 7 to 18 **6.** 7 to 8 **7.** 4:3 **8.** 3:2 **9.** $\frac{1}{5}$ **10.** $\frac{19}{17}$ **11.** 1 to 3
12. 15 to 2 **13.** $\frac{10}{3}$ **14.** $\frac{71}{17}$ **15.** 7 to 15
16. 11 to 400 **17.** 10 to 3 **18.** 13 to 80 **19.** 2 to 1
20. 56 **21.** 2 **22.** 75 **23.** 12 **24.** 15 **25.** 1
26. a) $1.94 **b)** $19.43 **27. a)** 1920 km
b) 80 km/h **28.** 1.7 m **29.** 2080 km

Extension Chapter 6: Ratio and Rate

1. green to white **2.** red to all discs **3.** red to green **4.** all discs to green **5.** red to white to green **6.** green to white to all discs **7.** 7:4
8. 5:3 **9.** 5:4 **10.** 7:4 **11.** 7:43 **12.** 10:90 or 1:9
13. 4:96 or 1:24 **14.** 8:292 or 2:73 **15. a)** 65 quarters, 30 loonies **b)** $51.25 **c)** 5:3 **16.** $21.40
17. $40.80 **18.** $49.75 **19.** $73.60 **20. a)** 152 kg
b) 4 m **21.** Answers may vary. Some examples are 14:9, 16:9, 20:9, 8:15 **22. a)** major highway: 1600 km; secondary highway: 960 km; city: 400 km
b) 2960 km **c)** 82.2 km/h

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CHAPTER 7: Percent

7.1 Percents

1. 54% 2. 60% 3. 42% 4. 64% 5. 60% 6. 25%
7. 40% 8. 35% 9–10. Answers will vary.
9. 36% 10. 42% 11. 40, 40% 12. 58, 58%
13. 3, 75 14. 1, 50 15. 17, 85 16. 52, 52%
17. 12% 18. 20% 19. 74% 20. 76% 21. 25%
22. 84% 23. 15% 24. 56% 25. $\frac{2}{5}$, 40% 26. $\frac{9}{25}$, 36% 27. $\frac{17}{100}$, 17% 28. 68% 29. 75%

7.2 Ratios, Fractions, Decimals, and Percents

1. 23% 2. 16% 3. 35% 4. 20% 5. 82.5%
6. 92% 7. 80% 8. 4%

	Fraction	Decimal	Percent
9.	$\frac{1}{4}$	0.25	25%
10.	$\frac{9}{100}$	0.09	9%
11.	$\frac{19}{25}$	0.76	76%
12.	$\frac{4}{15}$	0.267	26.7%
13.	$\frac{1}{8}$	0.125	12.5%
14.	$\frac{5}{6}$	0.833	83.3%
15.	$\frac{7}{12}$	0.583	58.3%

16. 0.55 17. 0.86 18. 0.07 19. 0.4 20. 0.27
21. 0.03 22. 0.824 23. 0.006 24. 0.085 25. 0.2175

	Fraction	Decimal	Percent
26.	$\frac{3}{10}$	0.3	30%
27.	$\frac{21}{25}$	0.84	84%
28.	$\frac{11}{20}$	0.55	55%
29.	$\frac{2}{25}$	0.08	8%
30.	$\frac{5}{8}$	0.625	62.5%
31.	$\frac{7}{1000}$	0.007	0.7%
32.	$\frac{23}{200}$	0.115	11.5%
33.	$\frac{9}{200}$	0.045	4.5%

34. > 35. < 36. = 37. = 38. < 39. >
40. 15%

7.3 Percent of a Number

1. 2.25 2. 131 3. 12.5 4. 24 5. 35.2 6. 76 7. 5
8. 270 9. 20.25 10. 7.5 11. 6.25 12. 457.5
13. $40.50 14. $0.43 15. $87.75 16. $137.28
17. $1.68 18. $10.88 19. = 20. < 21. = 22. <
23. 96 L 24. 140 g 25. 90 kg 26. 8.1 t 27. 0.04 L
28. 25 451 km^2 29. $3416 30. 3672

7.4 Estimating with Percent: Mental Math

Estimates may vary. 1. 65% 2. 60% 3. 16%
4. 50% 5. 12 6. 20 7. 39 8. 72 9. 36 10. 28
11. $4.50 12. $6.00 13. $22.50 14. $12.00
15. $2.50 16. $5.50 17. $15.00 18. $30
19. 80% 20. 25% 21. 75% 22. 50% 23. 50%
24. 90% 25. 165 m 26. 180 27. $15.00
28. $3.60 29. $90.00 30. $10.50 31. 10%

7.5 Discount and Sale Price

1–10. Estimates may vary. 1. $5.74 2. $19.80
3. $8.99 4. $99.90 5. $136.31 6. $1690.20
7. $10.63 8. $303.99 9. $3.79 10. $34.97
11. $31.31, $27.83, $24.35 12. a) $279.98
b) $284.99 c) Camera Shop by $5.01

	Price	Rate of Discount	Amount of Discount	Sale Price
13.	$219.50	30%	$65.85	$153.65
14.	$39.95	40%	$15.98	$23.97
15.	$955.00	15%	$143.25	$81.75
16.	$1869.49	20%	$373.90	$1495.59
17.	$87.90	35%	$30.77	$57.14

18. $0.74, $2.21 19. $1.07, $3.22 20. $0.50, $1.48
21. $1.88, $5.62

7.6 PST and GST

Answers will vary depending on the rates of GST and PST and on the method of calculating PST in your province.

7.7 Commission

1. $180 2. $732 3. $162.50 4. $19.60 5. $2250
6. $210.80 7. $75 8. $436 9. $8400
10. $18 250 11. $402.85 12. $9540
13. $2022.29 14. $1408.80 15. more than $12 500 16. $8748, $131.22 17. $11 358, $170.37
18. $6480, $97.20 19. $13 530, $202.95

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7.8 Finding the Percent

1. 72% 2. 48% 3. 20% 4. 50% 5. 62.5%
6. 80% 7. 25% 8. 13.7% 9. 17.5% 10. 71.9%
11. 20.8% 12. 73.8% 13. a) 49.6% b) 80%
14. 42.9% 15. 34.0% 16. a) 62.5% b) 12.5%
c) 25%

7.9 100% of a Number

1. 0.75, 75 2. 1.5, 150 3. 0.64, 64 4. 250 5. 400
6. 62.5 7. 75 8. 40 9. 70 10. 90 11. 80 12. 35
13. 200 14. $516.00 15. $29.00 16. $1250.00
17. $50.00 18. 400 19. 551 20. $725.00

7.10 Percents Greater Than 100%

1. 3 2. 4.4 3. 1.52 4. 2.7 5. 14.1 6. 25
7. 400% 8. 240% 9. 145% 10. 1200%
11. 725% 12. 2575% 13. 125% 14. 120%
15. 175% 16. 275% 17. 337.5% 18. 568%
19. 96 20. 55 21. 1352 22. 1424.5 23. 680
24. 933.24 25. $44.80 26. $230.00 27. $406.25
28. $66.69 29. $471.67 30. $50.65 31. 112%
32. 2 712 236 33. a) $21.51 b) $74.69

7.11 Simple Interest

	Principal	Interest Rate	Interest	Amount
1.	$700	5%	$35.00	$735
2.	$3400	6.5%	$221	$3621
3.	$11 500	10%	$1150	$12 650
4.	$2400	8.4%	$201.60	$2601.60
5.	$480	12%	$57.60	$537.60

	Principal	Rate	Time (years)	Interest	Amount
6.	$360	11%	2	$79.20	$439.20
7.	$12 000	9.5%	5	$5700	$17 700
8.	$840	10%	4.5	$378	$1218
9.	$5500	12.5%	2.5	$1718.75	$7218.75
10.	$22 000	8.2%	7	$12 628	$34 628

11. $140.25 12. $3850 13. 10.5% 14. $1745
15. a) $10 450 b) $32 450
16.

Year	Principal	Rate	Interest	Amount
1	$25 000	7%	$1750	$26 750
2	$26 750	7%	$1872.50	$28 622.50
3	$28 622.50	7%	$2003.58	$30 626.08
4	$30 626.08	7%	$2143.83	$32 769.91
5	$32 769.91	7%	$2293.89	$35 063.80

Test One Chapter 7: Percent

1. 60% 2. 75% 3. 65% 4. 28% 5. 70% 6. 90%
7. $\frac{2}{5}$ 8. $\frac{37}{50}$ 9. $\frac{173}{200}$ 10. $\frac{3}{25}$ 11. $1\frac{17}{100}$ 12. $\frac{1}{25}$
13. 0.58 14. 1.37 15. 0.075 16. 0.484 17. 0.6275
18. 0.148 19. 32% 20. 5% 21. 142% 22. 14.5%
23. 480% 24. 504% 25. 84 26. 39 27. 175.48
28. 539.4 29. 47% 30. 5% 31. 20% 32. 45%
33. 725 34. 56 35. 200 36. 960 37. 5671.05 km^2
38. a) $17.00 b) Answers will vary. 39. $586.88
40. $800.00

Test Two Chapter 7: Percent

	Fraction	Decimal	Percent
1.	$\frac{1}{25}$	0.04	4%
2.	$\frac{17}{25}$	0.68	68%
3.	$1\frac{7}{50}$	1.14	114%
4.	$\frac{3}{5}$	0.6	60%
5.	$4\frac{1}{2}$	4.5	450%
6.	$\frac{4}{5}$	0.8	80%

7. 16.7% 8. 66.7% 9. 45.5% 10. 55.6% 11. 58.3%
12. 57.1% 13. 35 14. 5.25 15. 95.7 16. 170

	Original Price	New Price	Percent
17.	$3.46	$7.10	48.7%
18.	$18.76	$55.80	33.6%
19.	$160.49	$208.60	76.9%
20.	$84.60	$68.32	123.8%

21. $12.00 22. $136.16 23. $136.29 24. $1636
25. $548.70 26. $5.12 27. a) 2485 b) 3727.5
28–31. GST and PST will vary. 28. Discount Price: $10.00 29. Discount Price: $39.98
30. Discount Price: $124.36 31. Discount Price: $26.00 32. 3.5% 33. a) $855.88 b) $535.29
c) $1654.71

Extension Chapter 7: Percent

1. a) 50% b) 10% c) 25% d) 20% e) 10%
f) 12.5% g) 30% h) 6.25% 2. a) 40% b) 38%
c) e d) t e) 30% 3. 28 4. 36 5. a) 43%
b) 33% c) 67% d) 17.6% 6. a) $472.50/week for a 38-h week b) $294/week for a 23.75-h week
c) $388.50/week for a 34.2-h week
d) $546/week for a 41.8-h week 7. 1 8. 30%

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CHAPTER 8:
Three-Dimensional Geometry

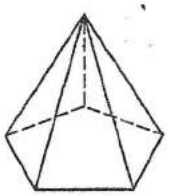
8.1 Three-Dimensional Solids

1. cube, rectangular prism, square pyramid, hexagonal prism, pentagonal prism, triangular prism **2.** cylinder, cube, rectangular prism, hexagonal prism, pentagonal prism, sphere, cone **3.** cylinder, cone **4.** cube, rectangular prism, hexagonal prism, pentagonal prism, pentagonal pyramid **5.** rectangular prism **6.** pentagonal prism **7.** sphere **8.** cylinder **9.** cone **10.** hexagonal prism

11.

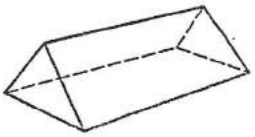
rectangular prism

12.



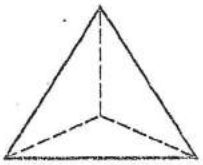
pentagonal pyramid

13.



triangular prism

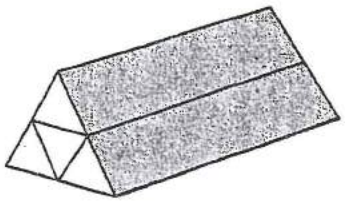
14.



triangular pyramid

15. Answers may vary. A prism is a polyhedron with 2 parallel congruent bases in the shape of a polygon and lateral sides that are rectangles. A pyramid is a polyhedron with 1 base in the shape of a polygon and the same number of triangular faces as there are sides on the base.

16.

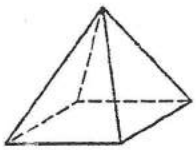


8.2 Solids, Shells, and Skeletons

1. shell **2.** solid **3.** skeleton **4.** solid
5. shell **6.** skeleton **7.** 6 rectangular faces
8. 2 pentagonal faces, 5 rectangular faces
9. 1 hexagonal face, 6 triangular faces

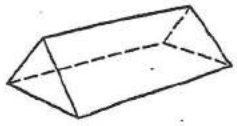
	Polyhedron	*F*	*E*	*V*
10.	rectangular prism	6	12	8
11.	pentagonal prism	7	15	10
12.	hexagonal pyramid	7	12	7
13.	cube	6	12	8
14.	triangular pyramid	4	6	4

15.



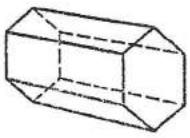
square pyramid

16.



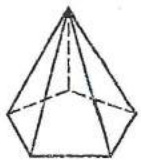
triangular prism

17.



hexagonal prism

18.

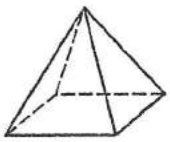


pentagonal pyramid

19. Answers will vary.

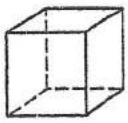
8.3 Nets of Three-Dimensional Shapes

1.



