Exam

Name_____

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

Find the slope of the line, if it is defined.

1) Through (9, –2) and (7, 4) 1) _____

A) –3 B) 2 C) 6 D) 3

Write an equation in slope–intercept form of a line satisfying the given conditions.

2) $m = -\frac{2}{7}$; $b = \frac{43}{7}$ 2) _____

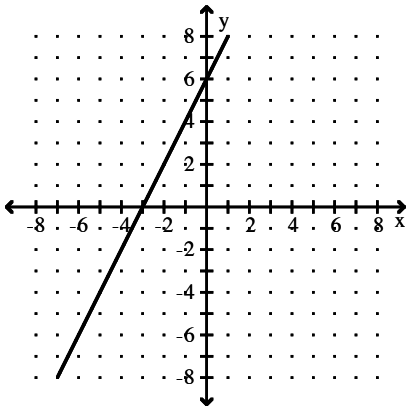
A) $y = \frac{2}{7}x + \frac{43}{7}$ B) $y = -\frac{2}{7}x + \frac{43}{7}$

C) $y = -\frac{2}{7}x - \frac{43}{7}$ D) $y = \frac{2}{7}x - \frac{43}{7}$

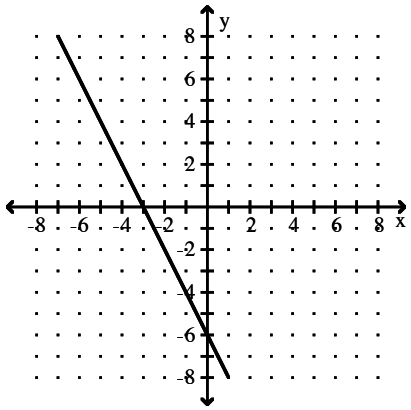
Choose one of the four lines graphed which most closely resembles the graph of the given equation.

3) $y = 2x + 6$ 3) _____

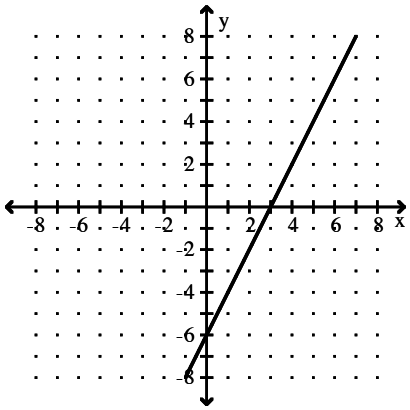
A)



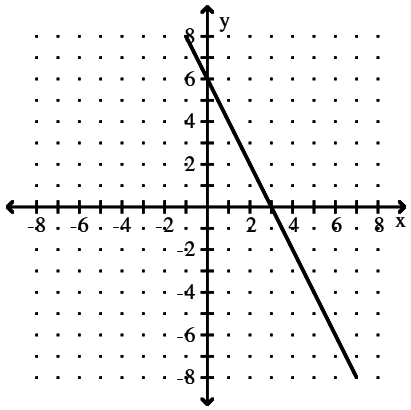
B)



C)



D)



Find the slope and the y–intercept of the line.

4) $3x + 4y = 18$ 4) _____

A) $m = -\frac{4}{3}$; $b = 4$ B) $m = \frac{3}{4}$; $b = 18$

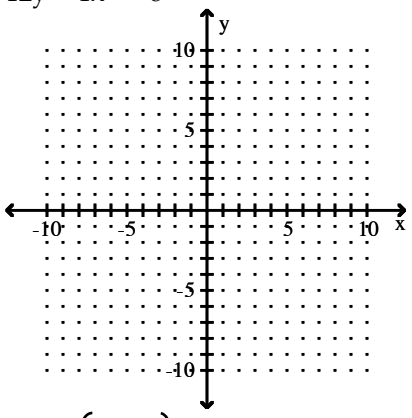
C) $m = \frac{4}{3}$; $b = \frac{9}{2}$ D) $m = -\frac{3}{4}$; $b = \frac{9}{2}$

5) $y = 5x$ 5) _____

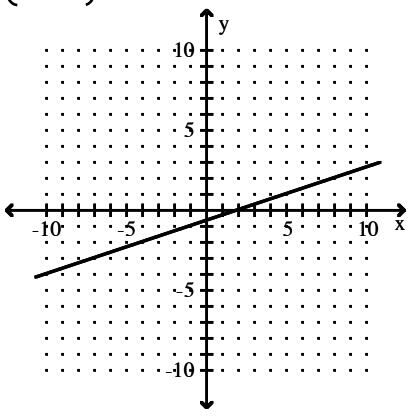
A) $m = \frac{1}{5}$; $b = 5$ B) $m = 5$; $b = 0$ C) $m = 1$; $b = 0$ D) $m = 0$; $b = 5$

Find the x– and y–intercepts for the equation. Then graph the equation.

