

Ch 7 Exponents Practice Test

True/False

Indicate whether the sentence or statement is true or false.

If false, write the corrected statement in the space provided.

_____ 1. The volume of a cube with a side length of 10 is 100.

_____ 2. $12^3 < 24^2$

_____ 3. A square parking lot with a side length of 0.25 km has an area of 6.25 km^2 .

_____ 4. The number 181 is a perfect square.

_____ 5. The exponent of 7^4 is 4.

_____ 6. $8 \div 8 \div 8 \div 8 \div 8 \div 8 = 5^8$

_____ 7. The exponent of a power is always greater than the base.

_____ 8. The base of 2^3 is 8, since $2^3 = 8$.

_____ 9. $8^2 = 4^3 = 2^6$

_____ 10. The value of a power increases with its exponent, if the base of the power is greater than 1.

_____ 11. $3 \div 3 \div 3 \div 3 \div 3 \div 3 < 6^3$

_____ 12. $\sqrt{1024} = 2^5$

13. A power is a number in exponential form and includes a base, an exponent, and a multiplication sign.

Identify the letter of the choice that best completes the statement or answers the question.

- _____ 24. a number whose square root is a natural number
25. the number that you multiply in a power

_____ 26. the number of factors you multiply in a power

Short Answer

Write your answer in the space provided.

27. Write each of the following as a repeated multiplication.
- a) 3^2
 - b) 15^3
 - c) 45^2
 - d) 11^3
28. Use a calculator to evaluate.
- a) 7^3
 - b) 9^2
 - c) 12^3
29. Fill in the blank with $<$, $=$, or $>$ to make each statement true.
- a) 3^3 _____ 5^2
 - b) 11^2 _____ 5^3
 - c) 4^3 _____ 8^2
 - d) 6^3 _____ 15^2
30. Using a calculator, find the area of a square with each side length.
- a) 18 m
 - b) 29 cm
 - c) 2.5 mm
31. Using a calculator, find the volume of a cube with each edge length.
- a) 13 units
 - b) 17 mm
 - c) 25 cm
32. Find the side length of a square with the given area.
- a) 144 00 mm^2
 - b) 625 cm^2
 - c) 0.25 m^2
 - d) 0.49 square units
33. Write each expression as a power, and use a calculator to evaluate.
- a) $0.3 \diamond 0.3$
 - b) $2.1 \diamond 2.1 \diamond 2.1$
 - c) $0.8 \diamond 0.8 \diamond 0.8 \diamond 0.8$
 - d) $5.5 \diamond 5.5$
34. Order the following numbers from least to greatest.
 6^3 , 15^2 , 7^4 , 1^9 , 4^6
35. Write each number as a power of 0.2.
- a) 0.0016
 - b) 0.008
 - c) 0.04
36. Fill in the blank with $<$, $=$, or $>$ to make each statement true.

- a) 3^2 $\sqrt{81}$
- b) $\sqrt{3025}$ 5^5
- c) 14^2 169
- d) 1^2 $\sqrt{1}$
37. Order the following numbers from least to greatest.
 $\sqrt{169}$, 3^3 , 30 , $\sqrt{676}$, 2^5
38. Find the values of x and y in the following expressions.
- a) $6^5 = x$
- b) $y^9 = 512$
- c) $1.2^x = 1.728$
- d) $5^x = y^2 = 625$
39. List the steps you would take to estimate how many textbooks are needed to cover the gym floor.

Problem

Write your answer in the space provided.

40. Rupert has a square desk in his bedroom that takes up an area of $10\,000\text{ cm}^2$. The area of Rupert's bedroom is four times the area of the desk. What is the side length of the square bedroom?

Ch 7 Exponents Practice Test

Answer Section

TRUE/FALSE

1. ANS: F

The volume of a cube with a side length of 10 is 1000.

