

**Graph the equation. Determine the asymptote, domain, and range.**

1.  $y = \left(\frac{1}{3}\right)^x - 3$

Asymptote \_\_\_\_\_

Domain \_\_\_\_\_

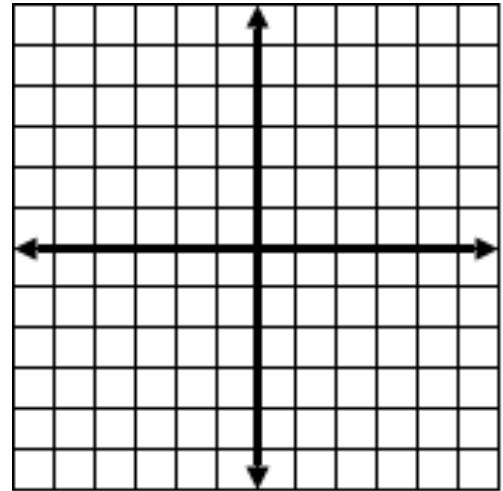
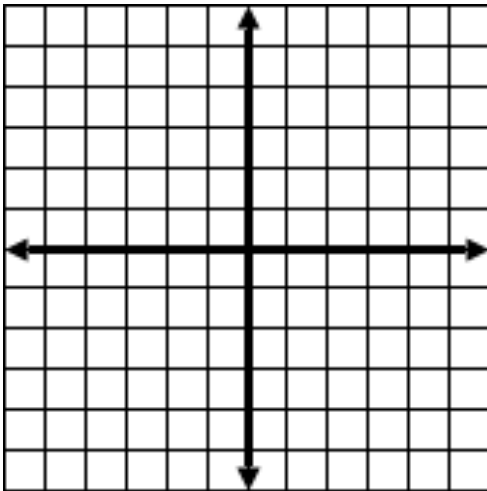
Range \_\_\_\_\_

2.  $y = 2^{x+1} + 3$

Asymptote \_\_\_\_\_

Domain \_\_\_\_\_

Range \_\_\_\_\_



**Solve each of the following.**

3. Martha invests \$3,000 in an account earning an APR of 5.2%. What is the balance on the account after 3 years?
4. If you invested \$4,530 in an account that earns an APR of 4.25% compounded continuously, how much interest would you have after 5 years?
5. If you purchased a car 6 years ago for \$21,990 and it depletes at a rate of 18.5% annually, how much would it be worth today?

**Calculate, round to the nearest thousandth.**

6.  $\log_5 43$

7.  $\log_8 412$

**Solve each of the following.**

8.  $\log_3(2x + 5) = \log_3(4x - 13)$

11.  $-4 = \log_3 m$

9.  $\log x + \log(x - 3) = 1$

12.  $2^{x+3} = 16^x$

10.  $\log_5 x = 3$

13.  $12^{3x} = 148$

**Express y in terms of x.**

14.  $\log y = 4 \log(2x)$

15.  $\ln y = \frac{1}{4}(\ln 5 + 3 \ln x)$

**Simplify each expression without a calculator.**

16.  $\ln e^4$

17.  $\log_6 216$

18.  $\log_{12} 1$

19.  $\log 0.0001$

20.  $\log_2 \frac{1}{32}$

21.  $\log_4 64$

**Write each in exponential form.**

22.  $\log m = -2.5$

23.  $\ln 4.2 = x$

24.  $t = \log_3 432$

**Write in logarithmic form.**

25.  $4^{-2} = \frac{1}{16}$

26.  $5^{x+2} = 8$

27.  $.125 = 2^{-3}$

**Express each to the nearest thousandth.**

28.  $\log 564$

29.  $\ln 12.7$

30.  $\log 44$

**Write each expression as a single logarithm or rational number.**

31.  $\log 4 + \log 12 - \log x$

33.  $3\log_5 x - 4\log_5 v$

32.  $2\log 5 + \log 4$

34.  $\frac{1}{3}(\log 5 + 2\log w)$

**Expand each expression.**

35.  $\log_7 \frac{4w^5}{3n}$

37.  $\ln \frac{4t}{q}$

36.  $\log_2(8qk)$

38.  $\ln \sqrt[5]{4m}$