

Name _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the function value.

1) Let $f(x) = 41 - x$. Find $f(3)$.

A) -8

B) 16

C) $\frac{1}{8}$

D) $\frac{1}{16}$

Solve the problem.

2) The population of a small country increases according to the function $B = 1,300,000e^{0.05t}$, where t is measured in years. How many people will the country have after 8 years?

A) 1,191,178

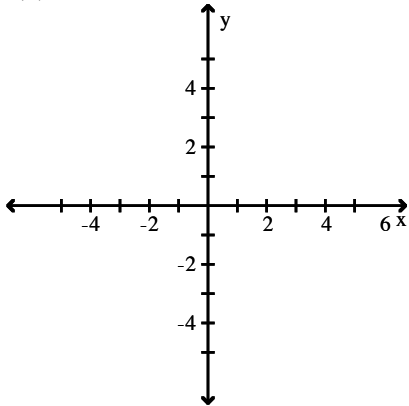
B) 517,322

C) 1,939,372

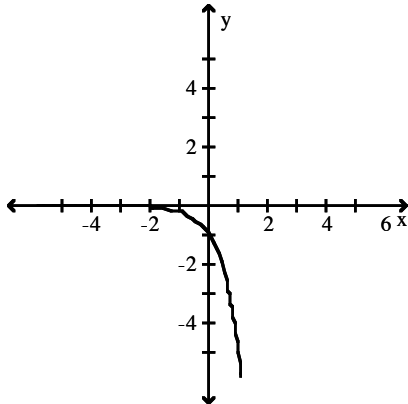
D) 3,265,452

Graph the function.

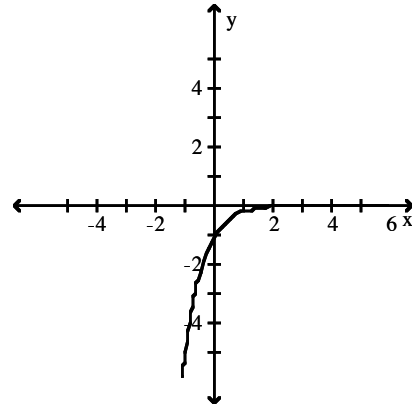
3) $f(x) = 5^{-x}$



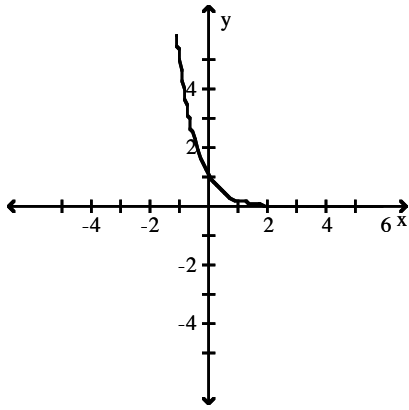
A)



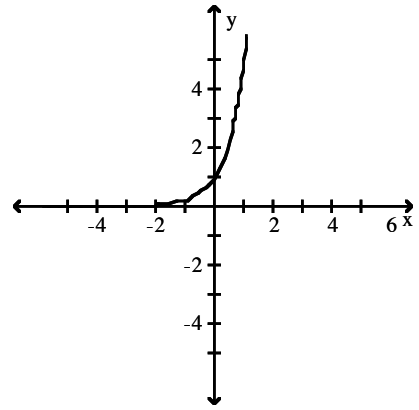
B)



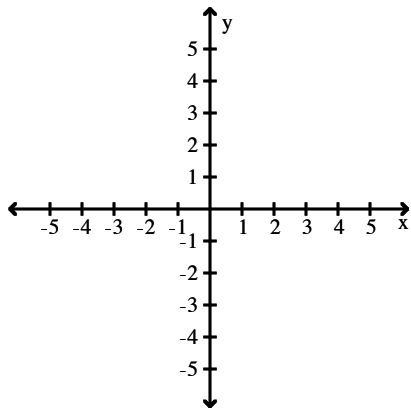
C)



