Name:_____Per:_____

Choose the correct term to complete each sentence.

1. In the exponential function $y = ab^x$, when $b > 1$, b is the __?__.

2. A __?__ is a logarithm that uses base 10.

3. The line $x = 2$ is a(n) __?__ of the function $f(x) = \frac{2}{x - 2}$.

4. The Change of Base Formula can be used to evaluate a __?__ with any base.

5. An __?__ can be solved by taking the logarithm of each side of the equation.

Determine whether each equation represents exponential growth or exponential decay. Find the rate of increase or decrease for each model. Graph each equation.

6. $y = 5^x$ **7.** $y = 2(4)^x$ **8.** $y = 0.2(3.8)^x$ **9.** $y = 3(0.25)^x$

Write an exponential equation whose graph passes through the given points.

10. $(1, 5), (2, 7)$

Write an exponential function to model each situation. Find the value of each function after five years, to the nearest dollar.

11. A $12,500 car depreciates 9% each year.

12. A baseball card bought for $50 increases 3% in value each year.

Find the amount in a continuously compounded account for the given conditions.

13. principal: $1000, annual interest rate: 4.8%, time: 2 yr

14. **Physics** Radium has a half-life of 1620 years. Write the decay function for a 3-mg sample. Find the amount of radium remaining after 50 years.

15. **Chemistry** The pH of a substance equals $-\log[H^+]$, where $[H^+]$ is the concentration of hydrogen ions. A sample of well water has a pH of 5.7. Find the concentration of hydrogen ions in the sample.

Write each equation in logarithmic form.

16. $6^2 = 36$ 17. $2^{-3} = 0.125$

Write each logarithmic expression as a single logarithm.

18. $\log 8 + \log 3$ 19. $\log_2 5 - \log_2 3$

20. $4 \log_3 x + \log_3 7$ 21. $\log z - \log y$

Solve each equation. Round your answers to the nearest hundredth.

22. $4^x = 27$ 23. $7^{x-3} = 25$ 24. $\log_2 4x = 5$ 25. $2 \log_3 x = 54$

26. **Biology** A culture of 10 bacteria is started, and the number of bacteria will double every hour. In about how many hours will there be 3,000,000 bacteria?

Solve each equation.

27. $e^{3x} = 12$ 28. $2 \ln x + 3 \ln 2 = 5$ 29. $4e^{(x-1)} = 64$

30. **Savings** An initial investment of $350 is worth $429.20 after six years of continuous compounding. Find the interest rate.