

**Write the equation in its equivalent exponential or logarithmic form:**

1.  $\log_b 64 = 2$

2.  $\log_6 216 = x$

3.  $2^3 = x$

4.  $2^{(-2)} = \frac{1}{4}$

**Evaluate the following without the use of a calculator:**

5.  $\log_{10} 10$

6.  $\log_3 \sqrt{3}$

7.  $\log_6 1$

8.  $6^{(\log_6 15)}$

9.  $\log_7 7^{(18)}$

10.  $\log 1000$

11.  $\log 10^7$

12.  $\ln e$

**Expand or condense the following expressions:**

13.  $\log_2 (8x)$

14.  $\log_5 \left( \frac{125}{x} \right)$

15.  $\log_b (yz^4)$

16.  $\log_4 \left( \frac{x-6}{x^5} \right)$

17.  $\log_4(x - 8) - \log_4(x - 4)$

$$18. 3 \log_6 x + 5 \log_6(x - 6)$$

$$19. 4 \log_x 2 - \log_x 8$$

**Solve the following equations:**

$$20. 4^{(1+2x)} = 64$$

$$21. e^{(x+8)} = \frac{1}{e^4}$$

**Solve the exponential equation. Give the exact answer (no decimals).**

$$22. 5^{(x+7)} = 3$$

$$23. e^{(x+4)} = 2$$

$$24. \log_3(x - 1) = -1$$

$$25. 4 + 8 \ln(x) = 8$$

$$26. \log_6 x + \log_6(x - 35) = 2$$

$$27. \log_6(5x - 5) = \log_6(3x + 7)$$

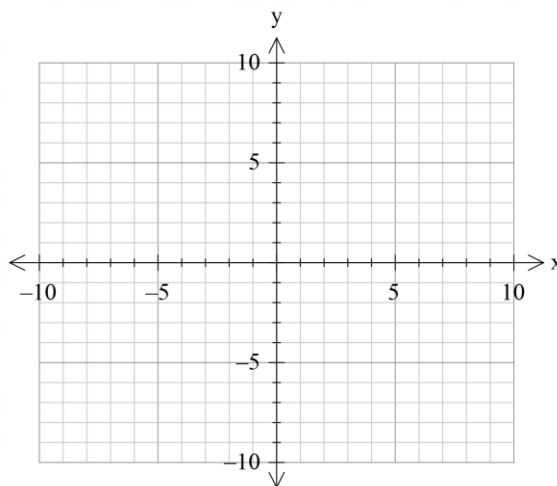
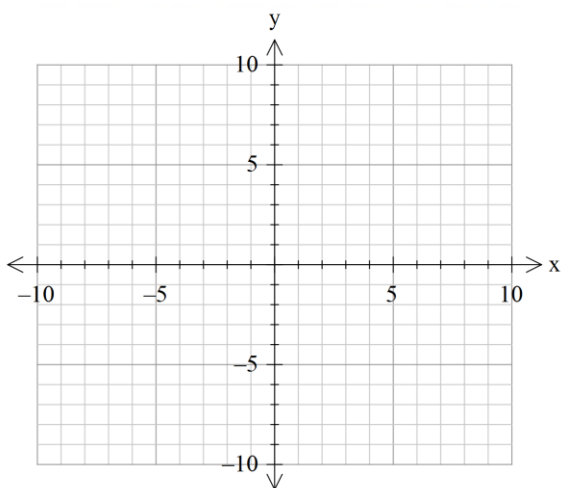
28.  $\log_{14}(x + 5) = 1 - \log_{14} x$

29.  $4^{(x+9)} = 8^{(x-2)}$

Use the parent function to obtain the graph of the following:

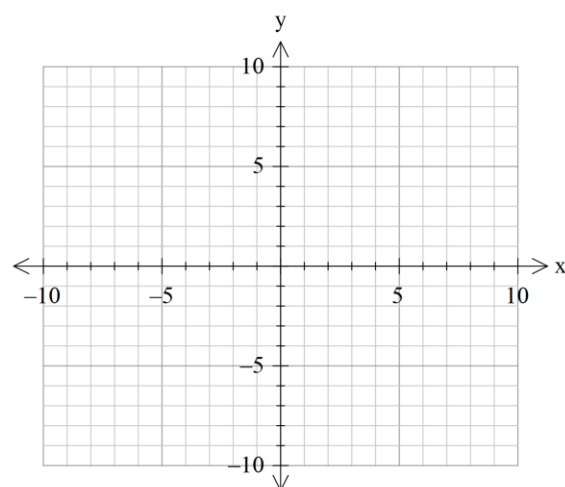
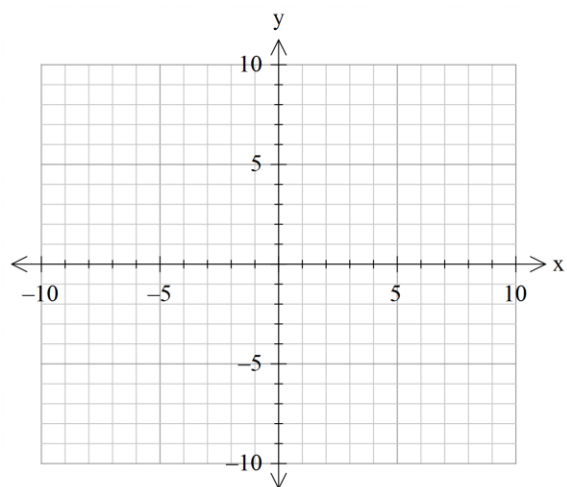
30.  $g(x) = 4^{(x-2)} + 2$

31.  $g(x) = e^{(x-2)} + 4$



32.  $f(x) = \left(\frac{3}{5}\right)^x$

33.  $f(x) = \log_2(x + 2)$



Use the compound interest formulas  $A = P\left(1 + \frac{r}{n}\right)^{nt}$  and  $A = Pe^{rt}$  to solve:

34. Find the accumulated value of an investment of \$900 at 12% compounded quarterly for 6 years.

35. Find the accumulated value of an investment of \$4000 at 7% compounded continuously for 5 years.

Use Newton's Law of Cooling  $T = C + (T_0 - C)e^{kt}$ , to solve the problem.

36. Mostacoli baked at 375°F is taken out of the oven into a kitchen that is 68°F. After 5 minutes, the temperature of the mostacoli is 327°F. What will its temperature be 19 minutes after it was taken out of the oven? Round your answer to the nearest degree.

Solve the following:

37. The half-life of silicon-32 is 710 years. If 50 grams is present now, how much will be present in 200 years? (Round your answer to three decimal places.)

38. The logistic growth function  $f(t) = \frac{87,000}{1+1449e^{-1.2t}}$  models the number of people who have become ill with a particular infection  $t$  weeks after its initial outbreak in a particular community. How many people were ill after 9 weeks?

39. The population of a particular country was 30 million in 1984; in 1989 it was 37 million. The exponential growth function  $A = 30e^{kt}$  describes the population of this country  $t$  years after 1984. Use the fact that 5 years after 1984 the population increased by 7 million to find  $k$  to three decimal places.

40. A fossilized leaf contains 18% of its normal amount of carbon 14. How old is the fossil (to the nearest year)? Use 5600 years as the half-life of carbon 14.