

### Properties of Exponents

Simplify. Assume that no variable equals 0.

- |   |   |
|---|---|
| 1. $n^5 \cdot n^2$  | 2. $y^7 \cdot y^3 \cdot y^2$                    |
| 3. $t^9 \cdot t^{-8}$   | 4. $x^{-4} \cdot x^{-4} \cdot x^4$              |
| 5. $(2f^4)^6$   | 6. $(-2b^{-2}c^3)^3$                            |
| 7. $(4d^2t^5v^{-4})(-5dt^{-3}v^{-1})$                                 | 8. $8u(2z)^3$                                   |
| 9. $\frac{12m^8y^6}{-9my^4}$  | 10. $\frac{-6s^5x^3}{18sx^7}$                   |
| 11. $\frac{-27x^3(-x^7)}{16x^4}$                                      | 12. $\left(\frac{2}{3r^2s^3z^6}\right)^2$       |
| 13. $-(4w^{-3}z^{-5})(8w)^2$  | 14. $(m^4n^6)^4(m^3n^2p^5)^6$                   |
| 15. $\left(\frac{3}{2}d^2f^4\right)^4\left(-\frac{4}{3}d^5f\right)^3$ | 16. $\left(\frac{2x^3y^2}{-x^2y^5}\right)^{-2}$ |
| 17. $\frac{(3x^{-2}y^3)(5xy^{-8})}{(x^{-3})^4y^{-2}}$                 | 18. $\frac{-20(m^2v)(-v)^3}{5(-v)^2(-m^4)}$     |

Express each number in scientific notation.

19. 896,000                      20. 0.000056                      21.  $433.7 \times 10^8$

Evaluate. Express the result in scientific notation.

22.  $(4.8 \times 10^2)(6.9 \times 10^4)$       23.  $(3.7 \times 10^9)(8.7 \times 10^2)$       24.  $\frac{2.7 \times 10^6}{9 \times 10^{10}}$

25. **COMPUTING** The term *bit*, short for *binary digit*, was first used in 1946 by John Tukey. A single bit holds a zero or a one. Some computers use 32-bit numbers, or strings of 32 consecutive bits, to identify each address in their memories. Each 32-bit number corresponds to a number in our base-ten system. The largest 32-bit number is nearly 4,295,000,000. Write this number in scientific notation.

26. Joshua operates a forklift. He is able to lift  $4.72 \times 10^3$  kilograms with the forklift. There are  $10^3$  grams in 1 kilogram. How many grams is  $4.72 \times 10^3$  kilograms? Express your answer in scientific notation.

27. The density of an object is equal to its mass divided by its volume. A dumbbell has a mass of  $9 \times 10^3$  grams and a volume of  $1.2 \times 10^3$  cubic centimeters. What is the density of the dumbbell?