DIF: Level 1

REF: Knowledge/Understanding

OBJ: Section 7.1

STO: NSN-7m4

TOP: Number Sense and Numeration

KEY: Volume of a Cube

2. ANS: F

$$12^3 > 24^2$$

Rationale:

$$12^3 = 1728, 24^2 = 576$$

$$1728 > 576$$

DIF: Level 3

REF: Knowledge/Understanding

OBJ: Section 7.1

STO: NSN-7m1

TOP: Number Sense and Numeration

KEY: Comparing Numbers

3. ANS: F

A square parking lot with a side length of 0.25 km has an area of 0.0625 km².

Rationale:

$$0.25 \times 0.25 = 0.0625$$

DIF: Level 3

REF: Application

OBJ: Section 7.1

STO: NSN-7m4

TOP: Number Sense and Numeration

KEY: Area of a Square

4. ANS: F

The number 181 is not a perfect square. It does not have a natural number as its square root.

Rationale:

181 is between 169 and 196, the square root of 181 is between 13 and 14. The square root of 181 is not a natural number.

DIF: Level 3

REF: Knowledge/Understanding

OBJ: Section 7.2

STO: NSN-7m4

TOP: Number Sense and Numeration

KEY: Perfect Square

5. ANS: T

DIF: Level 1

REF: Knowledge/Understanding

OBJ: Section 7.3

STO: NSN-7m4

TOP: Number Sense and Numeration

KEY: Power

6. ANS: F

$$8 \times 8 \times 8 \times 8 \times 8 = 8^5$$

DIF: Level 2

REF: Knowledge/Understanding

OBJ: Section 7.3

STO: NSN-7m4

TOP: Number Sense and Numeration

KEY: Exponent

7. ANS: F

The exponent of a power can be greater or smaller than the base.

DIF: Level 2

REF: Knowledge/Understanding

OBJ: Section 7.3

STO: NSN-7m4

TOP: Number Sense and Numeration

KEY: Power

8. ANS: F
The base of 2^3 is 2.

DIF: Level 2 REF: Knowledge/Understanding OBJ: Section 7.3
STO: NSN-7m4 TOP: Number Sense and Numeration KEY: Power

9. ANS: T DIF: Level 3 REF: Knowledge/Understanding
OBJ: Section 7.3 STO: NSN-7m1 TOP: Number Sense and Numeration
KEY: Comparing Numbers
10. ANS: T DIF: Level 3 REF: Knowledge/Understanding
OBJ: Section 7.3 STO: NSN-7m4 TOP: Number Sense and Numeration
KEY: Power

11. ANS: F
 $3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 > 6^3$

Rationale:

$$3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 = 729, 6^3 = 216$$

$$729 > 216$$

DIF: Level 3 REF: Knowledge/Understanding OBJ: Section 7.3
STO: NSN-7m1 TOP: Number Sense and Numeration KEY: Comparing Numbers

12. ANS: T DIF: Level 3 REF: Knowledge/Understanding
OBJ: Section 7.3 STO: NSN-7m1 TOP: Number Sense and Numeration
KEY: Comparing Numbers

13. ANS: F
A power is a number in exponential form and includes a base and an exponent.

DIF: Level 4 REF: Knowledge/Understanding OBJ: Section 7.3
STO: NSN-7m4 TOP: Number Sense and Numeration KEY: Power

MULTIPLE CHOICE

14. ANS: D DIF: Level 1 REF: Knowledge/Understanding
OBJ: Section 7.1 STO: NSN-7m4 TOP: Number Sense and Numeration
KEY: Area of a Square

15. ANS: A DIF: Level 2 REF: Knowledge/Understanding
OBJ: Section 7.1 STO: NSN-7m4 TOP: Number Sense and Numeration
KEY: Exponent

16. ANS: A DIF: Level 2 REF: Knowledge/Understanding
OBJ: Section 7.2 STO: NSN-7m4 TOP: Number Sense and Numeration
KEY: Square Root

17. ANS: D DIF: Level 3 REF: Knowledge/Understanding
OBJ: Section 7.2 STO: NSN-7m4 TOP: Number Sense and Numeration
KEY: Perfect Square

