

Name Ken

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

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

1) $y = 6^x$

1) yes; initial = 1
base = 6

2) $y = 2^4$

2) No

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

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

3) 25

4) $f(x) = 5^{1-x}$ for $x = 3$

4) $\frac{1}{25}$

5) $f(x) = 2 \cdot 16^x$ for $x = -3/2$

5) $2 \cdot \frac{1}{64} = \frac{1}{32}$

$2 \cdot \frac{1}{\sqrt{16}} = 4^3$

Determine a formula for the exponential function.

6)

x	f(x)
-2	39
-1	13
0	13/3
1	13/9
2	13/27

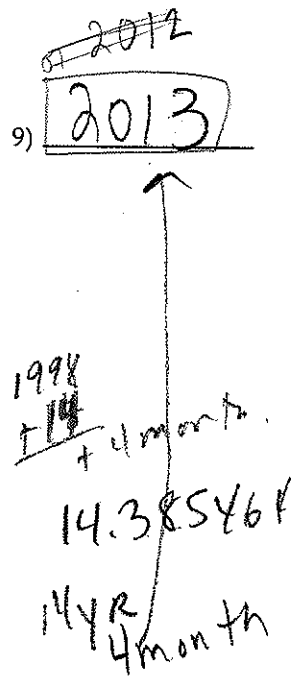
$\times \frac{1}{3}$

6) $f(x) = \frac{13}{3} \left(\frac{1}{3}\right)^x$

OR $f(x) = \frac{13}{3} (3)^{-x}$

Solve the problem.

9) In September 1998 the population of the country of West Goma in millions was modeled by $f(x) = 17.7e^{0.0018x}$. At the same time the population of East Goma in millions was modeled by $g(x) = 13.9e^{0.0186x}$. In both formulas x is the year, where $x = 0$ corresponds to September 1998. Assuming these trends continue, estimate the year when the population of West Goma will equal the population of East Goma.



10) Suppose the amount of a radioactive element remaining in a sample of 100 milligrams after x years can be described by $A(x) = 100e^{-0.01123x}$. How much is remaining after 103 years? Round the answer to the nearest hundredth of a milligram.

10) 31.45 mg

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

7) $f(x) = 0.1^x$

7) decay $\lim_{x \rightarrow \infty} = 0$ $\lim_{x \rightarrow -\infty} = \infty$

8) $f(x) = \left(\frac{1}{2}\right)^{-x} = 2^x$

8) growth $\lim_{x \rightarrow \infty} = \infty$ $\lim_{x \rightarrow -\infty} = 0$

Solve the equation.

11) $25^x = 4^1$

$4^x = 4^1$

11) $x = \frac{1}{4}$

12) $(5/9)^x = \frac{729}{125} \left(\frac{5}{9}\right)^{-3}$

12) $x = -3$

13) $3(10 - 2x) = 81$
 3

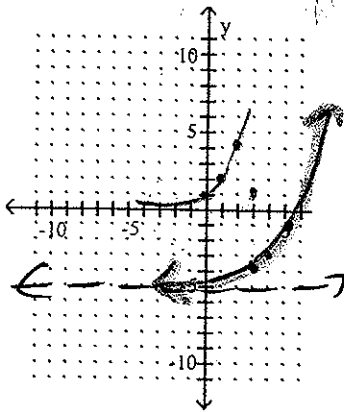
13) $x = 3$

$10 - 2x = 4$
 $-2x = -6$
 $x = 3$

Graph the function. Describe its position relative to the graph of the indicated basic function.

14) $f(x) = 2^{x-3} - 5$; relative to $f(x) = 2^x$

14) down 5 right 3



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

15) $f(x) = 5 \cdot 1.08^x$

15) growth 8%

16) $f(x) = 20,089 \cdot 0.836^x$

16) decay 16.4%

Find the exponential function that satisfies the given conditions.

17) Initial value = 32, increasing at a rate of 11% per year

17) $f(x) = 32(1.11)^x$

18) Initial value = 68, decreasing at a rate of 0.48% per week

18) $f(x) = 68(0.9952)^x$

Evaluate the logarithm.

19) $\log_8(\frac{1}{8})$

19) $x = -1$

20) $\ln \frac{1}{\sqrt{e}}$

20) $x = -\frac{1}{2}$

Simplify the expression.

21) $\log_6 6^2$

21) $x = 2$

22) $10^{\log_{10} 2}$

22) $x = 2$

23) $e^{\ln 20}$

$\ln x = \ln 20$

23) $x = 20$

Determine a formula for the exponential function.

24)

x	f(x)
-2	4
-1	6
0	9
1	13.5
2	20.25

24) $f(x) = 9(\frac{3}{2})^x$

Solve the equation by changing it to exponential form.

25) $\log_3 x = 4$

$3^4 = x$

25) $81 = x$

26) $\log_4 x = \frac{1}{2}$

$4^{\frac{1}{2}} = x$

26) $x = 2$

27) $\log x = -4$

$10^{-4} = x$

27) $x = \frac{1}{10,000}$

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

28) $f(x) = \ln(-x) + 5$; $g(x) = \ln x$

28) reflect over y axis up 5

29) $f(x) = \ln(x+7) - 9$; $g(x) = \ln x$

29) left 7 down 9

Graph the function. Describe its position relative to the graph of the indicated basic function.

30) $f(x) = \ln(x-4)$; relative to $f(x) = \ln x$

30) right 4

