 Name______________________

Decide if the function is an exponential function. If it is, state the initial value and the base.

1) $y = -9.4 \cdot 6^x$

Compute the exact value of the function for the given x–value without using a calculator.

2) $f(x) = \left(\frac{1}{4}\right)^x$ for $x = 3$

3) $f(x) = 5^x$ for $x = -2$

Determine a formula for the exponential function.

4)

x	f(x)
−2	80
−1	40
0	20
1	10
2	5

Describe the transformation of f(x) from g(x).

5) $f(x) = 3^{x-1} - 3$; relative to $g(x) = 3^x$

State whether the function is an exponential growth function or exponential decay function, and describe its end behavior using limits.

6) $f(x) = 0.7^x$

Decide whether the function is an exponential growth or exponential decay function and find the constant percentage rate of growth or decay.

7) $f(x) = 87 \cdot 0.04^x$

8) $f(x) = 8.4 \cdot 1.04^x$

Find the exponential function that satisfies the given conditions.

9) Initial value = 34, increasing at a rate of 13% per year

Evaluate the logarithm.

10) $\log_4 256$

11) $\log_6(\frac{1}{36})$

Simplify the expression.

12) $\log_7 7^3$

13) $10^{\log 16}$

Solve the equation by changing it to exponential form.

14) $\log_9 x = 4$

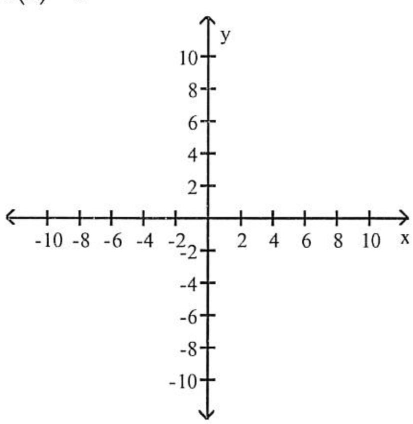
15) $\log x = 2.7$

Find the logistic function that satisfies the given conditions.

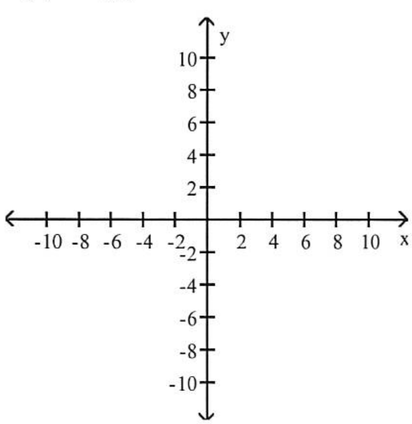
16) Initial value =10, limit to growth =60, passing through (1,20)

Sketch the graph of the function.

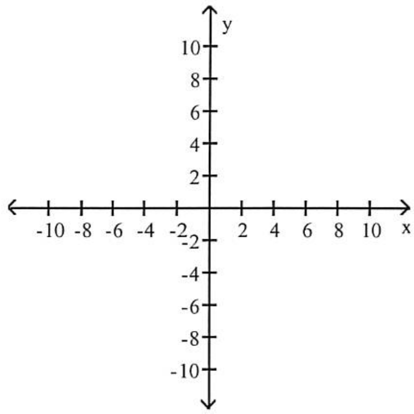
17) $f(x) = 2^{x - 1}$



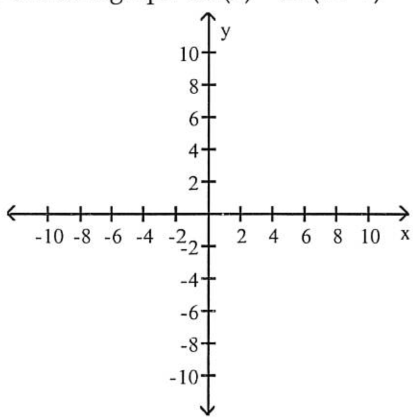
18) $f(x) = \log_2 x$



19) $f(x) = \dfrac{10}{1 + 2 \cdot 0.4^x}$



20) Sketch a graph of $f(x) = \ln(x + 4)$



Describe how to transform the graph of the basic function g(x) into the graph of the given function f(x).

21) $f(x) = \ln(x + 5) - 8; \quad g(x) = \ln x$

Assuming all variables are positive, use properties of logarithms to write the expression as a sum or difference of logarithms or multiples of logarithms.

22) $\log_{10}(xy)$

23) $\log_5\left(\dfrac{x^7 y^9}{2}\right)$

Use the product, quotient, and power rules of logarithms to rewrite the expression as a single logarithm. Assume that all variables represent positive real numbers.

24) $\log_4 13 - \log_4 a$

25) $5\log x + 4\log y$

Find the exact solution to the equation.

26) $\log_{10}(x - 3) = -1$

27) $9 \ln (x - 5) = 1$

28) $9^{7x} = 81$

29) $100\left(\frac{1}{5}\right)^{x/2} = 4$

Solve the equation.

30) $\log 2x = \log 5 + \log (x - 2)$

31) $\log (4 + x) - \log (x - 3) = \log 4$

32) $\dfrac{1000}{1 + 99e^{-0.3t}} = 250$

Use a calculator to find an approximate solution to the equation.

33) $2^x = 17$

34) $e^{-0.15t} = 0.22$

35) $6\ln(x + 2.8) = 9.6$

Solve the problem.

36) Suppose the amount of a radioactive element remaining in a sample of 100 milligrams after x years can be described by $A(x) = 100e^{-0.01022x}$. How much is remaining after 41 years? Round the answer to the nearest hundredth of a milligram.

37) There are currently 80 million cars in a certain country, increasing by 7.1% annually.

a) Write an exponential function that models the situaiton.

b) How many years will it take for this country to have 94 million cars? Solve algebraically and round to the nearest year.

38) The number of students infected with the flu on a college campus after t days is modeled by the function $P(t) = \dfrac{120}{1 + 19e^{-0.4t}}$. What was the initial number of infected students?

39) The number of students infected with the flu on a college campus after t days is modeled by the function $P(t) = \dfrac{120}{1 + 19e^{-0.4t}}$. What is the maximum number of infected students possible?

40) The number of students infected with the flu on a college campus after t days is modeled by the function $P(t) = \dfrac{120}{1 + 19e^{-0.4t}}$. When will the number of infected students be 100?