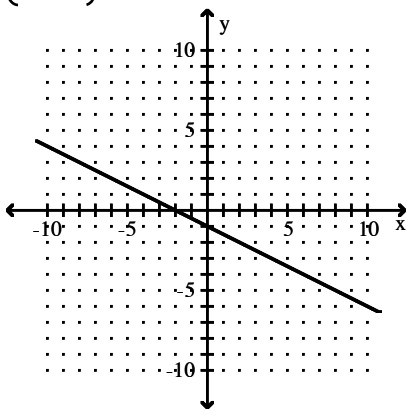
6) $12y - 4x = -8$ 6) _____



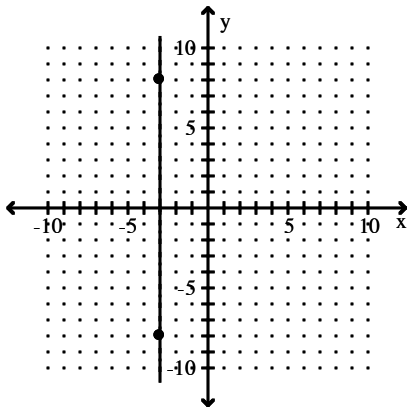
A) $\left(0, -\frac{2}{3}\right)$, (2, 0)



B) $\left(0, -\frac{2}{3}\right)$, (–2, 0)



Identify whether the slope is positive, negative, zero, or undefined.

7) 

7) _____

A) Positive B) Negative C) Zero D) Undefined

Use the given data points to construct a linear model, then use the model to find the appropriate Celsius or Fahrenheit temperature.

8)

Degrees Fahrenheit	32	140	212
Degrees Celsius	0	60	100

8) _____

Choose any two data points and use them to construct a linear equation that models the data, with x being Fahrenheit and y Celsius. Then use the equation to find the Celsius temperature corresponding to 176° Fahrenheit.

A) $y = \frac{9}{5}(x + 32)$; 374° Celsius B) $y = \frac{5}{9}(x + 32)$; 116° Celsius

C) $y = \frac{9}{5}(x - 32)$; 259° Celsius D) $y = \frac{5}{9}(x - 32)$; 80° Celsius

Solve the problem.

9) Use the formula $P = Ie^{kt}$. A bacterial culture has an initial population of 500. If its population grows to 7000 in 4 hours, what will it be at the end of 6 hours? 9) _____

A) 2250 B) 26,192 C) 207,063 D) 105

Find an exponential function of the form $P(t) = y_0e^{kt}$ to model the given data.

10) Under ideal conditions, a population of rabbits has an exponential growth rate of 11.9% per day. Consider an initial population of 500 rabbits. Find the exponential growth function. 10) _____

A) $P(t) = 50e^{0.119t}$ B) $P(t) = 100e^{1.19t}$

C) $P(t) = 500e^{0.119t}$ D) $P(t) = 100e^{11.9t}$

Solve the problem.

11) Suppose the sales of a particular brand of appliance satisfy the relationship $S(x) = 160x + 3100$, where $S(x)$ represents the number of sales in year x, with $x = 0$ corresponding to 1982. Find the number of sales in 1991. 11) _____

A) 4380 B) 9080 C) 8920 D) 4540

12) The number of books in a small library increases according to the function $B = 8400e^{0.04t}$, where t is measured in years. How many books will the library have after 5 years? 12) _____

A) 5871 B) 13,519 C) 13,313 D) 10,260

13) A biologist recorded 6 snakes on 10 acres in one area and 13 snakes on 29 acres in another area. Let y be the number of snakes in x acres. Write an equation for the number of snakes. 13) _____

A) $19y = 7x + 4$ B) $y = x + 4$ C) $19y = 7x + 44$ D) $19y = 7x - 44$

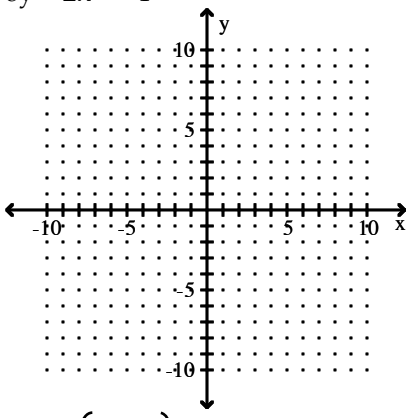
Convert to exponential form.

