## 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. $\left(8^{4}\right)^{3}$
5. $\frac{2^{15}}{2^{8}}$
6. $5^{3} \cdot 5^{0} \cdot 5^{5}$
7. $\left[(-4)^{3}\right]^{2}$
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. $-(6 p)^{2}$
13. $(5 x y)^{2}$
14. $\frac{1}{z^{7}} \cdot z^{9}$
15. $\left(x^{5}\right)^{3}$
16. $\left(-\frac{4}{c}\right)^{2}$

Simplify the expression. Write your answer using only positive exponents.
17. $\left(\frac{a^{-3}}{3 b}\right)^{4}$
18. $\frac{3}{4 d} \cdot \frac{(2 d)^{4}}{c^{3}}$
19. $y^{0} \cdot\left(8 x^{6} y^{-3}\right)^{-2}$
20. $\left(5 r^{5}\right)^{3} \cdot r^{-2}$
21. Graph the function $y=4^{x}$. Identify its domain and range.
22. Graph the function $y=\frac{1}{2} \cdot 4^{x}$. Compare the graph with the graph of $y=4^{x}$.
23. ANIMATION About $10^{7}$ bytes of data make up a single frame of an animated film. There are about $10^{3}$ frames in 1 minute of a film. About how many bytes of data are there in 1 hour of an animated film?
24. 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.
25. 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.

