8.1 EXERCISES

HOMEWORK KEY

- = **WORKED-OUT SOLUTIONS** on p. WS1 for Exs. 31 and 55
- = **TAKS PRACTICE AND REASONING** Exs. 40, 41, 50, 58, 60, and 61
- = **MULTIPLE REPRESENTATIONS** Ex. 55

SKILL PRACTICE

EXAMPLES 1,2,3, and 4 on pp. 489–491 for Exs. 3–41

1. **VOCABULARY** Copy and complete: The _?_ of the quantity 93,534,004 people is the power of 10 nearest the quantity, or 10^8 people.

2. **WRITING** *Explain* when and how to use the product of powers property.

SIMPLIFYING EXPRESSIONS **Simplify the expression. Write your answer using exponents.**

3. $4^2 \cdot 4^6$
4. $8^5 \cdot 8^2$
5. $3^3 \cdot 3$
6. $9 \cdot 9^5$
7. $(-7)^4(-7)^5$
8. $(-6)^6(-6)$
9. $2^4 \cdot 2^9 \cdot 2$
10. $(-3)^2(-3)^{11}(-3)$
11. $(3^5)^2$
12. $(7^4)^3$
13. $[(-5)^3]^4$
14. $[(-8)^9]^2$
15. $(15 \cdot 29)^3$
16. $(17 \cdot 16)^4$
17. $(132 \cdot 9)^6$
18. $((-14) \cdot 22)^5$

SIMPLIFYING EXPRESSIONS **Simplify the expression.**

19. $x^4 \cdot x^2$
20. $y^9 \cdot y$
21. $z^2 \cdot z \cdot z^3$
22. $a^4 \cdot a^3 \cdot a^{10}$
23. $(x^5)^2$
24. $(y^4)^6$
25. $[(b-2)^2]^6$
26. $[(d+9)^7]^3$
27. $(-5x)^2$
28. $-(5x)^2$
29. $(7xy)^2$
30. $(5pq)^3$
31. $(-10x^6)^2 \cdot x^2$
32. $(-8m^4)^2 \cdot m^3$
33. $6d^2 \cdot (2d^5)^4$
34. $(-20x^3)^2(-x^7)$
35. $-(2p^4)^3(-1.5p^7)$
36. $\left(\frac{1}{2}y^5\right)^3(2y^2)^4$
37. $(3x^5)^3(2x^7)^2$
38. $(-10n)^2(-4n^3)^3$

39. **ERROR ANALYSIS** *Describe* and correct the error in simplifying $c \cdot c^4 \cdot c^5$.

$$c \cdot c^4 \cdot c^5 = c^1 \cdot c^4 \cdot c^5$$
$$= c^{1 \cdot 4 \cdot 5}$$
$$= c^{20}$$

40. **TAKS REASONING** Which expression is equivalent to $(-9)^6$?

(A) $(-9)^2(-9)^3$ (B) $(-9)(-9)^5$ (C) $[(-9)^4]^2$ (D) $[(-9)^3]^3$

41. **TAKS REASONING** Which expression is equivalent to $36x^{12}$?

(A) $(6x^3)^4$ (B) $12x^4 \cdot 3x^3$ (C) $3x^3 \cdot (4x^3)^3$ (D) $(6x^5)^2 \cdot x^2$

SIMPLIFYING EXPRESSIONS **Find the missing exponent.**

42. $x^4 \cdot x^? = x^5$
43. $(y^8)^? = y^{16}$
44. $(2z^?)^3 = 8z^{15}$
45. $(3a^3)^? \cdot 2a^3 = 18a^9$

46. **POPULATION** The population of New York City in 2000 was 8,008,278. What was the order of magnitude of the population of New York City?

SIMPLIFYING EXPRESSIONS **Simplify the expression.**

47. $(-3x^2y)^3(11x^3y^5)^2$
48. $-(-xy^2z^3)^5(x^4yz)^2$
49. $(-2s)(-5r^3st)^3(-2r^4st^7)^2$