18. ANS: A
Length of each side = $\sqrt{196} = 14$

DIF: Level 3 REF: Knowledge/Understanding OBJ: Section 7.2
STO: NSN-7m4 TOP: Number Sense and Numeration KEY: Square Root

19. ANS: B

Length of each side = $\sqrt{2.56} = 1.6$

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| | DIF: Level 4 | REF: Knowledge/Understanding | OBJ: Section 7.2 |
| | STO: NSN-7m4 | TOP: Number Sense and Numeration | KEY: Square Root |
20. ANS: C DIF: Level 2 REF: Knowledge/Understanding
OBJ: Section 7.3 STO: NSN-7m4 TOP: Number Sense and Numeration
KEY: Exponent
21. ANS: A DIF: Level 2 REF: Knowledge/Understanding
OBJ: Section 7.3 STO: NSN-7m4 TOP: Number Sense and Numeration
KEY: Power
22. ANS: B DIF: Level 3 REF: Knowledge/Understanding
OBJ: Section 7.3 STO: NSN-7m1 TOP: Number Sense and Numeration
KEY: Comparing Numbers
23. ANS: B DIF: Level 3 REF: Knowledge/Understanding
OBJ: Section 7.3 STO: NSN-7m1 TOP: Number Sense and Numeration
KEY: Comparing Numbers

MATCHING

- | | | |
|---------------------|--------------|----------------------------------|
| 24. ANS: D | DIF: Level 2 | REF: Knowledge/Understanding |
| OBJ: Section 7.2 | STO: NSN-7m4 | TOP: Number Sense and Numeration |
| KEY: Perfect Square | | |
25. ANS: A DIF: Level 2 REF: Knowledge/Understanding
OBJ: Section 7.3 STO: NSN-7m4 TOP: Number Sense and Numeration
KEY: Base
26. ANS: C DIF: Level 2 REF: Knowledge/Understanding
OBJ: Section 7.3 STO: NSN-7m4 TOP: Number Sense and Numeration
KEY: Exponent

SHORT ANSWER

27. ANS:
a) $3 \diamond 3$
b) $15 \diamond 15 \diamond 15$
c) $45 \diamond 45$
d) $11 \diamond 11 \diamond 11$

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|--|--------------|----------------------------------|------------------|
| | DIF: Level 2 | REF: Knowledge/Understanding | OBJ: Section 7.1 |
| | STO: NSN-7m4 | TOP: Number Sense and Numeration | KEY: Exponent |
28. ANS:
a) $7^3 = 343$
b) $9^2 = 81$
c) $12^3 = 1728$

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|--|----------------------------------|------------------|------------------|--------------|
| | DIF: Level 2 | REF: Application | OBJ: Section 7.1 | STO: NSN-7m4 |
| | TOP: Number Sense and Numeration | | KEY: Exponent | |
29. ANS:
a) $3^3 > 5^2$

- b) $11^2 < 5^3$
- c) $4^3 = 8^2$
- d) $6^3 < 15^2$

DIF: Level 3 REF: Knowledge/Understanding OBJ: Section 7.1
 STO: NSN-7m1 TOP: Number Sense and Numeration KEY: Comparing Numbers

30. ANS:

Use the formula $A = s^2$.

- a) $A = 18^2$
 $A = 324$
 The area is 324 m².
- b) $A = 18^2$
 $A = 841$
 The area is 841 cm².
- c) $A = 2.5^2$
 $A = 6.25$
 The area is 6.25 mm².

DIF: Level 3 REF: Application OBJ: Section 7.1 STO: NSN-7m4
 TOP: Number Sense and Numeration KEY: Area of a Square

31. ANS:

Use the formula $V = l^3$.

- a) $V = l^3$
 $V = 13^3$
 $V = 2197$
 The volume is 2197 cubic units.
- b) $V = l^3$
 $V = 17^3$
 $V = 4913$
 The volume is 4913 mm³.
- c) $V = l^3$
 $V = 25^3$
 $V = 15\,625$
 The volume is 15 625 cm³.