14) $\log_4 64 = 3$ 14) _____

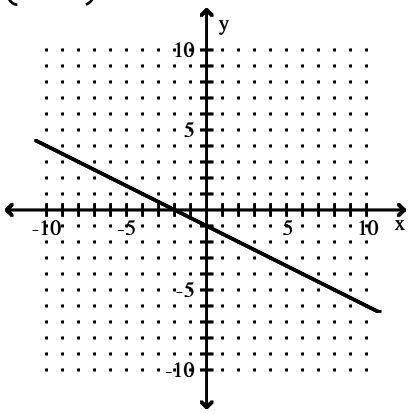
A) $(3)^4 = 64$ B) $(4)^{64} = 3$ C) $(4)^3 = 64$ D) $(64)^3 = 4$

Find the x– and y–intercepts for the equation. Then graph the equation.

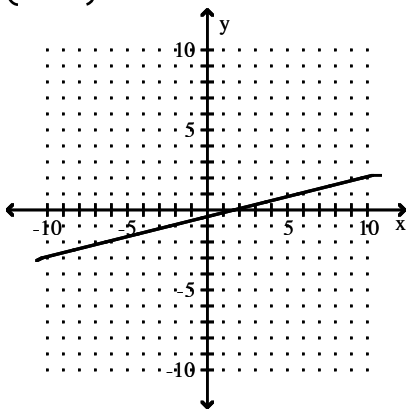
15) $8y - 2x = -4$ 15) _____



A) $\left(0, -\frac{1}{2}\right)$, (–2, 0)



B) $\left(0, -\frac{1}{2}\right)$, (2, 0)



Write in logarithmic form.

16) $7^2 = 49$ 16) _____

A) $2 = \log_{49} 7$ B) $7 = \log_2 49$ C) $49 = \log_7 2$ D) $2 = \log_7 49$

Write the expression as the logarithm of a single number or expression with a coefficient of 1. Assume all variables represent positive numbers.

17) $\log 4 + \log 24 - \log 6$ 17) _____

A) log 36 B) log 23 C) log 11 D) log 16

18) $3 \ln (x + 4) - 2 \ln (x^2 + 7)$ 18) _____

A) $\ln \left(\frac{2(x + 4)}{(x^2 + 7)^3}\right)$ B) $\ln \left(\frac{3(x + 4)}{(x^2 + 7)^2}\right)$ C) $\ln \left(\frac{(x + 4)^2}{(x^2 + 7)^3}\right)$ D) $\ln \left(\frac{(x + 4)^3}{(x^2 + 7)^2}\right)$

Write the expression as a sum and/or a difference of logarithms with all variables to the first degree.

19) $\log 8r^3s^4$ 19) _____

A) $24 \log r + 4 \log s$ B) $\log 24r + \log 4s$

C) $\log 11 + \log r + 4 \log s$ D) $\log 8 + 3 \log r + 4 \log s$

Solve the equation.

20) $\log_3 x = -5$ 20) _____

A) $\frac{1}{125}$ B) $\frac{1}{243}$ C) 243 D) 125

21) $5^x = 11$ 21) _____

A) 1.490 B) 2.200 C) 0.671 D) 0.788

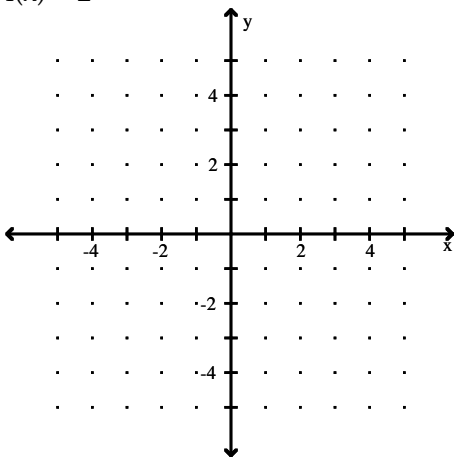
Solve the problem.