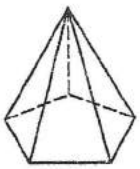
square pyramid

2.



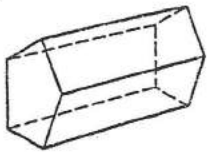
cube

3.



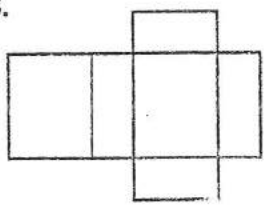
pentagonal pyramid

4.

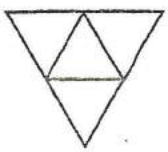


pentagonal prism

5.



6.



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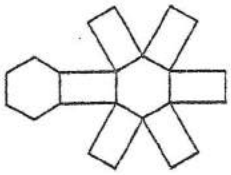
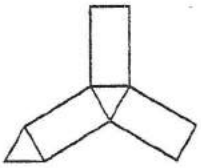
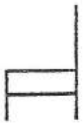
7. 

8. 

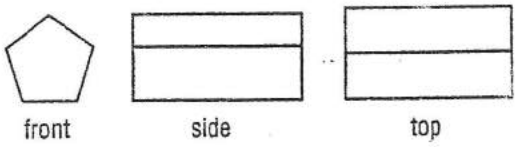
9. a) cube 10. a) square pyramid

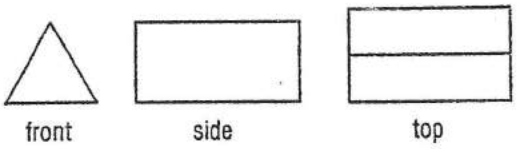
8.4 Points of View

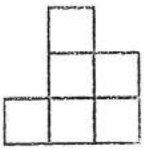
1. a) 

b) 

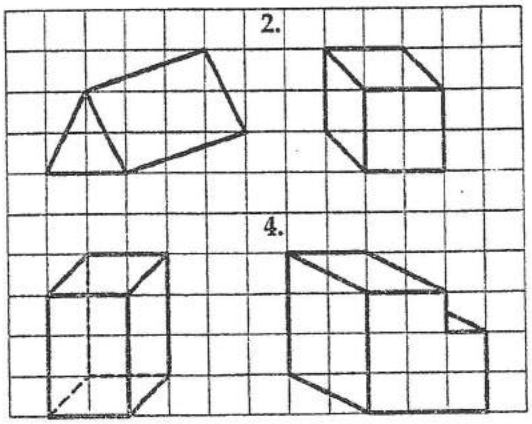
c) 

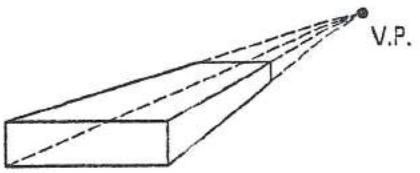
2. 

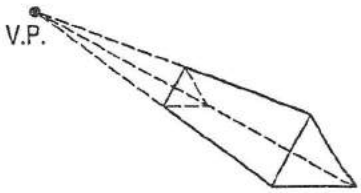
3. 

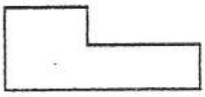
4. triangular pyramid 5. square pyramid
6. cylinder 7. a) 9
b) 

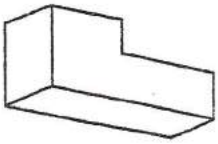
8.5 Sketching Three-Dimensional Shapes

1. 2. 3. 4. 

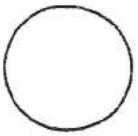
5. 

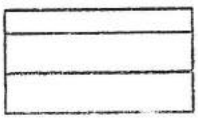
6. 

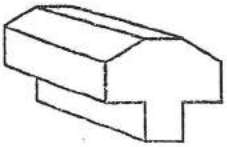
7. a) 

b) 

8. a) 

b) 

9. a) 

b) 

10. a) 

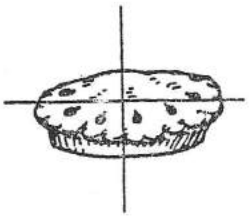
b) 

c) 

d) 

8.6 Planes of Symmetry

1. yes 2. no 3. yes 4. yes
5. 

6. 

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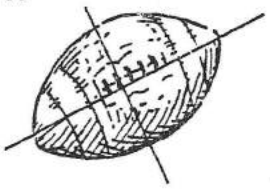
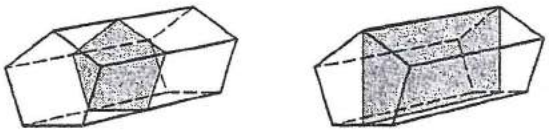
7.



8.

9.



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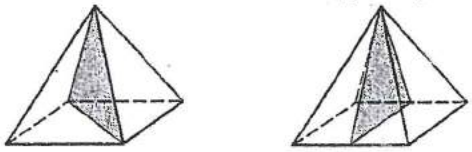

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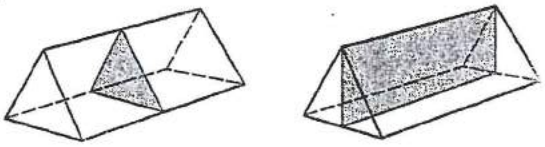
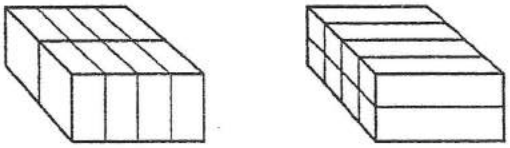


12.

13.



8.7 Surface Areas of Polyhedra

Nets may vary. **1.** 384 m^2 **2.** 208 cm^2
3. 102.48 cm^2 **4.** 164 cm^2 **5.** 296.4 cm^2
6. 181.5 cm^2 **7.** 142 cm^2 **8.** 982 cm^2
9. 13 800 cm^2

8.8 Volumes of Prisms

1. 2431 cm^3 **2.** 2016 cm^3 **3.** 8.4 cm^3 **4.** 0.81 m^3
5. 0.3825 m^3 **6.** 756 cm^3 **7.** 2.16 m^3 **8.** 1575 m^3
9. a) 141 750 mL **b)** 151 200 cm^3

8.9 Surface Area and Volume of a Cylinder

1. 527.52 cm^2, 904.32 cm^3 **2.** 942 cm^2,
1962.5 cm^3 **3.** 28 260 cm^2, 339 120 cm^3 **4.** 6908 cm^3
5. a) 1017.36 cm^3 **b)** 127.17 cm^2 **c)** 452.16 cm^2
d) 579.33 cm^2 **6. a)** rectangular prism
b) 301 cm^2 **c)** rectangular prism **d)** 645 cm^3

8.10 Mass
8.11 Capacity

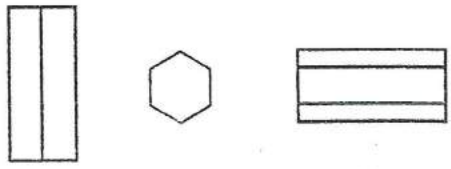
1. 0.3 **2.** 4.8 **3.** 6000 **4.** 2100 **5.** 0.075 **6.** 1.65
7. 820 **8.** 7.5 **9.** 600 000 **10.** 500 **11.** kilograms
12. kilograms **13.** grams **14.** grams **15.** tonnes
16. milligrams **17.** litres **18.** millilitres
19. litres **20.** millilitres **21.** litres
22. a) 1420 mL **b)** 5 **23.** 2.8 **24.** 6 **25.** 52

8.12 Volume, Capacity, and Mass

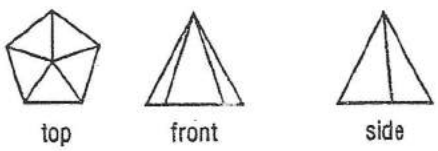
1. 2.5 L **2.** 0.75 L **3.** 15 L **4.** 150 L **5.** 5 kL
6. 6.3 kL **7.** 85 kL **8.** 27.6 L **9.** 650 g
10. 8 kg **11.** 25 kg **12.** 6 t **13.** 3 kg
14. 42 kg **15.** 25 t **16.** 120 t
17. 450 cm^3 **18.** 10 dm^3 **19.** 8 m^3
20. 2.5 cm^3 **21.** 16.2 dm^3 **22.** 145 cm^3
23. 750 g **24.** 450 mL **25.** a) 450 m^3 **b)** 900 kL
c) 450 t **26.** a) 1589.625 kL b) 1059.75 m^3
c) 1059.75 t

Test One Chapter 8: Three-Dimensional Geometry

1. hexagonal prism; 8 faces, 18 edges, 12 vertices
2. pentagonal pyramid; 6 faces, 10 edges, 6 vertices
3. Nets may vary. **4.** Nets may vary.
5.



6.



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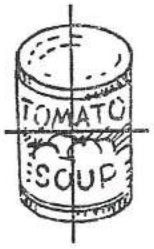

8.

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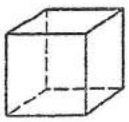
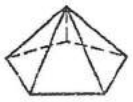
9. 103.68 cm^2 10. 1245.01 cm^2 11. 1242 cm^3
12. 1144.53 cm^3 13. 3.5 14. a) 11 b) 25 mL

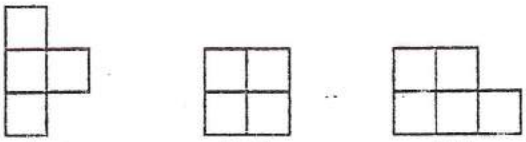
Test Two Chapter 8: Three-Dimensional Geometry

1. triangular pyramid; 4 faces, 6 edges, 4 vertices
2. cube; 6 faces, 12 edges, 8 vertices
3. cube
4. pentagonal pyramid

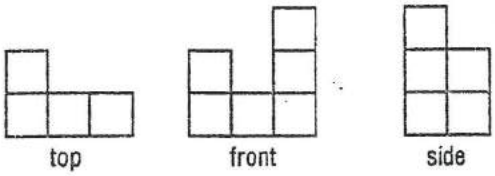




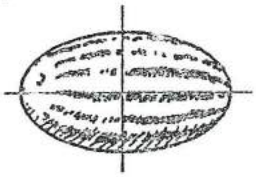
5.



6.



7.



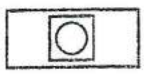
8.

9. 1616.96 cm^2 10. 989.1 cm^2 11. 1013.6 cm^3
12. 713.408 cm^3 13. 2.6 14. a) 1.12 dm^3
b) 1.12 kg c) 1.12 L

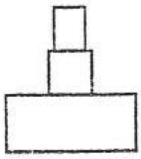
Extension Chapter 8: Three-Dimensional Geometry

1. \$17.00 2. \$12.75 3. \$11.25 4. cube: \$18.00; tetrahedron: \$6.00; octahedron: \$12.00; icosahedron: \$30.00; dodecahedron: \$63.00

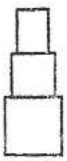
5. a)



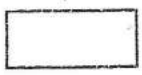
b)



c)



d)



6. a) 216 cm^2 b) 432 cm^2 7. 1 cm^3, 729 cm^3
8. a) increase of 20 cm^3 b) increase of 18 cm^2
c) increase of 36 cm^3 d) increase of 26 cm^2
e) increase of 45 cm^3 f) increase of 28 cm^2;

CHAPTER 9: Statistics and Probability

9.1 Collecting Data

1. a)

Favourite Chores		
Chore	Tally	Frequency
Dusting	𝍸 |	6
Vacuuming	𝍸 𝍸 ||||	14
Doing Dishes	𝍸 ||||	9
Mowing Lawn	𝍸 𝍸 𝍸	15
Shovelling Snow	𝍸 𝍸 𝍸 𝍸	20
Taking Out Garbage	𝍸 𝍸 |||	13
Making Bed	𝍸 𝍸 𝍸 |	16

b) Shovelling Snow c) 93

2. a)

Number of Children in Families		
Number of Children	Tally	Frequency
1	𝍸 ||	7
2	𝍸 ||	7
3	𝍸 𝍸 |	11
More than 3	𝍸	5

b) 30 c) 3 d) 16 3. a) census b) census
c) census 4. a) biased b) unbiased c) biased

9.2 Making Predictions

1. 450
2. a)

Pet Ownership		
Pet	Frequency	Percent
Dog	140	47%
Cat	100	33%
Bird	20	7%
Fish	25	8%
Other	15	5%

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b) Dog: 30 550; Cat: 21 450; Bird: 4550; Fish: 5200; Other: 3250

3. a)

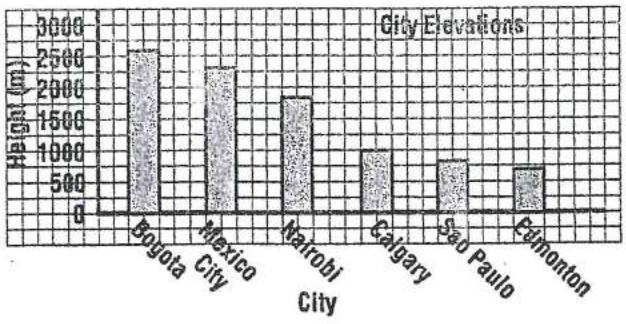
Home Appliances		
Appliance	Frequency	Percent
Air Conditioner	18	24%
Dishwasher	32	43%
Clothes Dryer	55	73%
Washing Machine	59	79%
Microwave Oven	51	68%

b) Some households have more than one appliance. c) Air Conditioner: 2 640 000; Dishwasher: 4 730 000; Clothes Dryer: 8 030 000; Washing Machine: 8 690 000; Microwave Oven: 7 480 000 4. a) Swimming Lessons: 180; Camp: 126; Summer Job: 113; Summer School: 104; Family Trip: 261 b) Some students participated in more than one activity. c) Answers will vary.