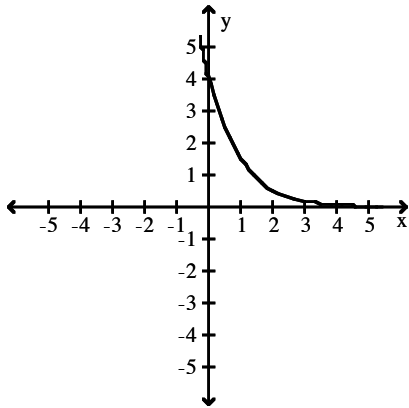
D)



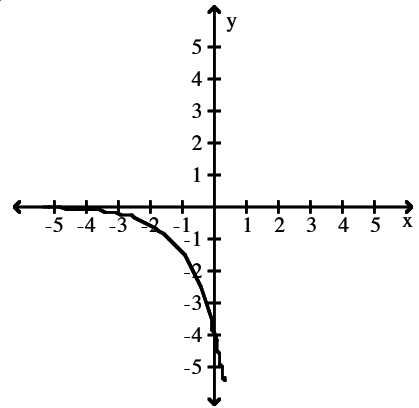
4) $f(x) = 4e^{-x}$



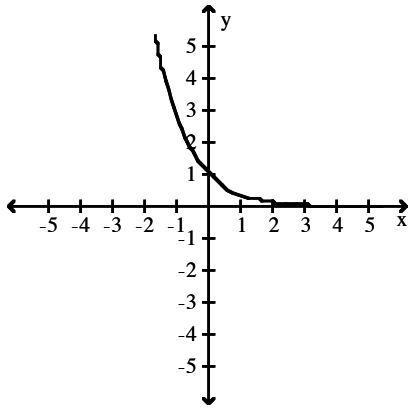
A)



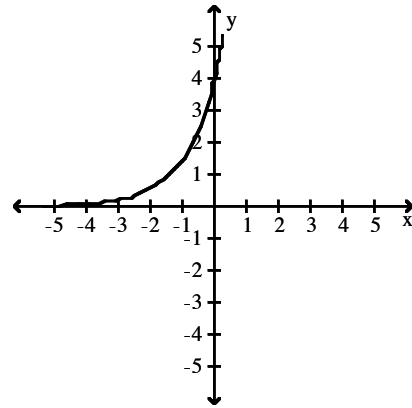
B)



C)



D)

**Solve the problem.**

- 5) A computer is purchased for \$4800. Its value each year is about 78% of the value the preceding year. Its value, in dollars, after t years is given by the exponential function $V(t) = 4800(0.78)^t$. Find the value of the computer after 7 years.

A) \$657.65

B) \$512.97

C) \$26,208.00

D) \$843.15

- 6) The half-life of a certain radioactive substance is 19 years. Suppose that at time $t = 0$, there are 24 g of the substance. Then after t years, the number of grams of the substance remaining will be:

$$N(t) = 24 \left(\frac{1}{2} \right)^{t/19}$$

How many grams of the substance will remain after 171 years?

A) 0.53 g

B) 0.27 g

C) 1.06 g

D) 0.13 g

Find the function value.

- 7) Let $f(x) = e^{3x}$. Find $f(-0.09)$, rounded to four decimal places.

A) 0.7634

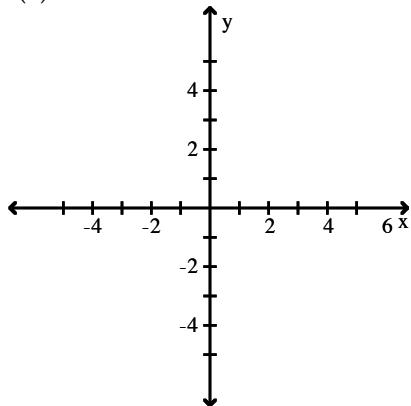
B) -0.8279

C) 0.8279

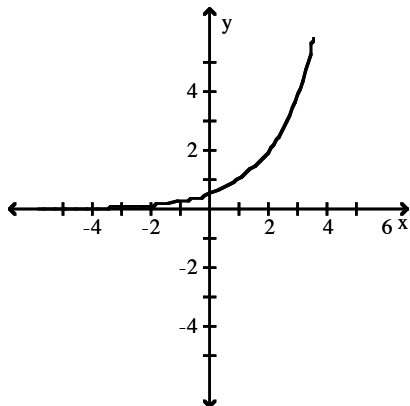
D) -0.7634

Graph the function.