22) In the formula $A = Ie^{kt}$, A is the amount of radioactive material remaining from an initial amount I at a given time t and k is a negative constant determined by the nature of the material. An artifact is discovered at a certain site. If it has 53% of the carbon–14 it originally contained, what is the approximate age of the artifact? (carbon–14 decays at the rate of 0.0125% annually.) (Round to the nearest year.) 22) _____

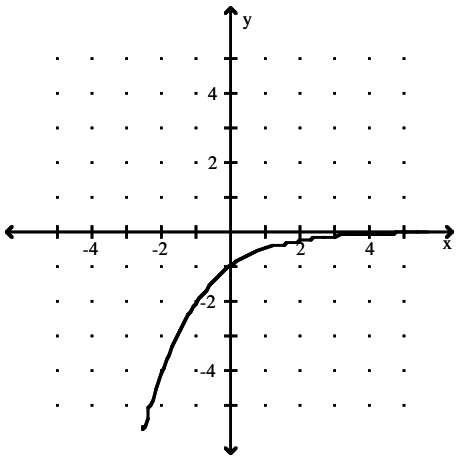
A) 3760 yr B) 4240 yr C) 2206 yr D) 5079 yr

Graph the function.

23) $f(x) = 2^x$ 23) _____



A)



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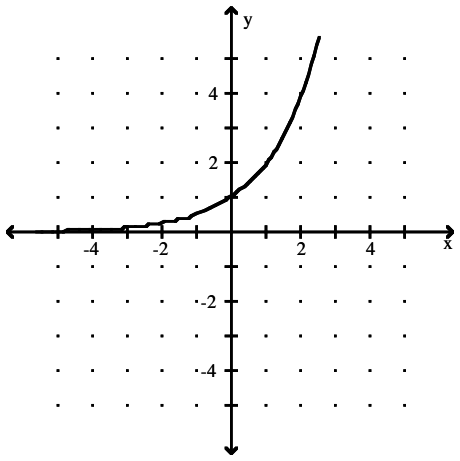
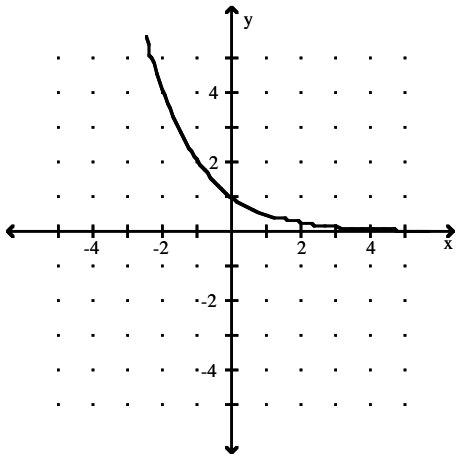


C)



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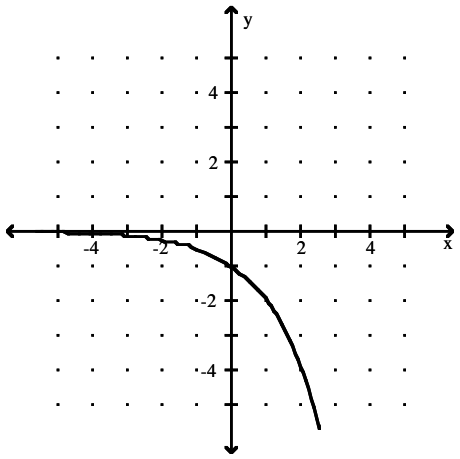
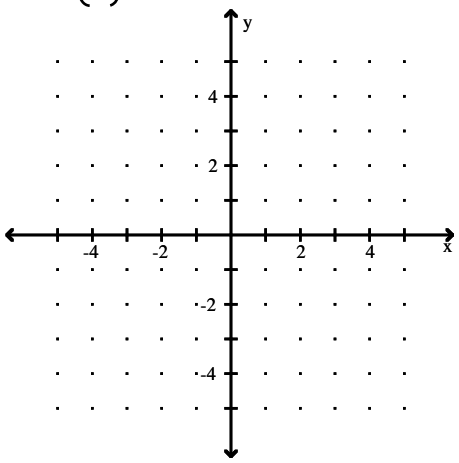
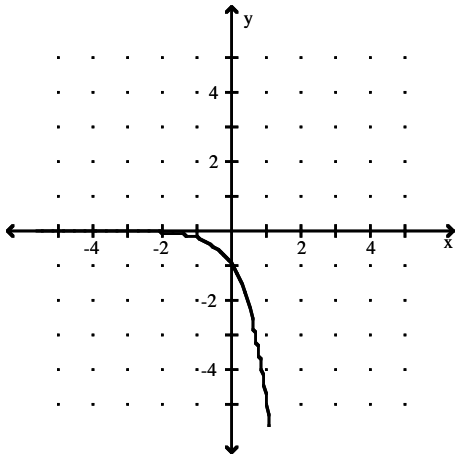