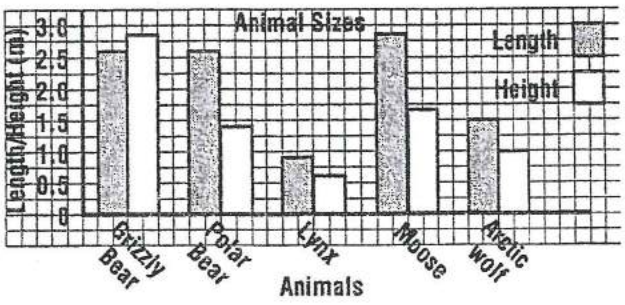
9.3 Reading and Drawing Bar Graphs

1. a) Rugby b) Basketball c) Rugby, Football, Field Hockey, Baseball, Basketball 2. a) Toronto, Athens, Montreal b) 17 million c) 17 million d) 76 million

3.



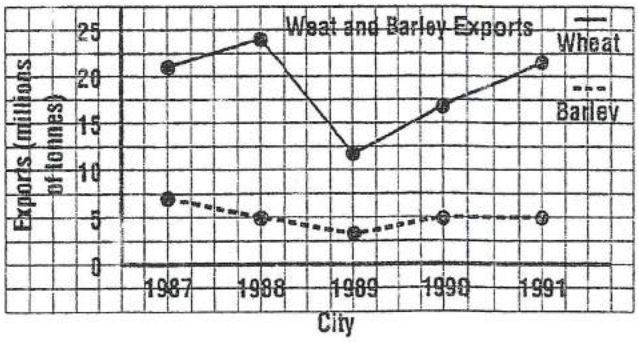
4.



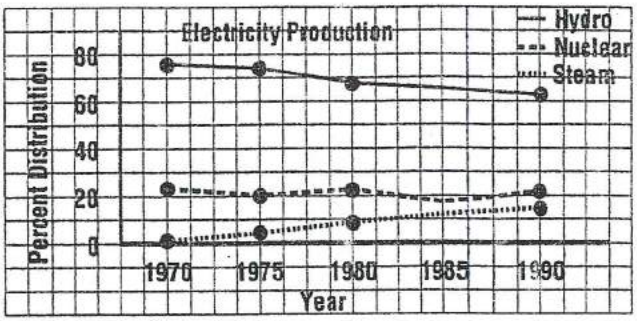
9.4 Reading and Drawing Broken-Line Graphs

1. a) 1985 and 1986, 1990 and 1991 b) 1987 and 1988 c) 1990

2.



3. a)



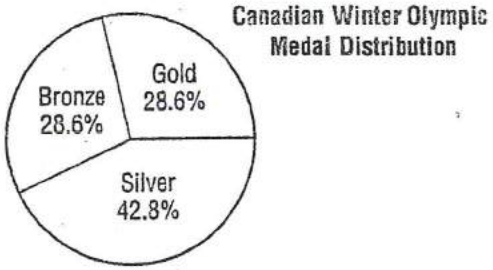
b) Hydro 4. Answers will vary.

9.5 Reading and Drawing Circle Graphs

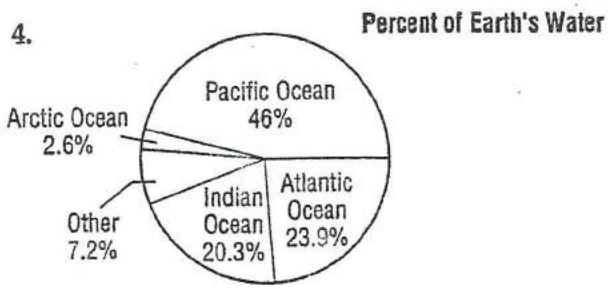
1. a) 4 702 524 b) 891 858 c) 2 053 976 d) 986 449 e) 2 418 827 f) 445 929 g) 2 013 437

2. a) Asia and Africa b) Europe and Australia

3.



4.



5.

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9.6 Reading and Drawing Pictographs

1. a) New Brunswick: 500; British Columbia: 2000; Manitoba: 875; Alberta: 1750; Nova Scotia: 500 **b)** 21.4

2. a)

Swim Meet Scores	
Mapleview	●●●●●◖
Parklawn	●●●●●●●●●◖
Valleywood	●●●●●●●●◢
Balmoral	●●●●●●●●●●◢
Rosedale	●●●●◕
Dewhurst	●●●●●●◕
Each ● represent 20 points	

b) Answers will vary.

3. a)

Average Monthly Precipitation	
Jan.	💧💧💧💧💧
Feb.	💧💧💧💧
Mar.	💧💧💧💧◖
Apr.	💧💧💧◖
May	💧💧💧◖
June	💧💧💧◖
Each 💧 represent 25 mL.	

b) Answers will vary.

9.7 Mean, Median, and Mode

1. 24 **2.** 104 **3.** 75.5 **4.** 964 **5.** 347 **6.** 54.2 **7.** 46 **8.** 16 **9.** 28 **10.** 99 **11.** 14.5 **12.** 3 and 9 **13.** 24 **14.** 20, 21, 26 **15.** 60 **16.** 5 **17. a)** Mean: 75; Median: 74 **b)** mean **18. a)** Mean: 3.2; Median: 2.5; Mode: 2 **b)** Answers may vary.

9.8 Stem-and-Leaf Plots

1. a) Mean: 41.4; Median: 37; Mode: 37 **b)** 34

2. a) Mean: 136.85; Median: 138; Mode: 139 and 151 **b)** 45 **c)** 2

3. a)

Days of Snowfall

5	1	2	4	4	4	5	5	6	6	6
6	0	0	6							
7	4	7	7							
8	3									

b) Mean: 61.2; Median: 56; Mode: 54 and 56 **c)** 5

4. a)

Student Marks

Test One						Test Two				
			9	5						
		7	4	6	1	6	7			
9	8	6	3	2	1	7	4	4	5	7	8
			8	5	3	8	2	6	8	
				4	2	9	2	2	5	

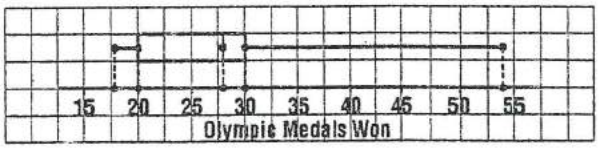
b) 14 **c)** Test One: 77; Test Two: 77.5

d) Test One: 35; Test Two: 34

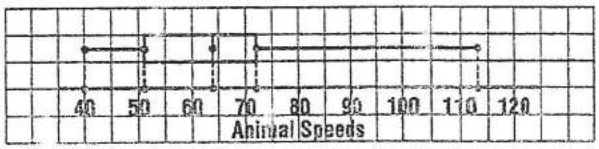
9.9 Box-and-Whisker Plots

1. a) 168 cm b) about 6

2.



3.

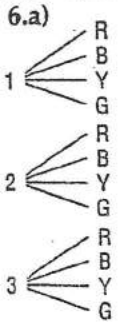


4. a) 92 b) 3 c) 3

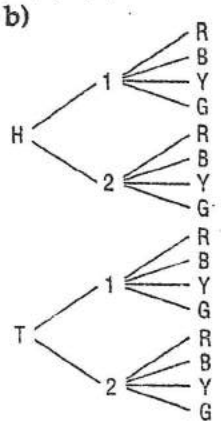
9.10 Possible Outcomes

1. 1, 2, 3, 4, 5, 6, 7, 8 **2.** H1, H2, H3, H4, H5, H6, T1, T2, T3, T4, T5, T6 **3.** (red) blue, green, yellow **4.** (O) U, T, C, M, E **5.** 1, 1; 1, 2; 1, 3; 1, 4; 1, 5; 1, 6; 2, 1; 2, 2; 2, 3; 2, 4; 2, 5; 2, 6; 3, 1; 3, 2; 3, 3; 3, 4; 3, 5; 3, 6; 4, 1; 4, 2; 4, 3; 4, 4; 4, 5; 4, 6

6.a)



b)



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7. a) 1, 1; 1, 2; 1, 3; 1, 4; 1, 5; 1, 6; 2, 1; 2, 2; 2, 3; 2, 4; 2, 5; 2, 6; 3, 1; 3, 2; 3, 3; 3, 4; 3, 5; 3, 6; 4, 1; 4, 2; 4, 3; 4, 4; 4, 5; 4, 6; 5, 1; 5, 2; 5, 3; 5, 4; 5, 5; 5, 6; 6, 1; 6, 2; 6, 3; 6, 4; 6, 5; 6, 6 b) 36 c) 4 d) 7; 6 ways
e) 2 and 12

9.11 Probability

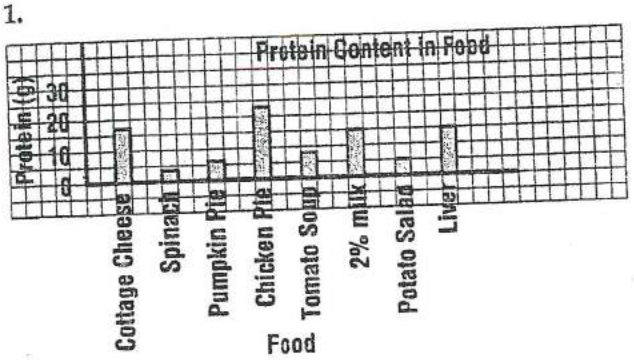
1. a) $\frac{1}{3}$ b) $\frac{1}{3}$ c) $\frac{1}{3}$ 2. a) $\frac{1}{4}$ b) $\frac{1}{2}$ c) $\frac{1}{4}$ 3. a) $\frac{1}{6}$
b) $\frac{1}{3}$ c) $\frac{1}{2}$ d) $\frac{1}{2}$ 4. a) $\frac{1}{4}$ b) $\frac{3}{4}$ c) $\frac{1}{2}$
5. a) 1, 2, 3, 4 b) $\frac{1}{4}$ c) $\frac{1}{2}$ d) $\frac{3}{4}$ 6. a) $\frac{1}{9}$ b) $\frac{5}{9}$
c) $\frac{1}{3}$ d) $\frac{2}{9}$ e) 0 f) $\frac{4}{9}$ 7. a) $\frac{1}{26}$ b) $\frac{1}{26}$ c) $\frac{21}{26}$
d) $\frac{5}{26}$ 8. a) 45% b) 30% c) 25% d) 70%
9. a) 4% b) 4% c) 24% d) 24%

9.12 Odds

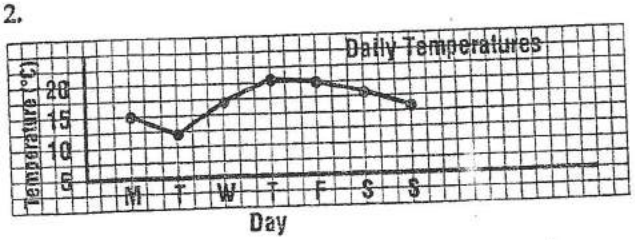
1. a) $\frac{5}{9}$ b) $\frac{5}{4}$ c) $\frac{4}{5}$ 2. a) $\frac{2}{11}$ b) $\frac{2}{9}$ c) $\frac{9}{2}$ d) $\frac{4}{11}$
e) $\frac{4}{7}$ f) $\frac{7}{4}$ 3. a) $\frac{1}{3}$ b) $\frac{1}{2}$ c) $\frac{2}{1}$ d) $\frac{2}{3}$ e) $\frac{2}{1}$ f) $\frac{1}{2}$
g) $\frac{5}{1}$ h) $\frac{4}{2}$ 4. $\frac{3}{5}$

Test One Chapter 9: Statistics and Probability

1.



2.



3. a) 147 b) 105 c) 42 d) 63 e) 21 f) 42
4. a) Mean: 26.9; Median: 28; Mode: 23 and 28
b) Mean: 64.5; Median: 63.5; Mode: 49
c) Mean: 61; Median: 65.5; Mode: no mode

5. a)

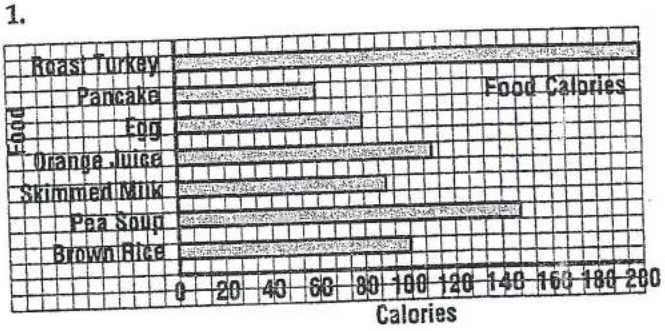
Student Heights

15	0	2	4	6	7	7	7	8	9	9
16	0	1	1	2	2	3	4	5	7	
17	1	3	3	4	5	6				
18	1									

b) 161.5 c) 157 d) 31 6. a) R1, R2, R3, R4, R5, R6, B1, B2, B3, B4, B5, B6, Y1, Y2, Y3, Y4, Y5, Y6
b) $\frac{1}{18}$ c) $\frac{1}{6}$ d) $\frac{1}{3}$

Test Two Chapter 9: Statistics and Probability

1.



2. a) about 21°C b) about 6°C c) about 7°C
3.

