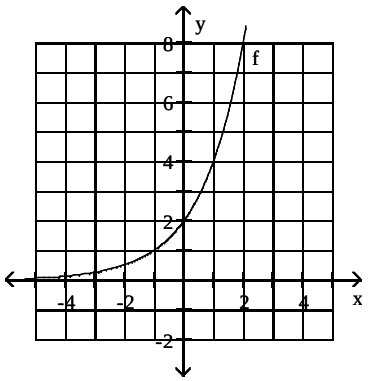
Math 102
Quiz 5 Preparation Ch.4.1 to 4.3 v02
NO BOOK/ NO NOTES/YES CALCUATOR
Dressler Fall 2016

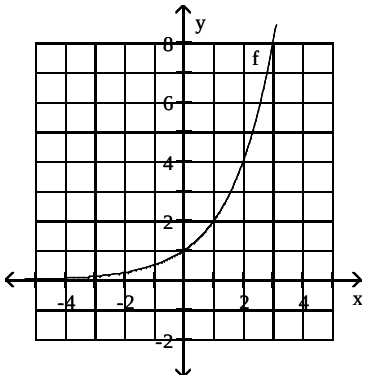
Name_____

Use the graph to find the requested value.

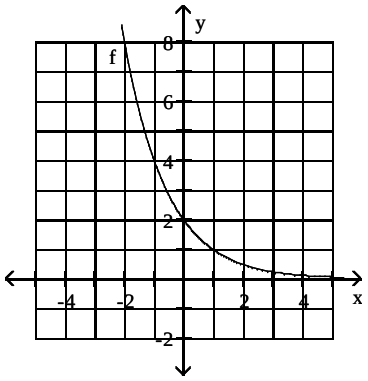
1) Find f(1). 1) _____



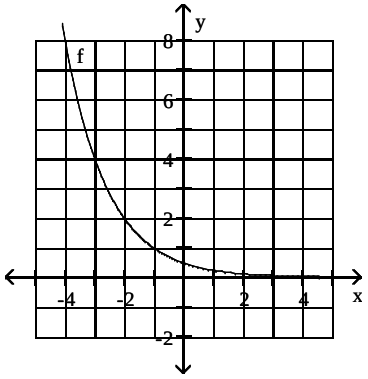
2) Find f(1). 2) _____



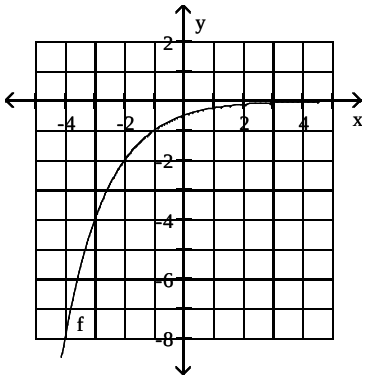
3) Find f(0). 3) _____



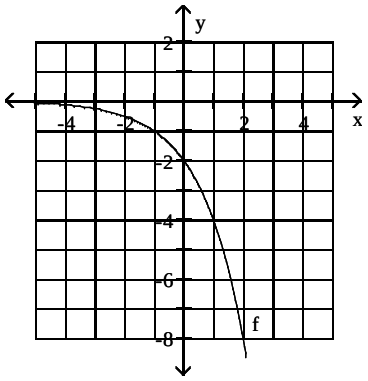
4) Find f(-1). 4) _____



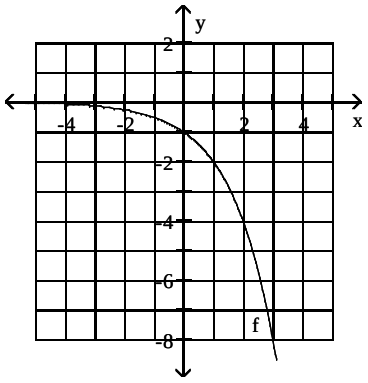
5) Find f(-3). 5) _____



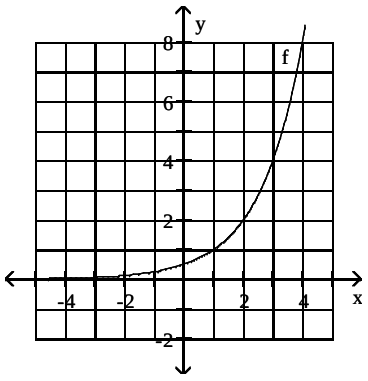
6) Find x where f(x) = -4. 6) _____



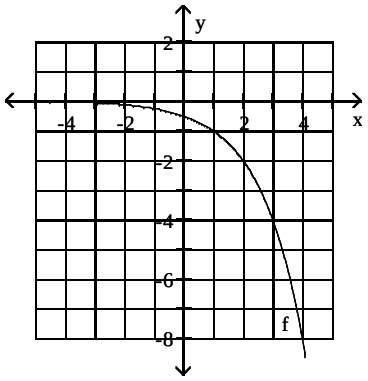
