8 CHAPTER TEST

Simplify the expression. Write your answer using exponents.

1. $(62 \cdot 17)^4$ **2.** $(-3)(-3)^6$ **3.** $\frac{8^4 \cdot 8^5}{8^3}$ **4.** $(8^4)^3$

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

Simplify the expression.

9. $t^2 \cdot t^6$ **10.** $\left(\frac{s}{t}\right)^6$ **11.** $\frac{1}{9^{-2}}$ **12.** $-(6p)^2$

13. $(5xy)^2$ **14.** $\frac{1}{z^7} \cdot z^9$ **15.** $(x^5)^3$ **16.** $\left(-\frac{4}{c}\right)^2$

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

17. $\left(\frac{a^{-3}}{3b}\right)^4$ **18.** $\frac{3}{4d} \cdot \frac{(2d)^4}{c^3}$ **19.** $y^0 \cdot (8x^6y^{-3})^{-2}$ **20.** $(5r^5)^3 \cdot r^{-2}$

Write the number in scientific notation.

21. 423.6 **22.** 7,194,548 **23.** 500.32 **24.** 71.23884

25. 0.562 **26.** 0.0348 **27.** 0.000123 **28.** 0.5603002

Write the number in standard form.

29. 4.02×10^5 **30.** 5.3121×10^4 **31.** 9.354×10^8 **32.** 1.307×10^{19}

33. 1.3×10^{-3} **34.** 3.32×10^{-4} **35.** 7.506×10^{-5} **36.** 9.3119×10^{-7}

37. Graph the function $y = 4^x$. Identify its domain and range.

38. Graph the function $y = \frac{1}{2} \cdot 4^x$. Compare the graph with the graph of $y = 4^x$.

39. **ANIMATION** About 1.2×10^7 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?

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.

b. Use the function to find the employee's salary after 5 years.

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.

b. Use a graphing calculator to graph the function.

c. Estimate the altitude at which the atmospheric pressure is about half of what it is at sea level.