DIF: Level 3 REF: Application OBJ: Section 7.1 STO: NSN-7m4
 TOP: Number Sense and Numeration KEY: Volume of a Cube

32. ANS:

- a) $\sqrt{144\,00} = 120$
 The length of each side is 120 mm.
- b) $\sqrt{625} = 25$
 The length of each side is 25 cm.
- c) $\sqrt{0.25} = 0.5$
 The length of each side is 0.5 m.
- d) $\sqrt{0.49} = 0.7$ units
 The length of each side is 0.7 units.

DIF: Level 3 REF: Knowledge/Understanding OBJ: Section 7.2
 STO: NSN-7m4 TOP: Number Sense and Numeration KEY: Square Root

33. ANS:
 a) $0.3^2 = 0.09$
 b) $2.1^3 = 9.261$
 c) $0.8^4 = 0.4096$
 d) $5.5^2 = 30.25$

DIF: Level 3
 STO: NSN-7m4

REF: Knowledge/Understanding
 TOP: Number Sense and Numeration

OBJ: Section 7.3
 KEY: Exponent

34. ANS:
 $6^3 = 216$
 $15^2 = 225$
 $7^4 = 2401$
 $1^9 = 1$
 $4^6 = 4096$

The numbers from least to greatest are
 $1^9 < 6^3 < 15^2 < 7^4 < 4^6$

DIF: Level 3
 STO: NSN-7m1

REF: Knowledge/Understanding
 TOP: Number Sense and Numeration

OBJ: Section 7.3
 KEY: Comparing Numbers

35. ANS:
 a) 0.2^4
 b) 0.2^3
 c) 0.2^2

DIF: Level 3
 STO: NSN-7m4

REF: Knowledge/Understanding
 TOP: Number Sense and Numeration

OBJ: Section 7.3
 KEY: Exponent

36. ANS:
 a) $3^2 = \sqrt{81}$
 b) $\sqrt{3025} > 5^5$
 c) $14^2 > 169$
 d) $1^2 = \sqrt{1}$

DIF: Level 3
 STO: NSN-7m1

REF: Knowledge/Understanding
 TOP: Number Sense and Numeration

OBJ: Section 7.3
 KEY: Comparing Numbers

37. ANS:
 $\sqrt{169} = 13$
 $3^3 = 27$
 $\sqrt{676} = 26$
 $2^5 = 32$

The numbers from least to greatest are
 $\sqrt{169} < \sqrt{676} < 3^3 < 30 < 2^5$

DIF: Level 4
 STO: NSN-7m1

REF: Knowledge/Understanding
 TOP: Number Sense and Numeration

OBJ: Section 7.3
 KEY: Comparing Numbers

38. ANS:
 a) $x = 7776$
 b) $y = 2$
 c) $x = 3$

d) $x = 4, y = 25$

DIF: Level 4

REF: Knowledge/Understanding

OBJ: Section 7.3

STO: NSN-7m4

TOP: Number Sense and Numeration

KEY: Exponent

39. ANS:

Responses will vary, but should include the following key steps:

- 1) Find the area of the textbook.
- 2) Estimate the area of the gym floor.
- 3) Divide the area of the gym floor by the area of the textbook.

DIF: Level 3

REF: Communication

OBJ: Section 7.4

STO: NSN-7m5

TOP: Number Sense and Numeration

KEY: Fermi Problem

PROBLEM

40. ANS:

Area of bedroom = 4 $\times$ Area of desk = 40 000 cm²

Side length of bedroom = $\sqrt{40\,000} = 200$

The side length of the square bedroom is 200 cm.

DIF: Level 3

REF: Thinking/Inquiry/Problem Solving

OBJ: Section 7.2

STO: NSN-7m4

TOP: Number Sense and Numeration

KEY: Area of a Square