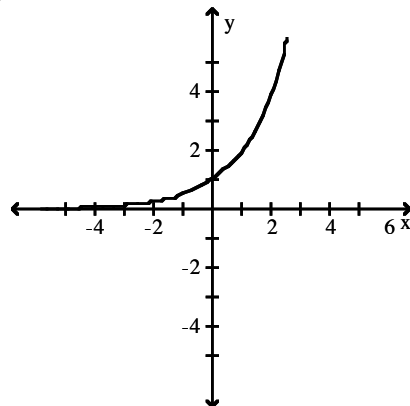
8) $f(x) = 2^{(x-1)}$



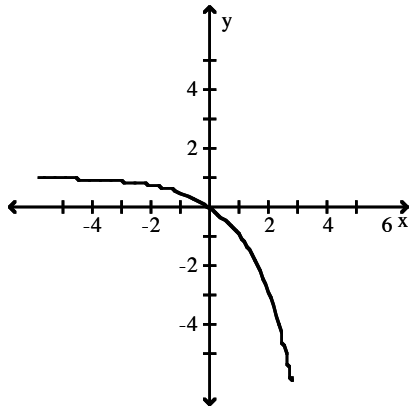
A)



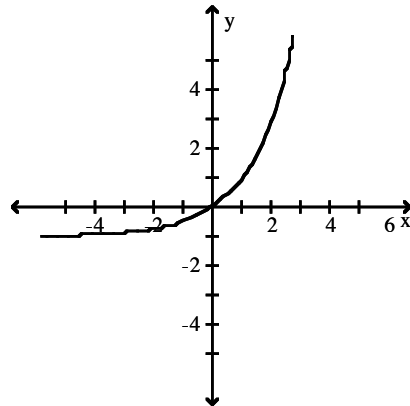
B)



C)



D)



Solve the problem.

9) The growth in the population of a certain rodent at a dump site fits the exponential function

$A(t) = 170e^{0.028t}$, where t is the number of years since 1984. Estimate the population in the year 2000.

A) 175

B) 266

C) 274

D) 133

Evaluate the logarithm, if possible. Round the answer to four decimal places.

10) $\log 245$

A) 2.3892

B) 2.3874

C) 2.3909

D) 5.5013

Solve the problem.

11) The sales of a new product (in items per month) can be approximated by $S(x) = 225 + 500 \log(3t + 1)$, where t represents the number of months after the item first becomes available. Find the number of items sold per month 3 months after the item first becomes available.

- A) 5225 items per month
B) 10,225 items per month
C) 1225 items per month
D) 725 items per month

12) Coyotes are one of the few species of North American animals with an expanding range. The future population of coyotes in a region of Mississippi can be modeled by the equation $P = 41 + 19 \ln(14t + 1)$, where t is time in years. Use the equation to determine when the population will reach 170.

- A) 439,891.5 years
B) 63.5 years
C) 63.7 years
D) 63.4 years

Provide an appropriate response.

13) What is the range of the function $y = \log_4 x$?

- A) $(0, \infty)$
B) $(-\infty, \infty)$
C) $(4, \infty)$
D) $[0, \infty)$

Solve the problem.

14) A certain noise has an intensity I of 8.17×10^{-5} . Given that decibel level L is related to intensity by

$L = 10 \log \left(\frac{I}{I_0} \right)$, where I_0 is 10^{-12} , determine the decibel level of the noise. Round your answer to the nearest decibel.

