

1. Use an exponential model to answer the following questions.

a) A population of 500 fruit flies increases at an annual rate of 40%. How many are there after 3 years?

b) Bailey buys a car for \$23,000. The car depreciates in value 18% per year. How much will it be worth in 7 years?

2. Use the formula  $A = P(1 + \frac{r}{n})^{nt}$  or  $A = Pe^{rt}$  to answer the following questions..

a) Sal invests \$6,000 in an account that pays 3.5%. The account is compounded monthly. How much will be in his account in 5 years?

b) Mia invests \$10,000 in an account that pays 4.75%. The account is compounded weekly. How much will be in her account in 12 years?

c) Bryan invests \$5,000 in an account that pays 9.25%. The account is compounded continuously. How much will be in his account in 35 years?

3. Write the inverse function for the following.

a)  $y = 4^x$

b)  $y = e^x$

c)  $y = \log_5 x$

4. Evaluate the following.

a)  $\log_3 81$

b)  $\log_4 2$

c)  $\log_5 125$

d)  $\log_3 \frac{1}{27}$

e)  $\log_{\frac{1}{7}} 49$

f)  $\log_2 8$

g)  $\log_4 64$

h)  $\log_6 \frac{1}{36}$

i)  $\log_{64} 8$

j)  $\ln \ln 1$

k)  $\log_7 7^5$

l)  $\log_\pi \pi^4$

m)  $\ln \ln e^2$

n)  $\log_{27} 3$

o)  $\log_{64} 4$

Condense the following expression into one logarithmic expression.

5.  $\log_5 8 - \log_5 12$

6.  $\log_b x + \log_b 4$

7.  $2\log 5 + 4\log x$

8.  $3\log_b x - 5\log_b y$

9.  $5\log_7 x - 2\log_7 x$

10.  $\log 20 + 2\log \frac{1}{2} + \log x$

11.  $2\ln x - 3\ln y - \ln z$

12.  $\frac{1}{2}\log x + \frac{1}{3}\log y - 2\log z$

Expand the following expressions.

13.  $\log_2 9x$

14.  $\log 4x^2$

15.  $\log_6 x^6$

16.  $\log \frac{2x}{y}$

17.  $\log 6x^3yz^2$

18.  $\log \sqrt{x}$

19.  $\log_b \frac{3x^2}{y^3}$

20. Rewrite the following values using the change of base formula: a.  $\log_7 52$  b.  $\log_3 75$

Solve the following equations:

21.  $3^{2x} = 40$

22.  $7^x + 18 = 98$

23.  $4^{x+3} + 2 = 70$

24.  $e^x - 25 = 100$

25.  $14\log_{36}(x-1) - 3 = 4$

26.  $\log_5(x-3) + 8 = 6$

27.  $6\log_{25}(x+2) + 5 = 8$

28.  $\log_3(3x-5) = \log_3(x-1)$

29.  $3^{2x} = 3^{4x-10}$

30.  $4^{2x} = 8^{x-1}$

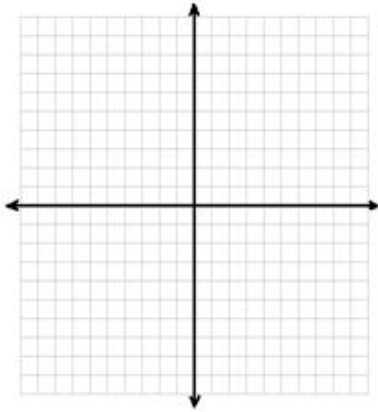
31.  $81^{3x} = 27^{x+2}$

32.  $\frac{1}{25}^{x+3} = 125^{x+2}$

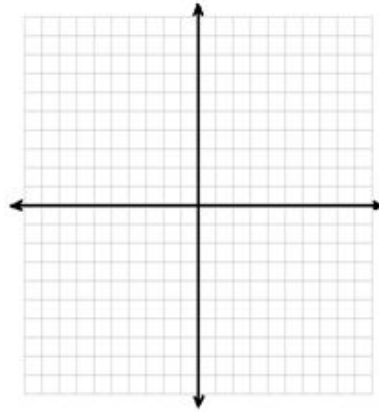
33.  $64^x = 16^{2x+1}$

Sketch the following functions. Include the asymptote the locator point.

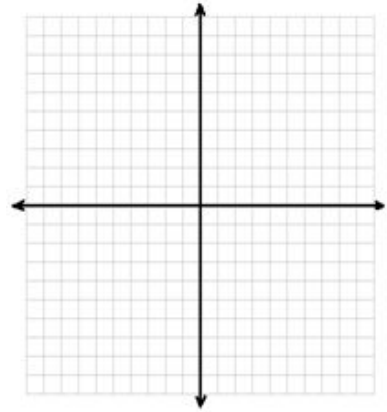
34.  $y = 4^x + 3$



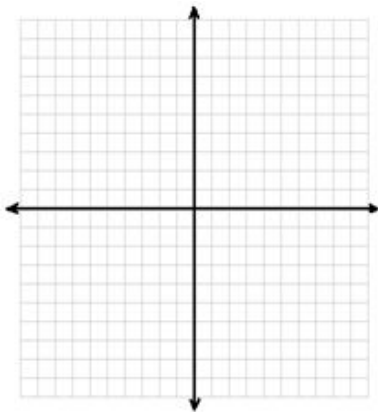
35.  $y = e^x - 2$



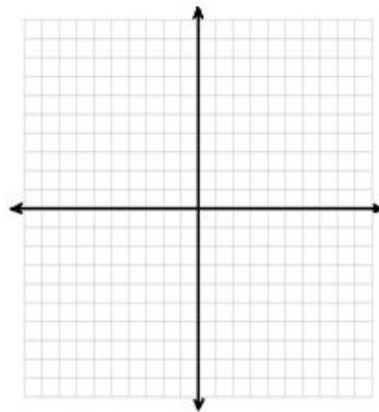
36.  $y = 2^{x+2} - 3$



37.  $y = \left(\frac{2}{3}\right)^x$



38.  $y = \log_5(x-3)$



39.  $y = \log_3(x+2) + 1$

