

LESSON

3-1

Exponents and Scientific Notation**Review for Mastery: Integer Exponents**

To rewrite a negative exponent,
move the power to the denominator
of a unit fraction.

$$5^{-2} = \frac{1}{5^2}$$

Complete to rewrite each power with a positive exponent.

1. $7^{-3} = \frac{1}{\quad}$

2. $9^{-5} = \frac{1}{\quad}$

3. $13^{-4} = \frac{1}{\quad}$

Complete each pattern.

4. $10^{-1} = \frac{1}{10} = 0.1$

5. $5^{-1} = \frac{1}{5}$

$$10^{-2} = \frac{1}{10^2} = \frac{1}{100} = 0.01$$

$$5^{-2} = \frac{1}{5^2} = \frac{1}{5 \cdot 5} = \frac{1}{25}$$

$$10^{-3} = \underline{\hspace{2cm}}$$

$$5^{-3} = \underline{\hspace{2cm}}$$

6. $3^{-1} = \frac{1}{3}$

7. $(-4)^{-1} = \underline{\hspace{2cm}}$

$$3^{-2} = \frac{1}{3^2} = \frac{1}{3 \cdot 3} = \frac{1}{9}$$

$$(-4)^{-2} = \underline{\hspace{2cm}}$$

$$3^{-3} = \underline{\hspace{2cm}}$$

$$(-4)^{-3} = \underline{\hspace{2cm}}$$

Simplify.

8. $2^{-3} = \frac{1}{\quad} = \underline{\hspace{2cm}}$

9. $(-6)^{-2} = \frac{1}{\quad} = \underline{\hspace{2cm}}$

10. $4^{-2} = \frac{1}{\quad} = \underline{\hspace{2cm}}$

11. $(-3)^{-3} = \frac{1}{\quad} = \underline{\hspace{2cm}}$

12. $6^{-2} = \underline{\hspace{2cm}}$

13. $(-2)^{-3} = \underline{\hspace{2cm}}$

14. $6^{-3} = \underline{\hspace{2cm}}$

15. $(-5)^{-2} = \underline{\hspace{2cm}}$

16. $2^{-4} = \underline{\hspace{2cm}}$

17. $(-9)^{-1} = \underline{\hspace{2cm}}$

UNIT 2 Exponents

Module 3

Answers for Lesson 3-1

Practice A

1. 0.1
2. 0.000001
3. 100
4. 10
5. 1
6. 1000
7. 0.00001
8. 1,000,000
9. 0.0000001
10. 10,000
11. 0.001
12. 100,000

13. $-\frac{1}{8}$
14. $\frac{1}{81}$
15. $\frac{1}{16}$
16. $\frac{1}{16}$
17. $\frac{1}{25}$
18. $\frac{1}{216}$
19. $\frac{1}{81}$
20. $-\frac{1}{27}$
21. $7\frac{1}{2}$
22. $4\frac{3}{4}$
23. $3\frac{1}{16}$
24. $5\frac{1}{25}$
25. $\frac{1}{100}$
26. $\frac{1}{10,000}$

Practice B

1. 0.001
2. 1000
3. 0.00001
4. 0.01
5. 1
6. 10,000
7. 10
8. 100,000
9. $\frac{1}{36}$
10. $-\frac{1}{729}$
11. $\frac{1}{32}$
12. $\frac{1}{81}$
13. $-\frac{1}{12}$
14. $\frac{1}{216}$

$$15. 9\frac{1}{2}$$

$$16. 15\frac{8}{9}$$

$$17. 6\frac{1}{16}$$

$$18. 0$$

$$19. 1\frac{4}{9}$$

$$20. 2$$

$$21. \frac{1}{1000}$$

$$22. 1,000,000$$

Practice C

$$1. -\frac{1}{64}$$

$$2. \frac{1}{121}$$

$$3. \frac{1}{729}$$

$$4. \frac{1}{243}$$

$$5. \frac{1}{64}$$

$$6. -\frac{1}{1024}$$

$$7. -\frac{1}{2}$$

$$8. 5\frac{8}{9}$$

$$9. 9\frac{1}{16}$$

$$10. -8$$

$$11. \frac{9}{14}$$

$$12. 5$$

$$13. 26\frac{1}{32}$$

$$14. 16\frac{1}{2}$$

$$15. 1,127,000 \text{ m}$$

$$16. 2420 \text{ km}$$

Review for Mastery

$$1. 7^3$$

$$2. 9^5$$

$$3. 13^4$$

$$4. \frac{1}{10^3} = \frac{1}{1000} = 0.001$$

$$5. \frac{1}{5^3} = \frac{1}{5 \cdot 5 \cdot 5} = \frac{1}{125}$$

$$6. \frac{1}{3^3} = \frac{1}{3 \cdot 3 \cdot 3} = \frac{1}{27}$$

$$7. \frac{1}{-4};$$

$$\frac{1}{(-4)^2} = \frac{1}{(-4) \cdot (-4)} = \frac{1}{16};$$

$$\frac{1}{(-4)^3} = \frac{1}{(-4) \cdot (-4) \cdot (-4)} = -\frac{1}{64}$$

$$8. 2^3; \frac{1}{8} \qquad 9. (-6)^2; \frac{1}{36}$$

$$10. 4^2; \frac{1}{16} \qquad 11. (-3)^3; -\frac{1}{27}$$

$$12. \frac{1}{36} \qquad 13. -\frac{1}{8}$$

$$14. \frac{1}{216} \qquad 15. \frac{1}{25}$$

$$16. \frac{1}{16} \qquad 17. -\frac{1}{9}$$

Challenge

- $\sqrt[2]{64^1}; 8^1; 8$
- $\sqrt[2]{100^1}; 10^1; 10$
- $\sqrt[2]{400^1} = 20^1 = 20$
- $\sqrt[3]{64^2} = 4^2 = 16$
- $\sqrt[3]{216^2} = 6^2 = 36$
- $\sqrt[3]{1000^2} = 10^2 = 100$
- $\sqrt[4]{625^3} = 5^3 = 125$
- $\sqrt[5]{32^2} = 2^2 = 4$
- $\sqrt[4]{10,000^5} = 10^5 = 100,000$

Problem Solving

- 10,000,000
- 0.0000001
- 1,000,000
- 0.000001
- D
- H
- C
- G

Reading Strategies

- 3
- 3
- $\frac{1}{3}$
- 4
- 4
- $\frac{1}{16}$

Column 1	Column 2	Column 3
$5^3 = 125$	$6^3 = 216$	$10^3 = 1000$
$5^2 = 25$	$6^2 = 36$	$10^2 = 100$
$5^1 = 5$	$6^1 = 6$	$10^1 = 10$
$5^0 = 1$	$6^0 = 1$	$10^0 = 1$
$5^{-1} = \frac{1}{5}$	$6^{-1} = \frac{1}{6}$	$10^{-1} = \frac{1}{10}$
$5^{-2} = \frac{1}{25}$	$6^{-2} = \frac{1}{36}$	$10^{-2} = \frac{1}{100}$

Puzzles, Twisters & Teasers

- A
- L
- A
- R
- M
- C
- L
- U
- C
- K

A L A R M

C L U C K

Answers for Lesson 3-2

Practice A

- 2^5
- 3^7
- 1^8
- 5^7
- 8^2
- 7^9
- 12^3
- n^{11}
- 2^3
- 10^1
- 4^3
- $(-3)^2$
- 5^2
- 24^6