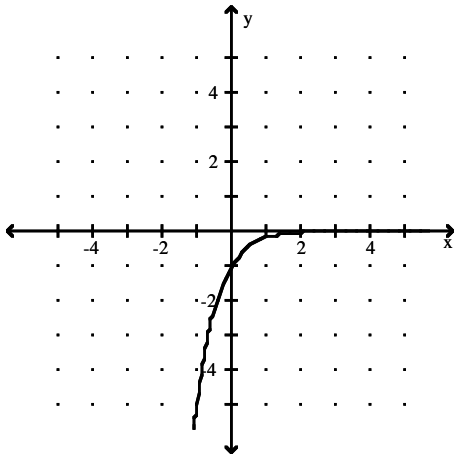
24) $f(x) = \left(\frac{1}{5}\right)^x$ 24) _____



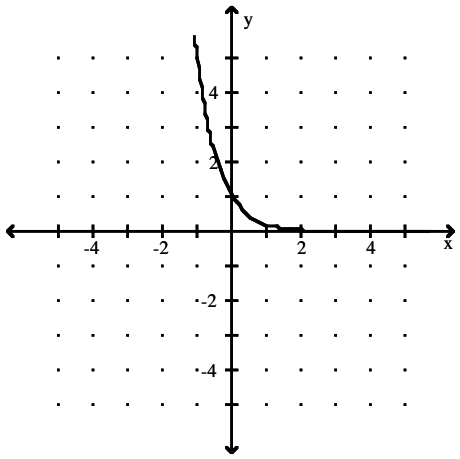
A)



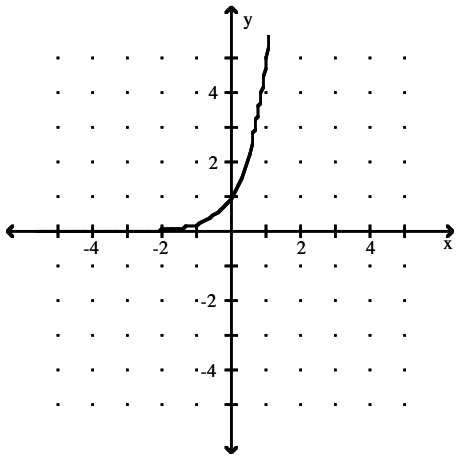
B)



C)



D)



Express the following in terms of u and v, where u = ln x and v = ln y. For example, ln x^3 = 3(ln x) = 3u.

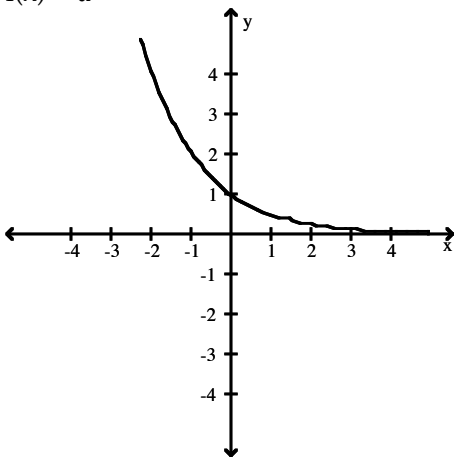
25) ln $\left(\frac{y^5}{x^9}\right)$ 25) _____

A) $\frac{v^5}{u^9}$ B) $\frac{5\,v}{9\,u}$ C) 5 u – 9 v D) 5 v – 9 u

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

Provide an appropriate response.

26) $f(x) = a^x$ 26) _____



The graph of an exponential function with base a is given. Sketch the graph of $h(x) = a^{-x}$. Give the domain and range of h.