4. a) Mean: 112.4; Median: 112; Mode: 107
b) Mean: 38.9; Median: 40; Mode: 34, 40, 41
c) Mean: 177.5; Median: 177.5; Mode: no mode
5. a)

Wet Days

10	2	3	4	7	8
11	3				
12	0	0	1	1	
13	1	3	7		
14					
15	2	6	6		

b) Mean: 124; Median: 120.5; Mode: 120, 121, 156
6. a) 1A, 1B, 1C, 2A, 2B, 2C, 3A, 3B, 3C, 4A, 4B, 4C, 5A, 5B, 5C, 6A, 6B, 6C, 7A, 7B, 7C, 8A, 8B, 8C
b) $\frac{1}{24}$ c) $\frac{1}{6}$ d) $\frac{1}{3}$ e) 0

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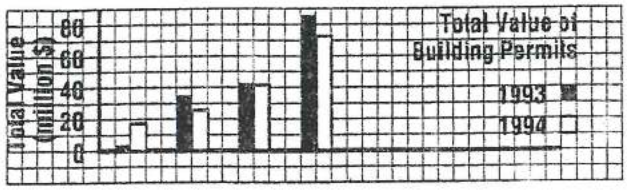
Extension Chapter 9: Statistics and Probability

1. Commercial decrease of $8.71, Institutional decrease of $2.27, Industrial increase of $14.64

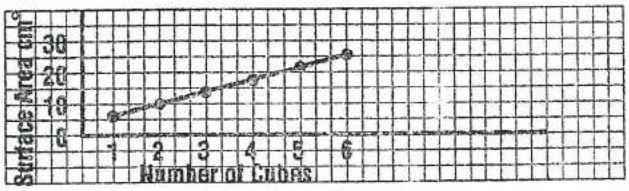
2.



3. 93.96% 4. The flag is being held by the person about to raise it on the flagpole. 5. Answers will vary, but it should be mentioned that the person raising the flag pauses briefly after 2.5 s, and then continues at 4 s and completes raising the flag at almost 8 s. 6. 20 m 7. about 3.7 m/s 8. a) 12.95 b) $\frac{7}{12}$ c) 1.2 9. a) 28 b) 1.5 c) $\frac{1}{3}$ 10. 34

11. Answers may vary. 12. a) $\frac{2}{11}$ b) $\frac{1}{11}$ c) $\frac{4}{11}$ d) $\frac{7}{11}$ e) $\frac{1}{55}$

13. a)



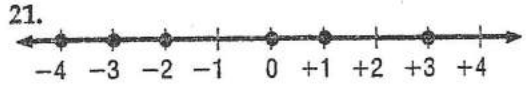
b) 102, 202, 402

CHAPTER 10: Integers

10.1 Integers

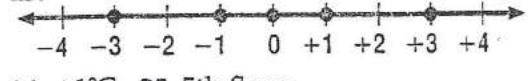
1. +7 2. −11 3. −1 4. 0 5. +30 6. +4 7. −6 8. −17 9. +9 10. +1 11. −48 12. +4 13. +45 14. −18 15. −8 16. −200 17. +15 18. −2, −1, 0, +1, +2, +3 19. −3, −1, 0, +2 20. −3, −2, 0, +1, +3

21.



22.

23.



24. +1°C 25. 5th floor

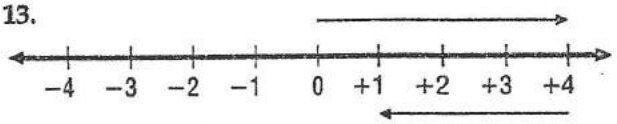
10.2 Comparing and Ordering Integers

1. +3 2. −7 3. −13 4. −18 5. −7 6. −48 7. +3 8. +12 9. 0 10. −4 11. +4 12. +4 13. > 14. < 15. < 16. > 17. > 18. < 19. < 20. > 21. > 22. −5, −4, −3, −2, −1, 0, +1 23. +7, +6, +5, +4, +3, +2, +1, 0 24. −6, −5, −4, −3, −2, −1, 0 25. −8, −7, −6, −5, −4, −3 26. −3, −4, −5, −6 27. +2, +1, 0, −1 28. −1, −2, −3, −4 29. 0, −1, −2, −3 30. −5, −2, 0, +1, +4 31. −11, −10, −7, +1, +6 32. −14, −9, −1, +2, +3 33. −21, −11, −6, 0, +5 34. a) E b) G and V c) A, G, E, N d) A e) NEGATIVE 35. +1, +4, +7 36. −13, −17, −21

10.3 Adding Integers

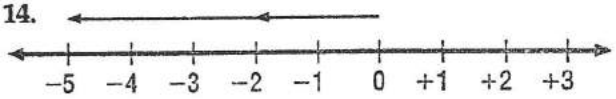
1. (+4) + (−2) = +2 2. (+3) + (−6) = −3 3. (−3) + (+4) = +1 4. (−4) + (+2) = −2 5. +2 6. 0 7. +6 8. −5 9. +1 10. −2 11. +8 12. −3

13.



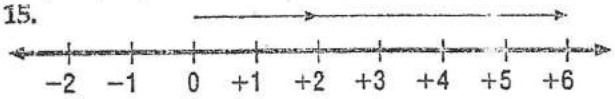
(+4) + (−3) = +1

14.



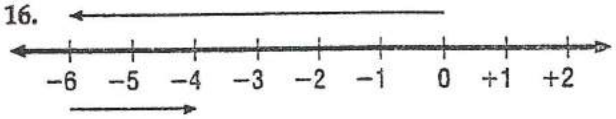
(− 2) + (−3) = −5

15.



(+2) + (+4) = +6

16.



(−6) + (+2) = −4

17. +2 18. −15 19. −2 20. +2 21. −5 22. −10 23. −8 24. +7 25. +19 26. −6 27. −11 28. +7

10.4 Subtracting Integers

1. (+4) + (+1) = +5 2. (−1) + (+8) = +7 3. (+7) + (−9) = −2 4. (−6) + (−5) = −11 5. (+7) + (−3) = +4 6. (−2) + (−6) = −8 7. (−4) + (+3) = −1 8. (+8) + (+6) = +14 9. (+5) + (−11) = −6 10. (−1) + (+4) = +3 11. −7 12. +15 13. −5 14. −16 15. −10 16. +4 17. +16 18. 0 19. +1 20. −4 21. +8 22. −8 23. −6 24. +3 25. +9 26. −11 27. a) 1169 b) 2672

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	−	+2	−3	+5	−9
28.	−6	−8	−3	−11	+3
29.	+1	−1	+4	−4	+10
30.	−5	−7	−2	−10	+4
31.	0	−2	+3	−5	+9
32.	+4	+2	+7	−1	+13
33.	−3	−5	0	−8	+6

34. a) 2 strokes below par b) 5 strokes below par

10.5 Multiplying Integers

1. − 2. + 3. − 4. + 5. − 6. + 7. −40 8. +28
9. +33 10. −20 11. −54 12. +27 13. +20
14. −36 15. +56 16. 0 17. +2 18. −1 19. −4
20. −6 21. −6 22. −8 23. +11 24. +8 25. +4
26. −64 27. −8 28. +1 29. −1 30. +81
31. +15 32. −40 33. −16 34. 0 35. −18 36. +48
37. 1750 m 38. −9°C 39. −4, +3 40. +6, −4

10.6 Dividing Integers

1. + 2. − 3. + 4. − 5. + 6. −
7. $+18 \div (-3) = -6$, $+18 \div (-6) = -3$
8. $-20 \div (-5) = +4$, $-20 \div (+4) = -5$
9. $-21 \div (+7) = -3$, $-21 \div (-3) = +7$
10. $+48 \div (+8) = +6$, $+48 \div (+6) = +8$ 11. −3
12. +2 13. −13 14. +4 15. +6 16. −4 17. −5
18. +4 19. −4 20. −4 21. +5 22. −7 23. −3
24. +13 25. −6 26. −4 27. +15 28. −14 29. +6
30. −3 31. −9 32. −13 33. +4°C 34. a) −18, +3; +18, −3 b) +12, +3; −12, −3

10.7 Integers in Standard Form

1. $7 + (-3) = 4$ 2. $-9 - 4 = -13$
3. $-4 \times (-7) = 28$ 4. $14 \div (-7) = -2$
5. $-12 + 6 = -6$ 6. $+13 - (-3) = +16$
7. $3 \times 7 = 21$ 8. $-32 \div (-4) = 8$
9. $-16 + 24 = 8$ 10. $-33 \div (-3) = 11$ 11. 5
12. −6 13. −7 14. 27 15. −42 16. −54
17. 9 18. −13 19. $-12 - 6 = -18$
20. $4 \times (-7) = -28$ 21. $48 \div 16 = 3$
22. $-8 \times (-20) = 160$ 23. $8 - (-6) + 3 = 17$
24. $-18 \div 3 \times 12 = -72$ 25. −2 26. −6
27. 17 28. −5 29. −3 30. 82 31. −3 32. 66
33. −25 34. 5

10.8 Integers on a Calculator

1. 7 2. −64 3. −67 4. 58 5. −8 6. 67
7. [C] 6 [−] 4 [+/−] [=] 8. [C] 5 [+/−] [×] [11] [=]
9. [C] 64 [+/−] [÷] 16 [+/−] [=]
10. [C] 8 [+/−] [×] 12 [+/−] [×] 3 [=]

11–20. Estimates will vary. 11. 4 12. 46

13. 868 14. −12 15. −208 16. −1104 17. −213
18. −15 19. 154 20. 111 21. [C] 6 [×] [=] [=]
22. [C] 4 [+/−] [×] [=] [=] [=] [=] 23. 125
24. −1331 25. 38 416 26. 117 649 27. 81
28. −1728 29. −2 30. −22

10.9 Order of Operations with Integers

1. 1 2. −15 3. −18 4. −1 5. −11 6. 22 7. 51
8. −13 9. −22 10. −75 11. −12 12. 5 13. 6
14. 18 15. −8 16. −991 17. 62 18. 1 19. −40
20. 81 21. −30 22. 50 23. −4 24. −22 25. 64
26. −7 27. 18 28. 1 29. −4 30. −5
31. $-3 \times 5 + 15 - 9$ 32. $15 + 5 - 9 - 3$
33. $-3 \times 5 + 15 - (-9)$ 34. $15 - (-3) \div (-9) - 5$
35. Answers will vary.

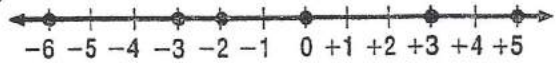
10.10 Scientific Notation: Large Numbers
10.11 Scientific Notation: Small Numbers

1. 10^2 2. 10^3 3. 10^4 4. 10^5 5. 10^4 6. 10^4 7. 10^6
8. 10^7 9. 3.2×10^3 10. 1.6×10^4 11. 7.2×10^2
12. 8.4×10^5 13. 2.1×10^6 14. 5×10^4
15. 7.3×10^7 16. 5.1×10^3 17. 2.42×10^6
18. 8.01×10^5 19. 41 000 20. 180 21. 7 000 000
22. 57 500 23. 320 000 24. 6 800 000 25. 10^{-3}
26. 10^{-2} 27. 10^{-5} 28. 10^{-3} 29. 10^{-3} 30. 10^{-6}
31. 4×10^{-5} 32. 3.5×10^{-2} 33. 7×10^{-4}
34. 6.2×10^{-4} 35. 7.8×10^{-5} 36. 5.4×10^{-3}
37. 3×10^{-3} 38. 6.8×10^{-4} 39. 0.06 40. 0.000 16
41. 0.000 072 42. 0.000 008 43. 0.003 02
44. 0.000 000 62 45. 0.000 005 18 46. 0.000 04

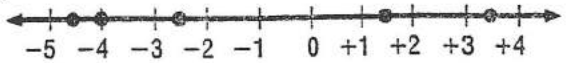
10.12 Rational Numbers

1. C 2. F 3. A 4. D 5. E 6. B 7–12. Answers will vary.

13.



14.



15.