- A) 182 decibels
B) 79 decibels
C) 69 decibels
D) 8 decibels

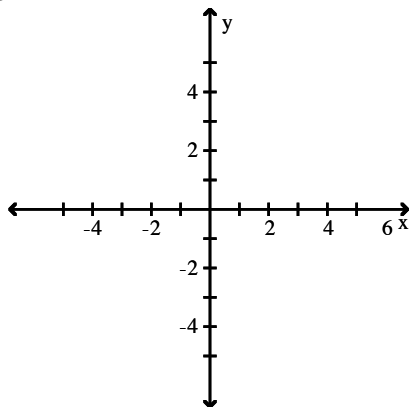
Find the value of the logarithm without using a calculator.

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

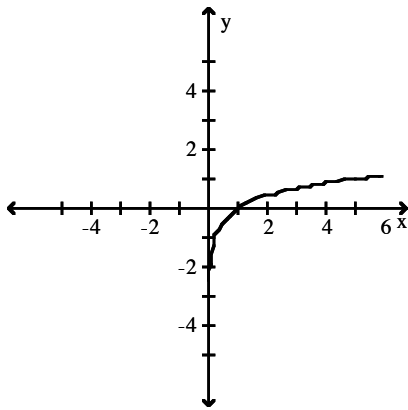
- A) -6
B) 2
C) -2
D) 6

Graph the function.

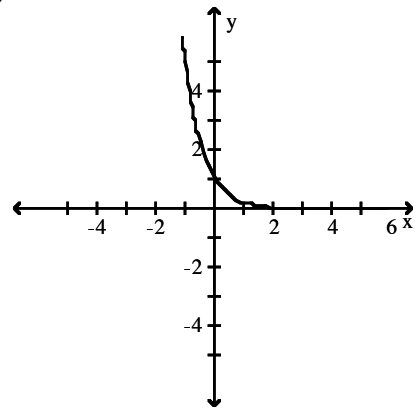
16) $y = \log_5 x$



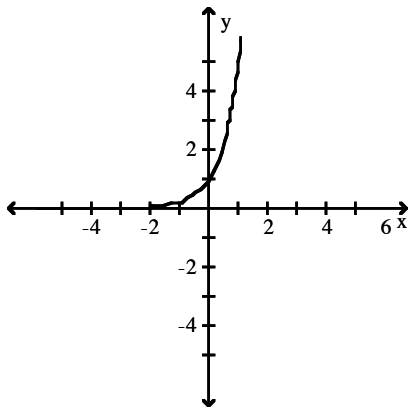
A)



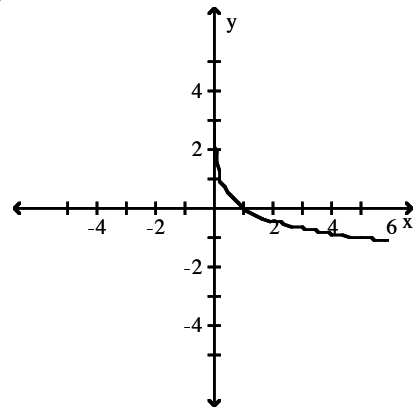
B)



C)



D)



Write the logarithmic equation in exponential form.

17) $y = \log(12x)$

A) $y^{10} = 12x$

B) $10y = 12x$

C) $12x^y = 10$

D) $10^{12x} = y$

Find the value of the logarithm without using a calculator.

18) $\log_3 \sqrt{3}$

A) -2

B) $\frac{1}{2}$

C) $-\frac{1}{2}$

D) 2

Provide an appropriate response.

19) What is the range of the function $y = \left(\frac{1}{4}\right)^x$?

A) $(-\infty, 0)$

B) $[0, \infty)$

C) $(0, \infty)$

D) $(-\infty, \infty)$

Solve the equation.

20) $\log_5 125 = x$

A) 625

B) 3

C) 130

D) 25