College Math   Name_____

Logarithmic & Exponential Functions - Unit Review   Date_____

Use a calculator to approximate each to the nearest thousandth.

1) $\log 2$

2) $\log_3 33$

3) $\ln 2.3$

Rewrite each equation in exponential form.

4) $\log_y x = -2$

5) $\log_1 \dfrac{135}{178} = x$

6) $\log b = 11$

7) $\ln m = 13$

Rewrite each equation in logarithmic form.

8) $x^y = \dfrac{2}{25}$

9) $e^m = 24$

10) $10^x = y$

11) $m^{-14} = n$

Expand each logarithm. (3 points each)

12) $\log_2 \dfrac{a^3}{b^6}$

13) $\log_9 \left(z^2 \sqrt{x} \right)$

14) $\log\left(x^6 y^5\right)$

15) $\log_7\left(\dfrac{x}{y^6}\right)^2$

Condense each expression to a single logarithm. (3 points each)

16) $4\ln a + 24\ln b$

17) $\log_9 u + 4\log_9 v + 6\log_9 w$

18) $5\log_7 u - 8\log_7 v$

19) $5\log_2 z + \dfrac{\log_2 x}{3}$

Solve each equation. (4 points each)

20) $8^x = 90$

21) $6 \cdot 14^x = 17$

22) $-3 \cdot 15^{-5m} = -36$

23) $5^{5.2r+3} - 1.2 = 95$

24) $\log_5 v = 1$

25) $\log_{12} a - 6 = -2$

26) $-7\log_{11} r + 10 = -4$

27) $-8\log_{11}(k - 2) = 0$

28) $\log_2 x + \log_2 6 = 4$

29) $\log_9 x - \log_9 2 = 1$

30) $\log_6 -3x - \log_6 5 = 1$

31) $\log_4(x - 8) - \log_4 8 = 2$

32) $\log_2(x - 5) + \log_2 9 = 2$

33) $\log_7(x + 3) + \log_7 3 = 1$

34) $\log x - \log 5 = \log 25$

35) $\log_7 8 + \log_7 4x = \log_7 13$

Evaluate each function.

36) $f(x) = 5^{x+3} - 3$; Find $f(-1)$

37) $h(x) = 5^x$; Find $h(2)$

38) $h(x) = 2 \cdot 5^{x-1} + 1$; Find $h(1)$

39) $f(a) = 2 \cdot 5^a$; Find $f(1)$

40) $h(x) = 2^{x+1}$; Find $h(0)$

41) $w(x) = 4^x + 3$; Find $w(-x)$

42) $k(t) = 3^{t+2} - 3$; Find $k(-4t)$

43) $w(a) = 4^{2a} + 3$; Find $w(a^2)$

44) $w(x) = 4^{x-1} - 1$; Find $w(-3x)$

45) $h(a) = -5^{3a}$; Find $h(4 + a)$

Without graphing, state if each function is exponential growth or exponential decay.

46) $f(x) = 2 \cdot \left(\dfrac{1}{2}\right)^x$

47) $f(x) = \dfrac{1}{4} \cdot \left(\dfrac{1}{6}\right)^x$
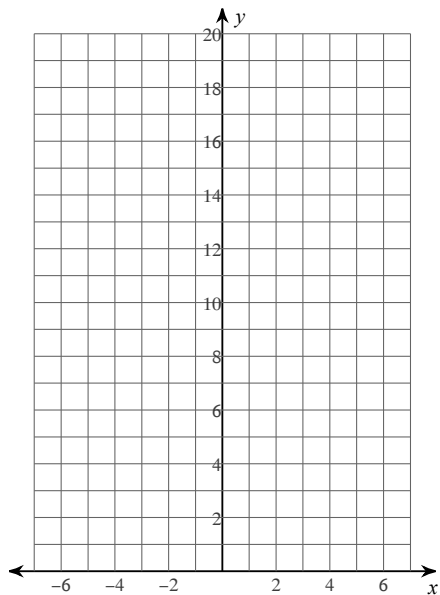
48) $f(x) = \dfrac{1}{2} \cdot 3^x$

49) $f(x) = 2 \cdot 3^x$
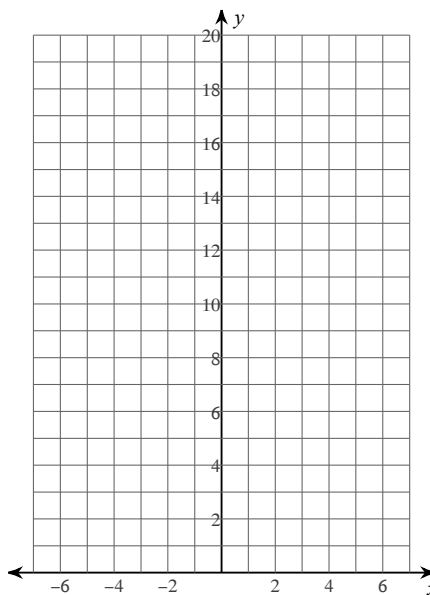
50) $f(x) = \dfrac{1}{4} \cdot \left(\dfrac{1}{5}\right)^x$