16. $\frac{13}{4}$ 17. $\frac{-3}{5}$ 18. $\frac{-16}{5}$ 19. $\frac{-3}{2}$ 20. $\frac{3}{8}$ 21. $\frac{-1}{2}$ 22. <
23. > 24. = 25. = 26. > 27. > 28. $\frac{11}{2}$ 29. $\frac{21}{5}$
30. $\frac{33}{4}$ 31. $\frac{-43}{4}$ 32. $\frac{+13}{2}$ 33–34. Answers will

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Test One Chapter 10: Integers

1. > 2. > 3. < 4. < 5. < 6. < 7. > 8. <
9. +5, +2, −1, −5, −8 10. +12, 0, −7, −11, −15
11. +1, −4, −8, −9, −12 12. +13, +11, +6, −2, −19 13. +5, +2, 0, −2, −6 14. −4 15. −2
16. −11 17. +4 18. 0 19. −6 20. −3 21. +1
22. +14 23. −23 24. −3 25. −18 26. −56
27. +28 28. +50 29. −2 30. −7 31. +3 32. −2
33. 9 34. −3 35. −36 36. 14 37. −68 38. −12
39. 1.76×10^4 40. 5.4×10^6 41. 7.4×10^{-4}
42. 9×10^{-6} 43. 6300 44. 0.000 861 45. 0.0208
46. 955 000

Test Two Chapter 10: Integers

1. > 2. > 3. < 4. > 5. 7, 2, −2, −5, −6,
6. 8, 1, −4, −7, −10 7. 6, 2, −2, −3, −7 8. 6
9. −3 10. −5 11. −27 12. −9 13. −4 14. −5
15. 22 16. 51 17. −29 18. 15 19. −24 20. 48
21. −80 22. −48 23. 26 24. 16 25. −20 26. −11
27. −9 28. 48 29. −18 30. 4 31. −4 32. −65
33. 18 34. 1.9×10^4 35. 2.34×10^7 36. 4×10^{-5}
37. 3.9×10^{-4} 38. 360 000 000 39. 0.0047
40. 1 420 000 41. 0.000 000 204 42. −19°C
43. +9, −4

Extension Chapter 10: Integers

1. −10, −7, −13 2. 64, −128, 256 3. Answers may vary. −54, −108, 324 is one possible answer.
4. a) −15

b)

−16	−6	−8
−2	−10	−18
−12	−14	−4

×2

−4	$-1\frac{1}{2}$	−2
$-\frac{1}{2}$	$-2\frac{1}{2}$	$-4\frac{1}{2}$
−3	$-3\frac{1}{2}$	−1

÷2

16	6	8
2	10	18
12	14	4

×(−2)

4	$1\frac{1}{2}$	2
$\frac{1}{2}$	$2\frac{1}{2}$	$4\frac{1}{2}$
3	$3\frac{1}{2}$	1

÷(−2)

c) All 4 are magic squares. The magic numbers are: $-30, -7\frac{1}{2}, 30, 7\frac{1}{2}$ 5. a) INTEGERS
b) 14 c) 6 and −6 d) E ÷ T e) G, I and S, T
f) NET = −7, TIN = −15, TEN = −1, RIG = 3
6. $\frac{1}{2}$ 7. −2 8. −2 9. 2 10. −2 11. 2 12. 2
13. The sum of the values on the sides of each triangle divided by −3 equals the inside value.
14. a) 2 b) −4 c) 4 d) −8 e) −2 f) 11
15. a) $-7 \times 6 - 4 \times (-8)$ b) $-3 + 6 + (-7) - 4$
c) $6 \div (-3) \times 5 + (-7)$ d) $(-7 - 2) \div (-3) \times 4$
e) $6 - (-8) + 5 + 2$ f) $6 \times 4 - (-3) \times (-8)$

CHAPTER 11: Algebra

11.1 Variables and Expressions

1. $w + 12$ 2. $2l - 3w$ 3. $5d + 10n$ 4. $14 - 2h$
5–8. Answers may vary. 5. three times the width plus two times the length 6. four times the height minus six 7. four times the length plus two times the width plus seven 8. six times the number of dimes minus four times the number of nickels plus three 9. 6 10. 16 11. 29 12. 45 13. 9 14. 35
15. 13 16. 22 17. 10 18. 1000 19. 0 20. 27
21. 27 22. 54 23. 4 24. 54 25. 5.7 26. 1.2
27. 2.7 28. 12.9 29. 2.4 30. 8.1 31. −9 32. −20
33. 2 34. −11 35. −1 36. −18 37. −7 38. −24
39. 4 40. 36 41. $1125

11.2 Solving Equations

1. true 2. false 3. false 4. true 5. false 6. true
7. 8 8. 6 9. 25 10. 15 11. 5 12. 9 13. 31
14. 11 15. 6 16. 7 17. 48 18. 36 19. 8 20. 8
21. 4 22. 2 23. 8 24. 4 25. 13 26. 6 27. 4
28. 6 29. 5 30. 6 31. 8 32. 22 33–38 Answers may vary. 33. 1, 10; 2, 11; 3, 12 are possible answers 34. 1, 8; 2, 7; 3, 6 are possible answers
35. 9, 1; 18, 2; 27, 3 are possible answers 36. 2, 18; 3, 27; 4, 36 are possible answers 37. 2, 1, 17; 3, 2, 25 are possible answers 38. 1, 1, 10; 3, 2, 5 are possible answers 39. c; $n = 62$

11.3 Solving Equations by Addition
11.4 Solving Equations by Subtraction

1. 9, 22 2. 12, 20 3. 4, 11 4. 5, 19 5. 6, 27 6. 22
7. 20 8. 14 9. 31 10. 11 11. 38 12. 28 13. 47
14. 11.7 15. 3.1 16. 8.7 17. 7.7 18. 5, 6 19. 7, 7
20. 11, 11 21. 6, 8 22. 8, 16 23. 7 24. 4 25. 10
26. 11 27. 19 28. 6 29. 8 30. 27 31. 3.2 32. 1.3
33. 5.7 34. 2.9

11.5 Solving Equations by Division
11.6 Solving Equations by Multiplication

1. 7, 8 2. 3, 16 3. 8, 8 4. 13, 4 5. 5 6. 7 7. 8
8. 9 9. 21 10. 12 11. 13 12. 9 13. 3.2 14. 1.3

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15. 3.5 16. 6.4 17. 3, 36 18. 8, 40 19. 5, 35
20. 11, 44 21. 21 22. 66 23. 240 24. 96 25. 105
26. 92 27. 108 28. 111 29. 7.8 30. 11.2 31. 1.92
32. 0.7

11.7 Like Terms
11.8 The Distributive Property

1. $9x$ 2. $4y$ 3. $9z$ 4. $10p$ 5. $6f$ 6. $10x$ 7. $4d + 12b$
8. $4t + 9y$ 9. $9c + 7$ 10. $3z + 4x$ 11. $2m + 5n$
12. $w + u$ 13. 33 14. 40 15. 4 16. -14 17. 27
18. -4 19. $3x + 18$ 20. $4a + 16$ 21. $7y - 21$
22. $8b - 16$ 23. $15 + 5c$ 24. $18 + 2d$ 25. $42 - 7s$
26. $27 - 9x$ 27. $12z + 9$ 28. $30p - 10$ 29. $-21q + 7$
30. -2 -12d 31. $12x - 28y$ 32. $56a + 32b$
33. $12x + 28y + 8$ 34. $6a - 12b + 18$
35. $-9 - 12c - 3d$ 36. $-16 + 8g + 8h$

11.9 Solving Equations in More Than One Step

1. 6 2. 7 3. 8 4. 5 5. 11 6. 5 7. 3 8. 2 9. 7
10. 2 11. 13 12. 1 13. 20 14. 25 15. 9 16. 99
17. 4 18. 4 19. 2.5 20. 3.2 21. 7 22. 4 23. 4
24. 4 25. 8 26. 1 27. 2 28. 17

11.10 Writing Equations

1. $x + 3 = 12$ 2. $x - 6 = 4$ 3. $\frac{y}{3} = 8$ 4. $9z = 54$
5. $x + x - 3 = 16$ or $2x - 3 = 16$ 6. $7x + 9 = 30$
7. $\frac{x - 4}{2} = 8$ 8. $3x + 6 = 24$ 9. $w - 2 = 9$
10. $6l = 72$ 11. $A - 12 = 60$ 12. $\frac{1}{2}bh = 20$
13. $2x + 4 = 28$ 14. $3x = 39$ 15. $2x + 2 = 116$
16. $6x = 48$ 17–19. Answers may vary.

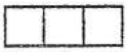
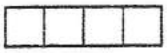
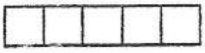
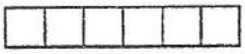
11.11 Using Equations to Solve Problems

1. 44 2. 48 3. 21 cm, 25 cm, 28 cm 4. 6 cm, 18 cm
5. 16 cm 6. 35 adults, 420 children 7. 78, 79, 80
8. 13, 52, 16 9. cheetah: 16 kg, lion: 62 kg, giraffe: 372 kg 10. 12 cm, 17 cm, 17 cm 11. 7 nickels, 14 dimes, 21 quarters

11.12 Developing and Working with Formulas

1. a) 32 m^2 b) 6 cm c) 8 m 2. a) 15 cm^2 b) 4 m
c) 6 cm 3. a) 48, 60, 72 b) $C = 12h$ 4. a) 10.5 cm
b) 11.7 cm c) 7.8 m d) 10.6 m

5. a)

Number of Squares	Figure	Perimeter
1		4
2		6
3		8
4		10
5		12
6		14

b) $2n + 2$ c) 50 d) 30 6. $r = \frac{C}{2\pi}$ 7. a) 7.5 cm
b) 6 cm c) 12.5 cm d) 25 cm

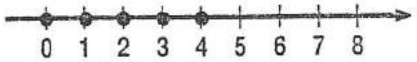
11.13 Equations with Integer Solutions

1. -6 2. -7 3. 11 4. -3 5. -18 6. 27 7. -18
8. -5 9. 0 10. -4 11. -4 12. 5 13. -15
14. -33 15. 32 16. -4 17. 4 18. -5 19. -2
20. -2 21. 3 22. -4 23. -8 24. -2 25. -4
26. -3 27. 5 28. -11 29. -5.9 30. -4.8
31. -8.6 32. 2.7

11.14 Solving Inequalities

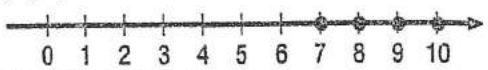
1. 0, 1, 2, 3 2. 0, 1, 2, 3, 4, 5, 6 3. 0, 1, 2, 3, 4
4. 0, 1, 2, 3, 4, 5, 6, 7, 8 5. 7, 8, 9, 10 6. 3, 4, 5, 6, 7, 8, 9, 10 7. 2, 3, 4, 5, 6, 7, 8, 9, 10 8. 0, 1, 2, 3, 4, 5, 6, 7, 8
9. 9, 10, 11,...

10. 0, 1, 2, 3, 4



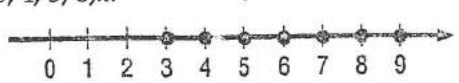
11. 0, 1, 2, 3, 4, 5, 6, 7

12. 7, 8, 9,...



13. 0, 1, 2, 3, 4, 5, 6, 7, 8, 9

14. 3, 4, 5, 6,...



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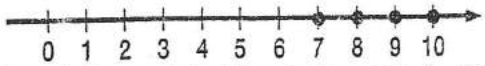
15. 0, 1, 2, 3, 4, 5, 6, 7, 8, 9

16. 7, 8, 9, 10,...



17. $x \leq 5$ or $x < 6$ 18. $x > 3$ or $x \geq 4$ 19. $52x \geq 860$; $x =$ \$16.54 20. 1, 2, 3, 4, 5, 6, 7, 8

Test One Chapter 11: Algebra

1. 3 2. 4 3. 13 4. 15 5. 5 6. 8 7. 6 8. 36 9. 5 10. 5 11. $8x + 3$ 12. $3m + 3$ 13. $15t - 7$ 14. $3a + 8$ 15. $3x + 6$ 16. $12a - 12$ 17. $12m + 6n$ 18. $15s - 5r$ 19. 3 20. 6 21. 1.2 22. 2.4 23. 16 24. 7 25. 0, 1, 2, 3, 4, 5

26. 5, 6, 7,...

27. $5x - 9 = 51$ 28. $2x + 15 = 49$ 29. 7 cm, 10 cm 30. 10 31. \$17.50, \$22.50

Test Two Chapter 11: Algebra

1. 18 2. 11.5 3. −33 4. 0 5. 12 6. 20 7. 8 8. 27 9. 7 10. 4 11. $9x + 3y$ 12. $6m + 3n - 9$ 13. $11a - 6b + 5$ 14. $8t + s$ 15. $3x + 15$ 16. $12a - 30$ 17. $12m + 15n$ 18. $21s - 7t$ 19. 2 20. 8 21. 6 22. 2.2 23. 6 24. −7 25. 0, 1, 2, 3, 4, 5

26. 5, 6, 7,...

27. $3x + 3 = 45$ 28. $9x - 6 = 57$ 29. 16 30. 5, 15, 9

Extension Chapter 11: Algebra

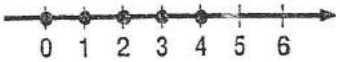
1.

x	y	$x + y$	$3x - y$	$x + 4y$	$(x - y)^2$	$(y - x)^3$
2	6	8	0	6	16	64
−3	2	−1	−11	5	25	125
−1	7	6	−10	27	64	512
0	4	4	−4	16	16	64
3	8	11	1	35	25	125
2	7	9	−1	30	25	125

2. a) b) c)

3. a) −0.5 b) 2.1 c) 0 d) 4.9 4. a) $6\frac{5}{6}$ b) $7\frac{1}{3}$ c) $4\frac{23}{24}$ d) $8\frac{1}{12}$ 5. a) 36, 46, 56 b) 10 units c) 66 units, 76 units d) $P = 10 \times n + 6$

6. a) $x < 5$



b) $x \geq 3$

CHAPTER 12: Relations

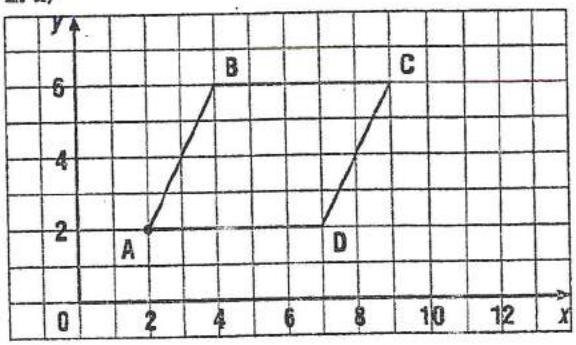
12.1 Relations as Ordered Pairs

1. a) 1, 3, 6, 9, 11 b) x plus y equals four c) (3, 1), (1, 3), (−2, 6), (−5, 9), (−7, 11) 2. a) 1, −3, −4, −6, −9 b) x minus y equals three c) (4, 1), (0, −3), (−1, −4), (−3, −6), (−6, −9) 3. a) 8, 6, 3, 0, −2 b) y equals five plus x c) (3, 8), (1, 6), (−2, 3), (−5, 0), (−7, −2) 4. a) 8, 5, −1, −7, −10 b) y equals three times x minus one c) (3, 8), (2, 5), (0, −1), (−2, −7), (−3, −10) 5. a) 4 b) 0 c) 6 d) 7 e) 9 f) 11 6. a) −3 b) 1 c) 6 d) −5 e) −8 f) 8 7. Answers may vary. (5, 2), (4, 1), (3, 0), (2, −1), (1, −2) are some possibilities 8. Answers may vary. (4, 1), (8, 2), (−4, −1), (−8, −2), (−12, −3) are some possibilities 9. Answers will vary.

