

Simplify the expression. Write your answer using exponents.

1.  $(62 \cdot 17)^4$   **$62^4 \cdot 17^4$**     2.  $(-3)(-3)^6$   **$(-3)^7$**     3.  $\frac{8^4 \cdot 8^5}{8^3}$   **$8^6$**     4.  $(8^4)^3$   **$8^{12}$**   
 5.  $\frac{2^{15}}{2^8}$   **$2^7$**     6.  $5^3 \cdot 5^0 \cdot 5^5$   **$5^8$**     7.  $[(-4)^3]^2$   **$(-4)^6$**     8.  $\frac{(-5)^{10}}{(-5)^3}$   **$(-5)^7$**

Simplify the expression.

9.  $t^2 \cdot t^6$   **$t^8$**     10.  $(\frac{s}{t})^6$   **$\frac{s^6}{t^6}$**     11.  $\frac{1}{9^{-2}}$   **$81$**     12.  $-(6p)^2$   **$-36p^2$**   
 13.  $(5xy)^2$   **$25x^2y^2$**     14.  $\frac{1}{z^7} \cdot z^9$   **$z^2$**     15.  $(x^5)^3$   **$x^{15}$**     16.  $(-\frac{4}{c})^2$   **$\frac{16}{c^2}$**

Simplify the expression. Write your answer using only positive exponents.

17.  $(\frac{a^{-3}}{3b})^4$   **$\frac{1}{81a^{12}b^4}$**     18.  $\frac{3}{4d} \cdot \frac{(2d)^4}{c^3}$   **$\frac{12d^3}{c^3}$**     19.  $y^0 \cdot (8x^6y^{-3})^{-2}$   **$\frac{y^6}{64x^{12}}$**     20.  $(5r^5)^3 \cdot r^{-2}$   **$125r^{13}$**

Write the number in scientific notation.

21. 423.6  **$4.236 \times 10^2$**     22. 7,194,548  **$7.194548 \times 10^6$**     23. 500.32  **$5.0032 \times 10^2$**     24. 71,23884  **$7.123884 \times 10^1$**   
 25. 0.562  **$5.62 \times 10^{-1}$**     26. 0.0348  **$3.48 \times 10^{-2}$**     27. 0.000123  **$1.23 \times 10^{-4}$**     28. 0.5603002  **$5.603002 \times 10^{-1}$**

Write the number in standard form.

29.  $4.02 \times 10^5$   **$402,000$**     30.  $5.3121 \times 10^4$   **$53,121$**     31.  $9.354 \times 10^8$   **$935,400,000$**     32.  $1.307 \times 10^{19}$  **See margin.**  
 33.  $1.3 \times 10^{-3}$   **$0.0013$**     34.  $3.32 \times 10^{-4}$   **$0.000332$**     35.  $7.506 \times 10^{-5}$   **$0.00007506$**     36.  $9.3119 \times 10^{-7}$   **$0.00000093119$**

37. Graph the function  $y = 4^x$ . Identify its domain and range. **See margin.**  
 38. Graph the function  $y = \frac{1}{2} \cdot 4^x$ . Compare the graph with the graph of  $y = 4^x$ . **See margin.**  
 39. **ANIMATION** About  $1.2 \times 10^7$  bytes of data make up a single frame of an animated film. There are 24 frames in 1 second of a film. About how many bytes of data are there in 1 hour of an animated film? **about  $1.04 \times 10^{12}$  bytes**  
 40. **SALARY** A recent college graduate accepts a job at a law firm. The job has a salary of \$32,000 per year. The law firm guarantees an annual pay increase of 3% of the employee's salary.  
 a. Write a function that models the employee's salary over time. Assume that the employee receives only the guaranteed pay increase. **See margin.**  
 b. Use the function to find the employee's salary after 5 years. **\$37,096.77**  
 41. **SCIENCE** At sea level, Earth's atmosphere exerts a pressure of 1 atmosphere. Atmospheric pressure  $P$  (in atmospheres) decreases with altitude and can be modeled by  $P = (0.99987)^a$  where  $a$  is the altitude (in meters).  
 a. Identify the initial amount, decay factor, and decay rate.  
**initial amount: 1, decay factor: 0.99987, decay rate: 0.013%**  
 b. Use a graphing calculator to graph the function. **See margin.**  
 c. Estimate the altitude at which the atmospheric pressure is about half of what it is at sea level. **about 5332 m**

## Additional Resources

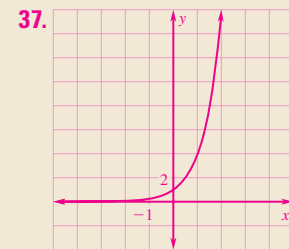
### Assessment Book

- Chapter Test, Levels A, B, C, pp. 112–117
- Standardized Chapter Test, pp. 118–119
- SAT/ACT Chapter Test, pp. 120–121
- Alternative Assessment, pp. 122–123

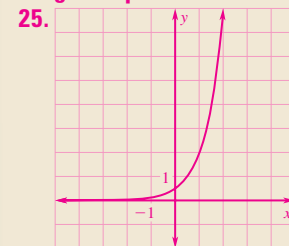
### Test Generator CD-ROM

### Chapter Test

Easily-readable reduced copies (with answers) of Chapter Test B, the Standardized Chapter Test, and the Alternative Assessment from the Assessment Book can be found on pp. 486E–486F.



domain: all real numbers,  
range: all positive real numbers



The graph is a vertical shrink of  $y = 4^x$ .

40a. Let  $y$  represent the yearly salary and  $x$  represent the number of years since accepting the job.  $y = 32,000(1.03)^x$ .