51) $f(x) = 5 \cdot 2^x$

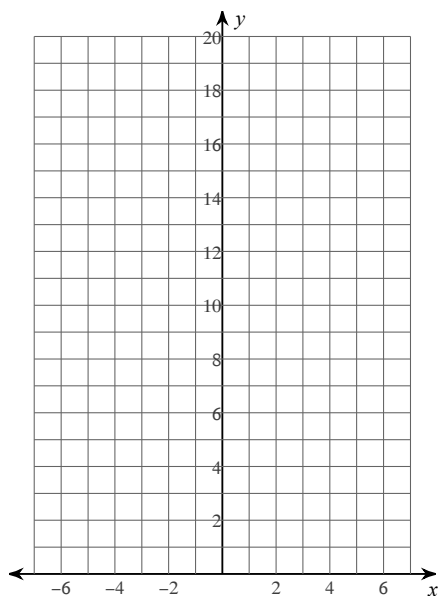**Sketch the graph of each function.**

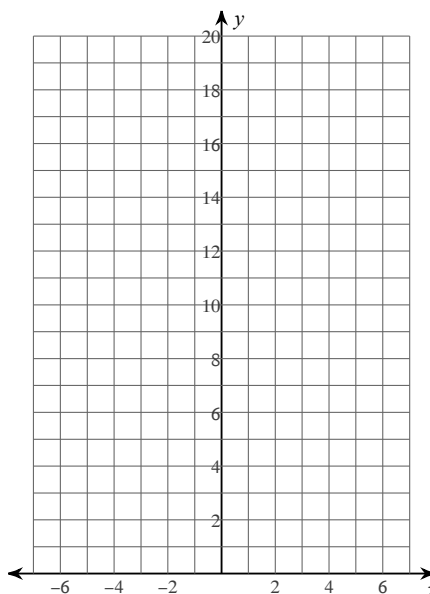52) $f(x) = \dfrac{1}{4} \cdot \left(\dfrac{1}{3}\right)^x$
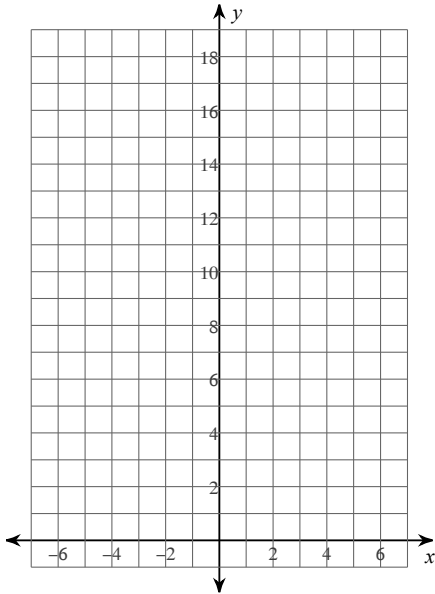
53) $f(x) = 4 \cdot 2^x$
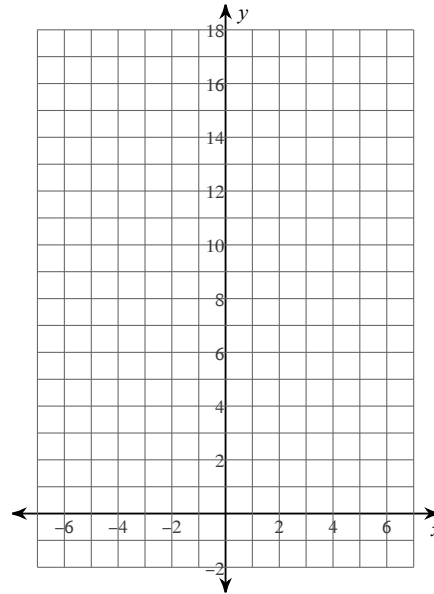
54) $f(x) = 3 \cdot 2^x$

55) $f(x) = \dfrac{1}{2} \cdot \left(\dfrac{1}{6}\right)^x + 2$

56) $f(x) = \dfrac{1}{2} \cdot 4^x - 1$

57) $f(x) = \dfrac{1}{4} \cdot \left(\dfrac{1}{4}\right)^x - 2$

Use simple interest to find the ending balance.

58) $1,400 at 1.3% for 2 years

59) $160 at 5.5% for $1\dfrac{1}{2}$ years

Find the total value of the investment after the time given.

60) $7,300 at 2.9% compounded
annually for 10 years

61) $255 at 10.1% compounded
semiannually for 3 years

62) $34,000 at 1.5% compounded
semiannually for 6.5 years

63) $38,600 at 8.12% compounded
monthly for 2.25 years