12.2 Graphing Ordered Pairs

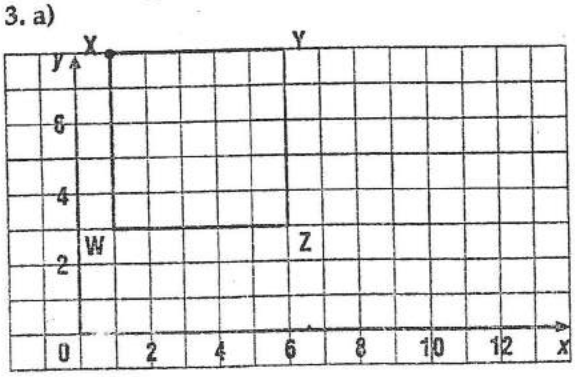
1. A(5, 6), B(8, 3), C(1, 8), D(2, 4), E(11, 7), F(11, 2), G(7, 0), H(0, 2), I(7, 9), J(1, 0), K(9, 5), L(4, 1)

2. a)



b) parallelogram, 20 square units

3. a)



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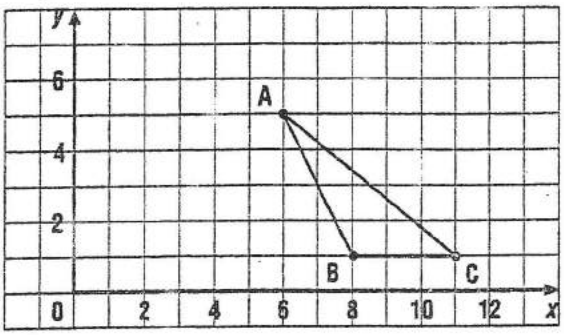
b) (6, 3) c) $P = 20$ units, $A = 25$ square units

4. a)

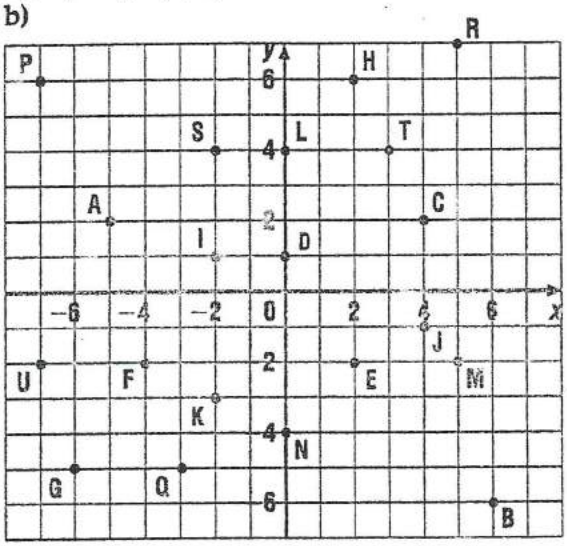


b) scalene, obtuse c) 6 square units

12.3 Graphing on the Coordinate Plane

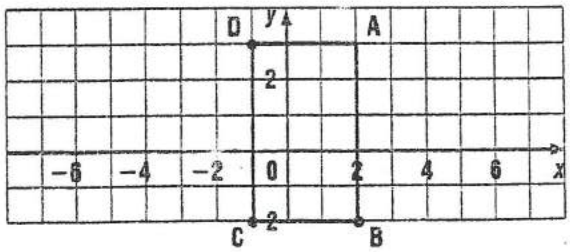
1. a) A(−5, 2), B(6, −6), C(4, 2), D(0, 1), E(2, −2), F(−4, −2), G(−6, −5), H(2, 6), I(−2, 1), J(4, −1), K(−2, −3), L(0, 4)

b)



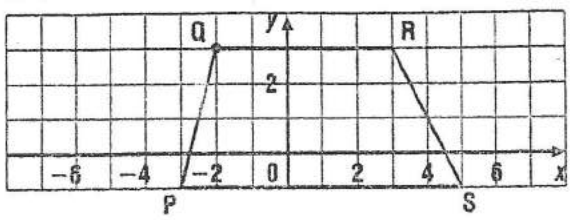
c) L, D, N d) Answers will vary, but should include 3 of F, Q, K, G, U. e) Answers will vary, but should include 3 of E, J, M, B.

2. a)



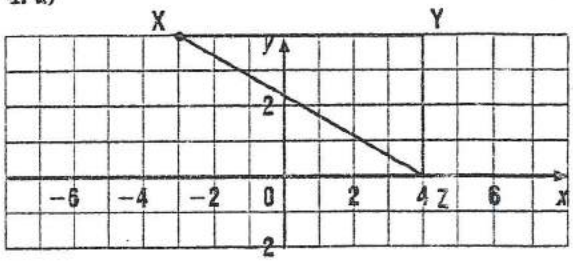
b) rectangle, 15 square units

3. a)



b) trapezoid, 26 square units

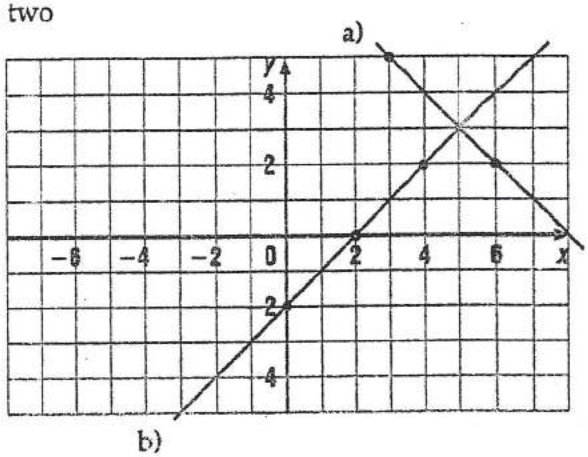
4. a)



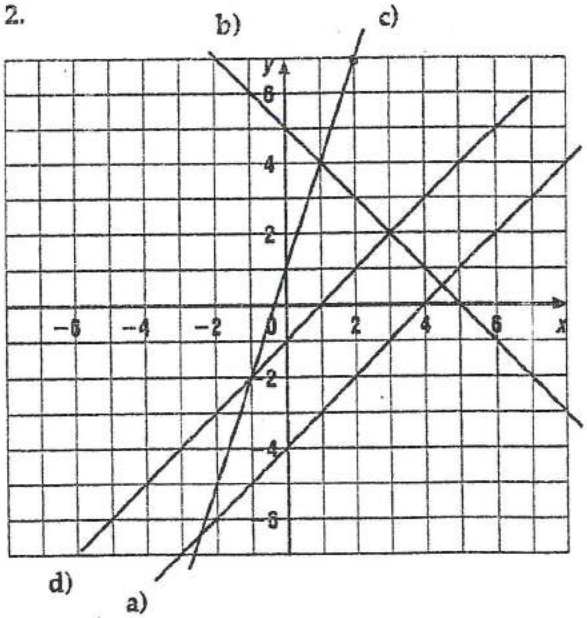
b) XY = 7 units, YZ = 4 units, XZ = 8.1 units
c) $P = 19.1$ units, $A = 14$ square units

12.4 Graphing Relations

1. a) x plus y equals eight b) y equals x minus two



2.



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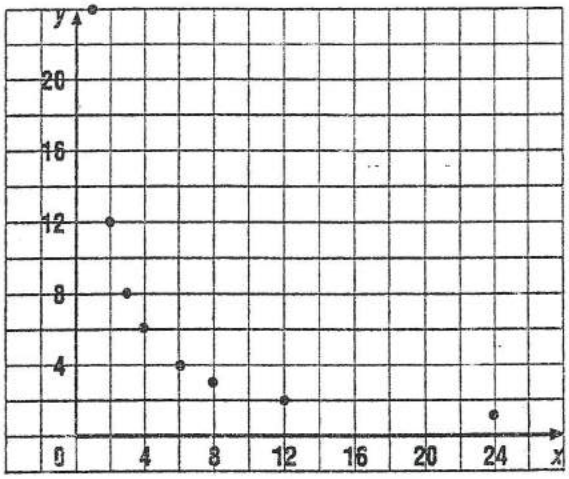
3. a)

Width, w	Length, l	Ordered Pair, (w, l)
1	24	(1, 24)
2	12	(2, 12)
3	8	(3, 8)
4	6	(4, 6)
6	4	(6, 4)
8	3	(8, 3)
12	2	(12, 2)
24	1	(24, 1)

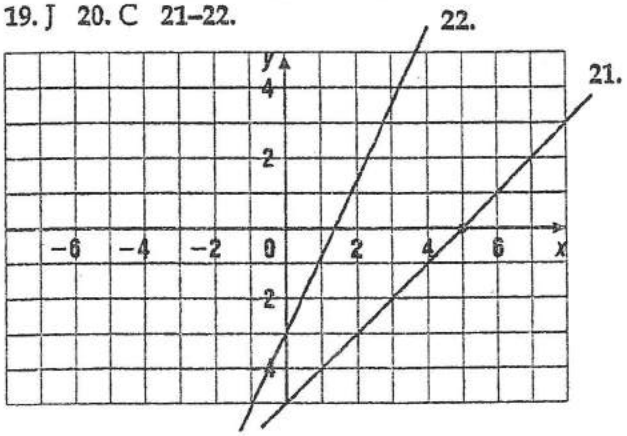
b)



c) 50 units, 28 units, 22 units, 20 units, 20 units, 22 units, 28 units, 50 units d) 1 by 24

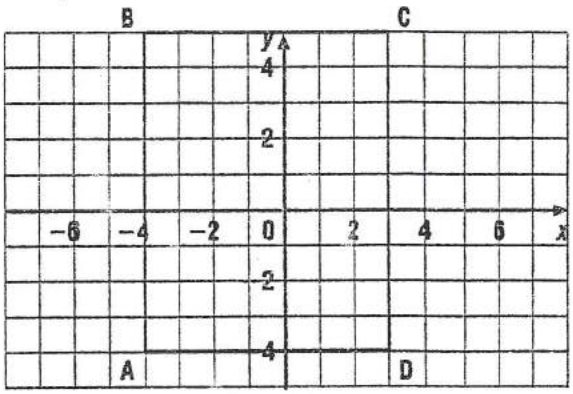
Test One Chapter 12: Relations

1. a) 4, 5, 6, 7, 8 b) x plus y equals seven c) (3, 4), (2, 5), (1, 6), (0, 7), (−1, 8) 2. a) 2, 1, 0, −1, −2 b) x minus y equals four c) (6, 2), (5, 1), (4, 0), (3, −1), (2, −2) 3. a) 2, 0, −2, −4, −6 b) y equals two times x minus two c) (2, 2), (1, 0), (0, −2), (−1, −4), (−2, −6) 4–7. Answers may vary. 4. (0, 6), (1, 5), (2, 4), (−1, 7), (−2, 8) 5. (2,0), (3, 1), (4, 2), (1, −1), (0, −2) 6. (1, 7), (2, 6), (3, 5), (4, 4), (5, 3) 7. (1, 1), (2, 4), (3, 7), (0, −2), (−1, −5) 8. a) 0 b) 1 c) 4 d) 2 e) −5 f) −2 9. $x - y = 2$ 10. $y = x + 3$ 11. D 12. F 13. E 14. A 15. L 16. I 17. K 18. H 19. J 20. C 21–22.

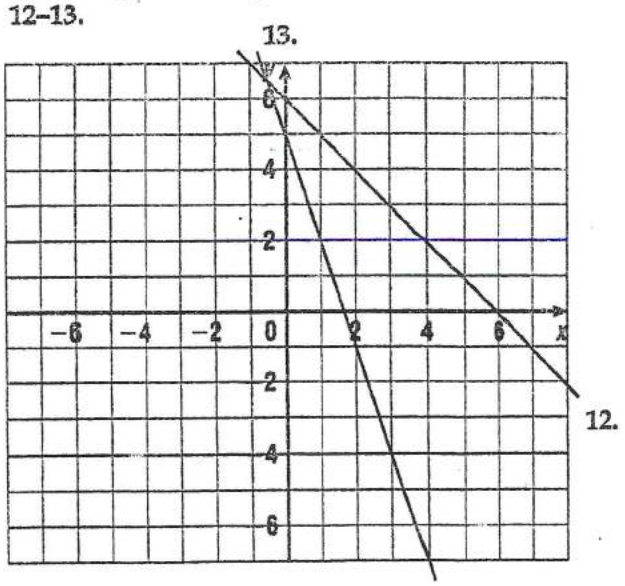


Test Two Chapter 12: Relations

1. a) 0, −1, −2, −3, −4 b) x minus y equals two c) (2, 0), (1, −1), (0, −2), (−1, −3), (−2, −4) 2. a) −3, −1, 1, 3, 5 b) y equals two times x plus 3 c) (−3, −3), (−2, −1), (−1, 1), (0, 3), (1, 5) 3. a) 8, 4, 0, −4, −8 b) y equals four times x c) (2, 8), (1, 4), (0, 0), (−1, −4), (−2, −8) 4–7. Answers may vary. 4. (0, 2), (−1, 5), (1, −1), (2, −4), (3, −7) 5. (−3, −2), (3, 1), (1, 0), (−1, −1), (5, 2) 6. (0, 1), (1, 8), (−1, −6), (2, 15), (−2, −13) 7. (0, −2), (1, 2), (−1, −6), (2, 6), (−2, −10) 8. a) −3 b) −4 c) 12 d) 6 e) −10 f) 3 9. $y = x - 3$ 10. $x + y = 2$ 11. a)



b) rectangle c) 63 square units 12–13.



