

EXERCISES

For more practice, see *Extra Practice*.

A Practice by Example

Example 1
(page 99)

Write each expression using an exponent. Name the base and exponent.

1. 3×3
2. $2 \times 2 \times 2$
3. $9 \times 9 \times 9$
4. 100×100
5. $12 \times 12 \times 12 \times 12$
6. $8.1 \cdot 8.1$
7. $1 \times 1 \times 1 \times 1 \times 1$
8. 29
9. $n \cdot n \cdot n \cdot n \cdot n \cdot n$

Example 2
(page 100)

Write each number in expanded form using powers of 10.

10. 7,650
11. 83,792
12. 41,006
13. 60,251
14. 400,003
15. 7,892,510

Examples 3, 4
(pages 100, 101)

Simplify each expression. Exercise 16 has been started for you.

16. $14^2 = 14 \times 14 = \blacksquare$
17. 2^6
18. 3^5
19. 25^3
20. 2.5^3
21. 3^4
22. $4^2 + 5$
23. $2^2 + 3^2$
24. $(2 + 3)^2$
25. $(3^2 - 1)^2$
26. $5(5^2 - 9)$
27. $(9 - 7)^3 \times 6$

B Apply Your Skills

Simplify each expression.

28. $37^3 + 1$
29. $(37 + 1)^3$
30. $(9 + 1)^2 - 1^3$
31. $15^2 - (1 + 13^2) + 5$
32. $(10 - 8)^4 \times 3.5$
33. $2 \times 3^2 \times 4^2$

34. **Number Sense** Tell whether the expression $2^2 \cdot 3^2 - 2^3 - 1$ has the same value as the expression $2^2 \cdot (3^2 - 2^3) - 1$. Explain why or why not.

Find the missing exponent that makes each equation true.

35. $40 = 2^{\blacksquare} \times 5$
36. $45 = 5 \times 3^{\blacksquare}$
37. $343 = 7^{\blacksquare}$
38. $144 = 9 \cdot 4^{\blacksquare}$

39. **Patterns** Copy the table at the right.

- a. Fill in the missing values.
- b. **Writing in Math** Explain how the number of zeros in the standard form of a power of 10 relates to the exponent.
- c. Extend and complete the table for 10^7 and 10^8 .

Power	Standard Form
10^1	10
10^2	100
10^3	1,000
10^4	\blacksquare
\blacksquare	\blacksquare

40. **Biology** Suppose a single-celled animal splits in two after one hour. Each new cell also splits in two after one hour. How many cells will there be after eight hours? Write your answer using an exponent.
41. **Astronomy** The interior temperature of the sun is about 35,000,000°F. Write this number in expanded form using powers of 10.
42. **Science** Scientists estimate that Earth is approximately 15×10^9 years old. Write this number in standard form.
43. Copy and complete the table of cubes below.

n^3	1^3	2^3	3^3	4^3	5^3	6^3
Standard Form	1	8	■	■	■	■

Write each product or quotient using an exponent.

44. $5^2 \times 5^3$ 45. $2^4 \times 2^3$ 46. $4^5 \div 4^2$ 47. $10^6 \div 10^1$

Simplify each expression.

48. $(2 \times 3^3 + 1) \div 11$ 49. $10^2 \times 4 \div 5$ 50. $(4^2 - 1) \div 3 + 1$
 51. $(1 + 6)^2 - (1^2 + 6^2)$ 52. $100 - (1.8 + 5)^2$ 53. $2.7(125 \div 5^2)$

54. **Entertainment** The size of the image of a motion picture is related to the distance of the projector from the screen.
- a. **Writing in Math** Describe how the size of the image is related to the distance the projector is from the screen.
- b. **Patterns** A projector is 25 feet from a screen. How large will the image of the motion picture be?

Distance From Screen	Picture Size
1 unit	1 unit ²
2 units	4 units ²
3 units	9 units ²
4 units	16 units ²



C Challenge

55. **Patterns** Copy the pattern at the right.
- a. Extend the pattern three more rows. $1 = 1$
 $1 + 3 = 4$
 $1 + 3 + 5 = 9$
 $1 + 3 + 5 + 7 = 16$
- b. Write the sum of each row using an exponent.
- c. What is the sum of the first 20 odd numbers?
56. **Stretch Your Thinking** In the equations at the right, ■ represents a one-digit number and ❁ represents a two-digit number. What are the numbers?
- $22 - \blacksquare = \clubsuit$
 $6 + \blacksquare = \clubsuit$



Test Prep

Multiple Choice

57. Which expression is NOT equivalent to $3 \times 3 \times 3 \times 3$?

- A. $(3 + 3)^2 \times 3 \times 3$ B. $3^1 \times 3^3$
C. $(3 + 3 + 3) \times 3^2$ D. $3^2 \times (3 \times 3)$

58. What is the value of $2^3 \times 3^2$?

- F. 72 G. 54 H. 48 I. 36

59. What is the value of $5 + 6^2 - 1$?

- A. 16 B. 30 C. 40 D. 120

60. What is the value of $2 + (2^4 + 100) \div 2^2$?

- F. 9 G. 11 H. 31 I. 32



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Mixed Review

Lesson 1-7

Find each product.

61. 11.23×100 62. 7.005×10 63. $1,000 \times 0.88$
64. 1.25×4.5 65. 9.05×3.30 66. 11×0.18

Lesson 1-3

Use $<$, $=$, or $>$ to complete each statement.

67. 10.0010 \blacksquare 10.01 68. 0.0991 \blacksquare 0.00999 69. 21.1 \blacksquare 21.100