Extension Chapter 12: Relations

	x	y	$x + 2y$	$2x^2 - y$	$12 + y^2$	$5x - 3y$
1.	3	2	−1	20	15	21
2.	−1	−4	−9	6	28	7
3.	2	0	2	8	12	10
4.	6	−2	2	74	16	36
5.	4, −4	−5	−6, −14	37	37	35, −11
6.	3	−3	−3	21	21	24

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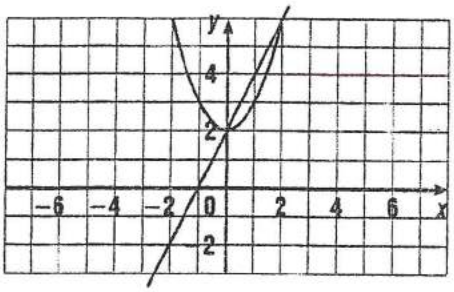
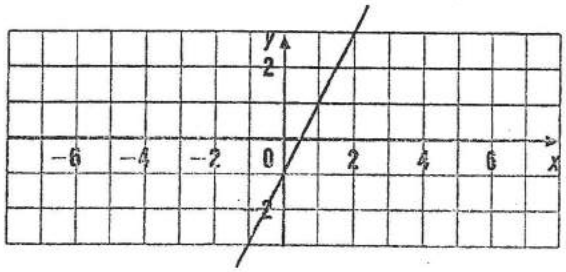
7.

$6x$ 12	$-7 - x$ -9	$x + 4$ 6
$x - 5$ -3	$x^2 - 1$ 3	$4x + 1$ 9
$x - 2$ 0	$9x - 3$ 15	$-3x$ -6

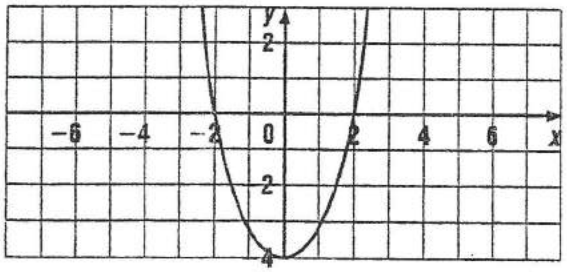
8. a), b) Ordered pairs will vary. c) (0, 2), (2, 6)



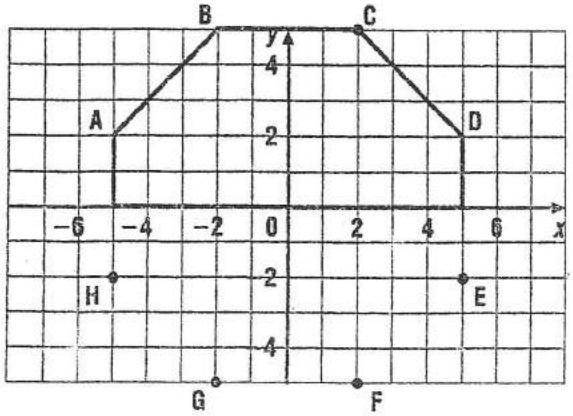
9. a) $y = 2x - 1$



b) $y = x^2 - 4$



5. a) A(−5, 2), B(−2, 5), C(2, 5), D(5, 2) b) E(5, −2), F(2, −5), G(−2, −5), H(−5, −2)

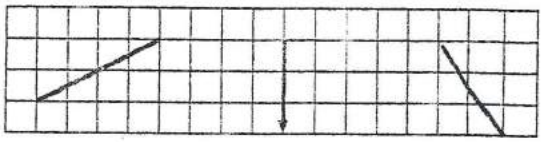


c) 82 square units

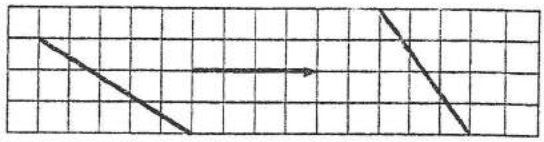
CHAPTER 13: Transformations

13.1 Translations

1–3.

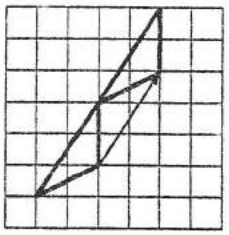


4–6.

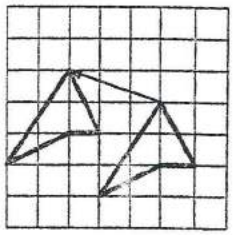


7. 2 units right, 3 units up 8. 1 unit right, 4 units down 9. 2 units left, 3 units up 10. 3 units left

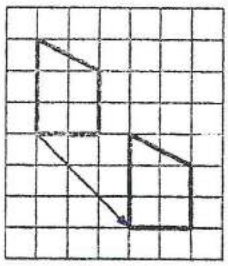
11.



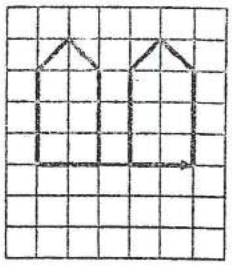
12.



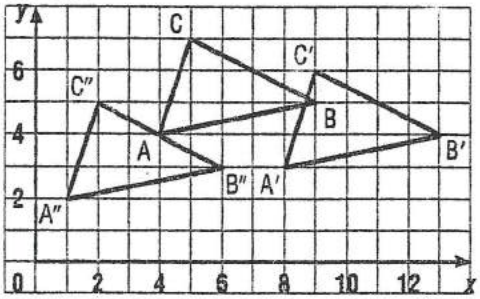
13.



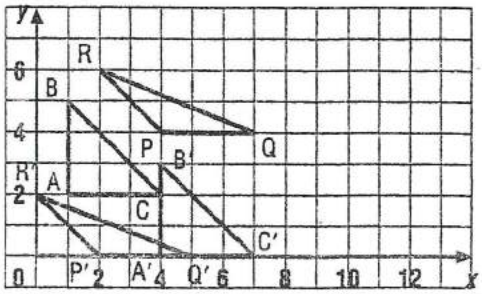
14.



15–16.



17–18.



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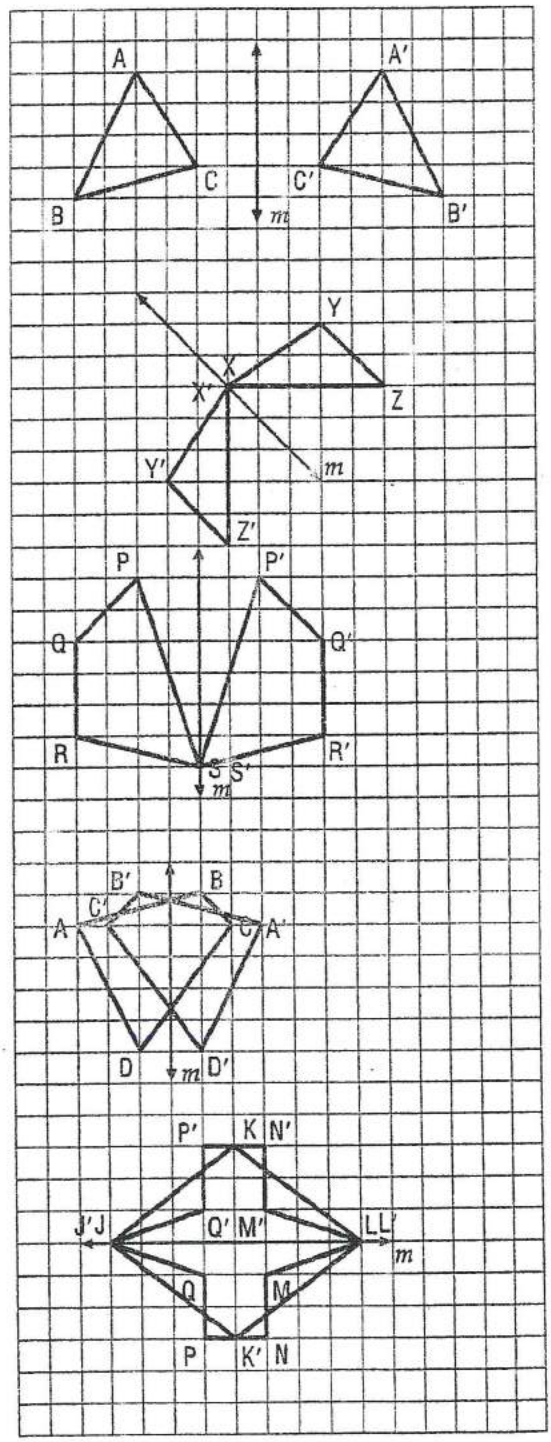
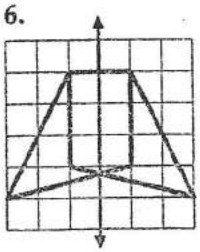
13.2 Reflections

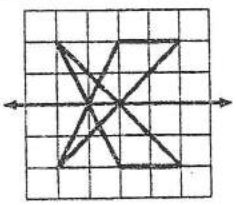
1–5.



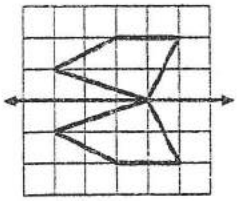
6.



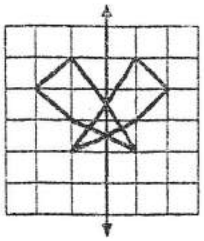
7.



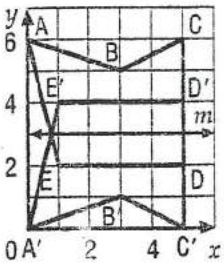
8.



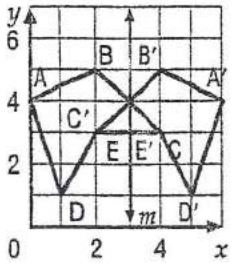
9.



10.



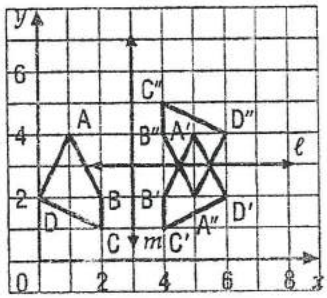
11.



10. A(0, 6), B(3, 5), C(5, 6), D(5, 2), E(1, 2); A′(0, 0), B′(3, 1), C′(5, 0), D′(5, 4), E′(1, 4)

11. A(0, 4), B(2, 5), C(4, 3), D(1, 1), E(2, 3); A′(6, 4), B′(4, 5), C′(2, 3), D′(5, 1), E′(4, 3)

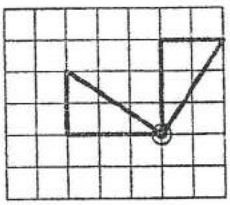
12.



c) A(1, 4), B(2, 2), C(2, 1), D(0, 2); A′(5, 4), B′(4, 2), C′(4, 1), D′(6, 2); A″(5, 2), B″(4, 4), C″(4, 5), D″(6, 4)

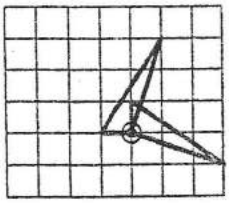
13.3 Rotations

1.



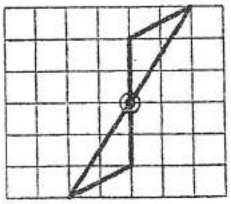
270°ccw

2.



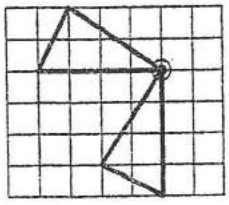
90° cw

3.



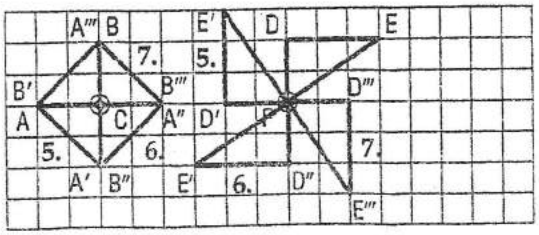
180° ccw

4.



90° ccw

5–7.



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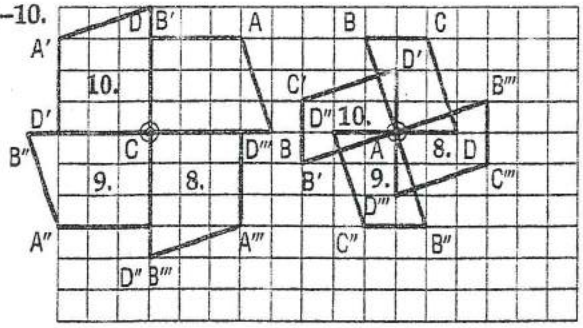
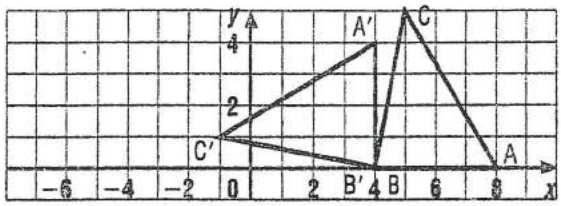
8–10.

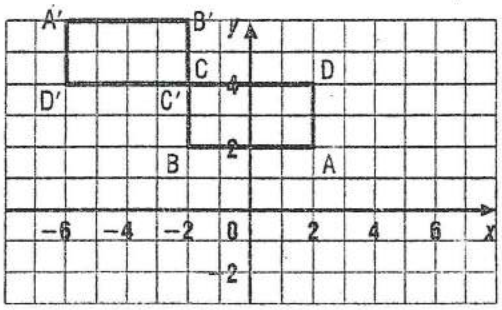


11.



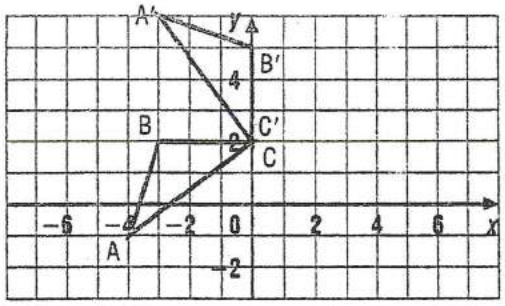
A′(4, 4), B′(4, 0), C′(−1, 1)

12.



A′(−6, 6), B′(−2, 6), C′(−2, 4), D′(−6, 4)

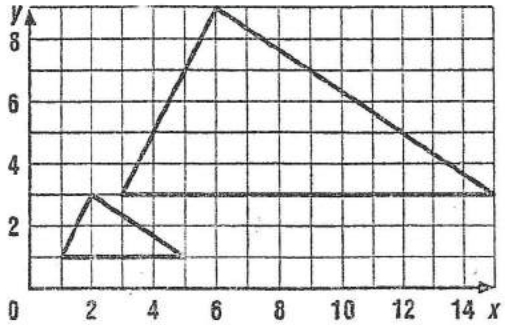
13.



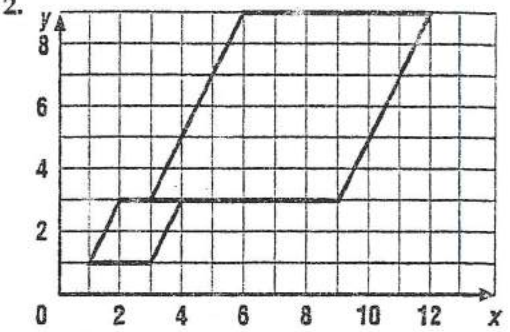
A′(−3, 6), B′(0, 5), C′(0, 2)

13.4 Dilatations

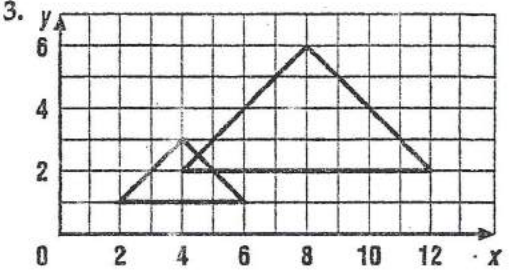
1.



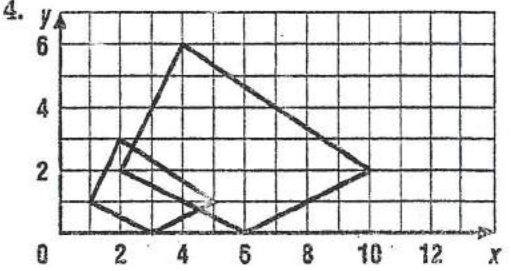
2.



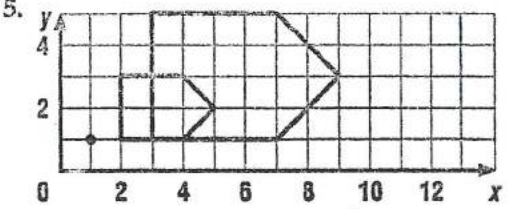
3.



4.

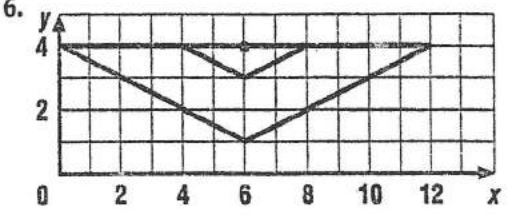


5.



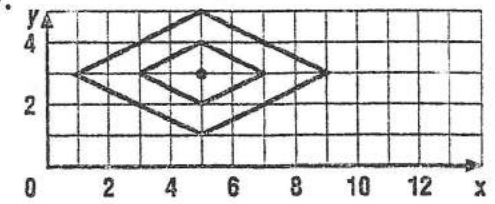
(3, 1), (7, 1), (9, 3), (7, 5), (3, 5)

6.



(0, 4), (6, 1), (12, 4)

7.



(1, 3), (5, 1), (5, 5), (9, 3)

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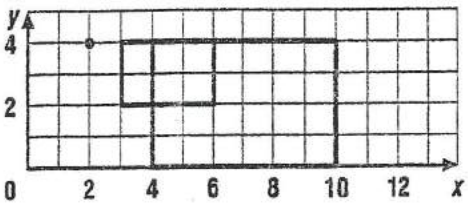
8.



(3, 2), (6, 2), (3, 4), (6, 4)

13.5 Similar Figures

1. a) $\angle P = \angle X, \angle Q = \angle Y, \angle R = \angle Z$

b) $\frac{PQ}{XY} = \frac{PR}{XZ} = \frac{QR}{YZ}$ c) $\triangle PQR \sim \triangle XYZ$

2. a) $\angle A = \angle D, \angle B = \angle E, \angle C = \angle F$

b) $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$ c) $\triangle ABC \sim \triangle DEF$

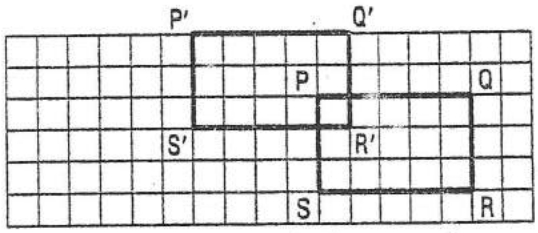
3. a) $\triangle ABE \sim \triangle CDE$, $\triangle RQP \sim \triangle WYX$, $\triangle MNO \sim \triangle GST$ b) $\angle A = \angle DCE, \angle B = \angle CDE, \angle E = \angle E$; $\angle R = \angle W, \angle Q = \angle Y, \angle P = \angle X; \angle M = \angle G$, $\angle N = \angle S, \angle O = \angle T$ c) $\frac{AB}{CD} = \frac{BE}{DE} = \frac{AE}{CE}$; $\frac{RQ}{WY} = \frac{RP}{WX} = \frac{QP}{YX}; \frac{MN}{GS} = \frac{MO}{GT} = \frac{NO}{ST}$ 4. a) 8 b) 6 c) 16 d) 12 5. Pine: 18.4 m; Oak: 30 m

6. a) $A = 225\ cm^2$; $P = 60$ cm b) $A = 56.25\ cm^2$; $P = 30$ cm c) The area is $\frac{1}{4}$ the original; the perimeter is $\frac{1}{2}$ the original.

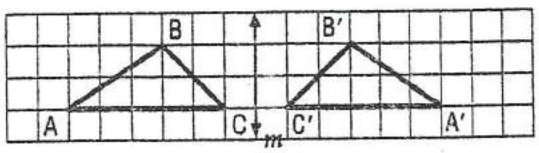
Test One Chapter 13: Transformations

1. a) B, D b) C, E c) A 2. 4 units left, 2 units up
3. 3 units right, 2 units down

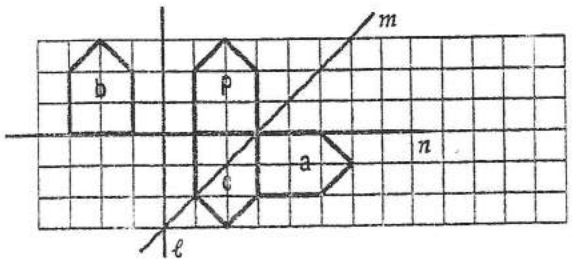
4.



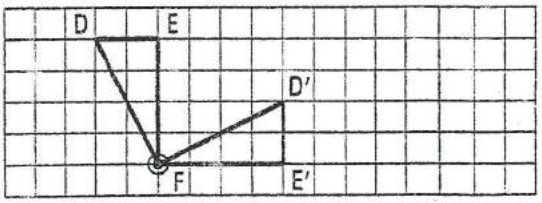
5.



6.

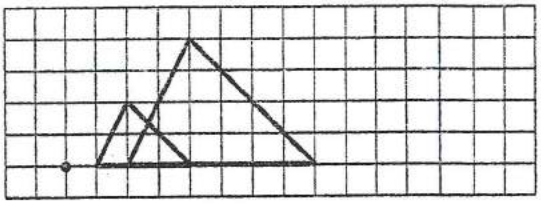


7.

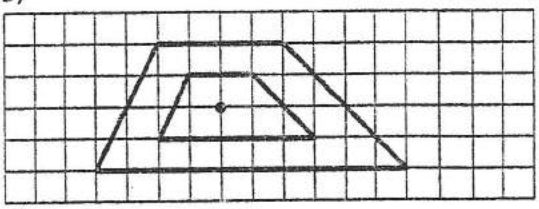


8. a) 180° cw b) 270° ccw c) $\frac{3}{4}$ turn cw d) $\frac{1}{4}$ turn cw

9. a)



b)

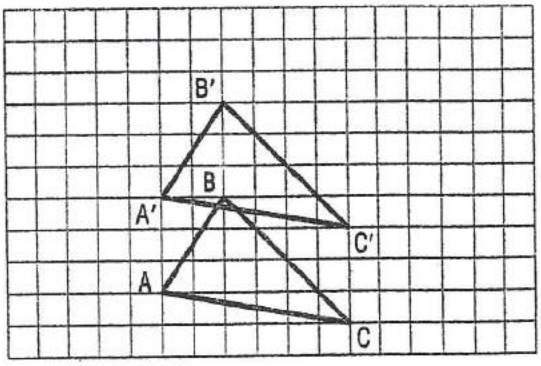


10. DE = 21 cm, DF = 16.5 cm

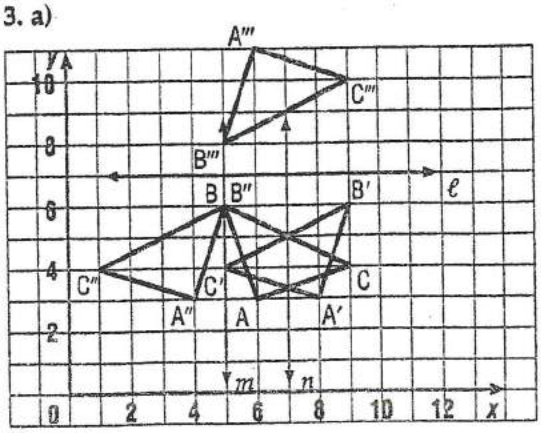
Test Two Chapter 13: Transformations

1. a) [3, –2] b) [–6, –2] c) [–3, 3]

2.



3. a)



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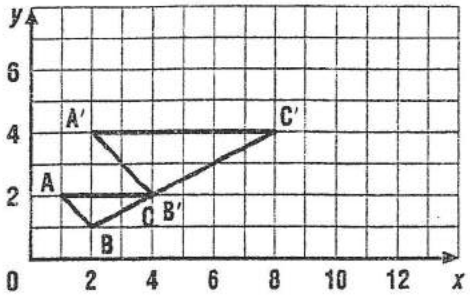
b) A′(8, 3), B′(9, 6), C′(5, 4); A″(4, 3), B″(5, 6), C″(1, 4); A‴(6, 11), B‴(5, 8), C‴(9, 10)

4. a) 180° cw about D b) 90° cw about C
c) 180° cw about A

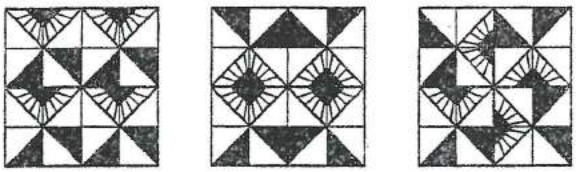
5. a), b)



6. a) $x = 6.5$, $y = 6$ b) $z = 14$, $p = 36$

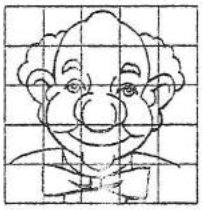
Extension Chapter 13: Transformations

1. a) b) c)



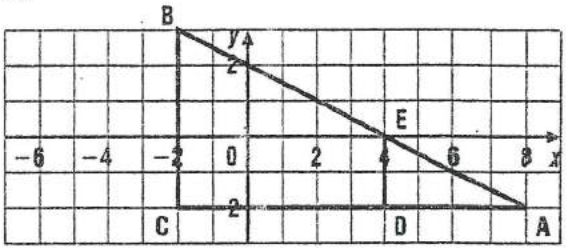
d) Answers will vary.

2. a)



b) $\frac{1}{2}$ c) $\frac{1}{4}$ 3. A: rotation, translation;
B: translation; C: translation; D: translation;
E: rotation, translation; F: rotation, translation;
G: reflection, translation

4. a) A(8, −2), B(−2, 3), C(−2, −2)
b)



$\frac{AC}{AD} = \frac{AB}{AE} = \frac{BC}{ED}$ c) AC = 10, BC = 5, AB = 11.2;
AD = 4, ED = 2, AE = 4.5

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