7) Find x where f(x) = -2. 7) _____



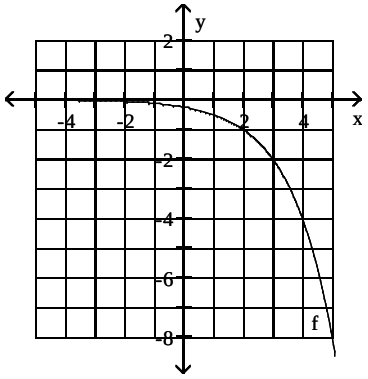
8) Find x where f(x) = 4. 8) _____



9) Find x when f(x) = -2. 9) _____

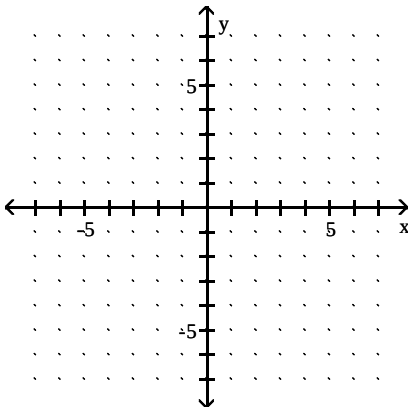


10) Find x when f(x) = -4. 10) _____



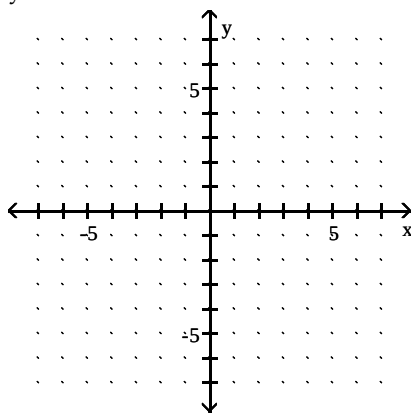
Sketch the graph of the given function.

11) $y = 4^x$ 11) _____



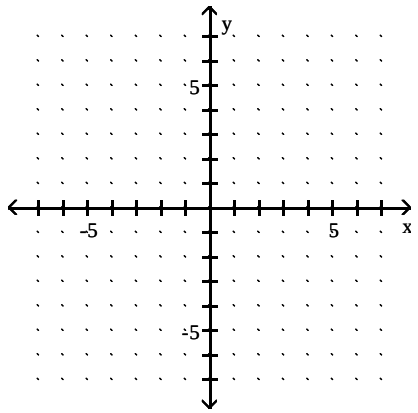
12) $y = 3^x$

12) _____



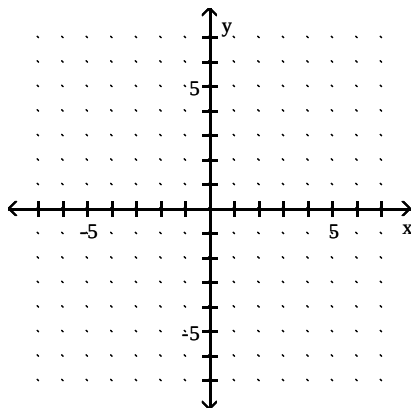
13) $y = (\frac{1}{2})^x$

13) _____



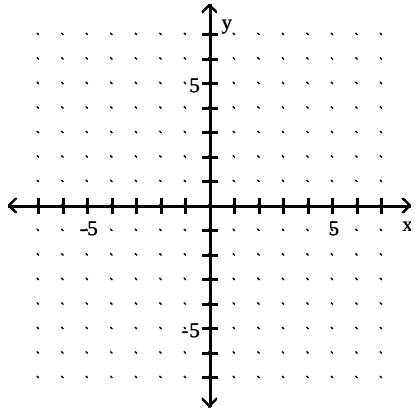
14) $y = (\frac{1}{3})^x$

14) _____



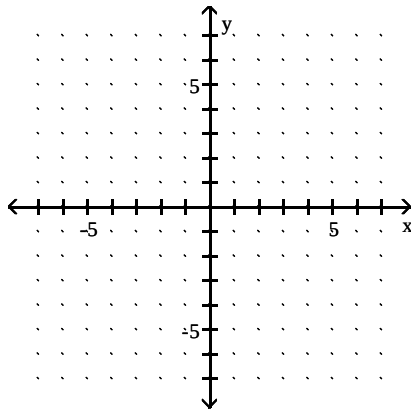
15) $y = (\frac{5}{2})^x$

15) _____

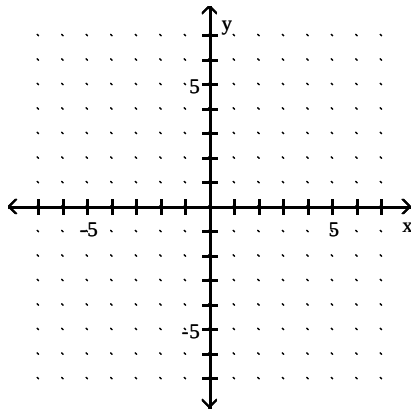


16) $y = (\frac{3}{5})^x$

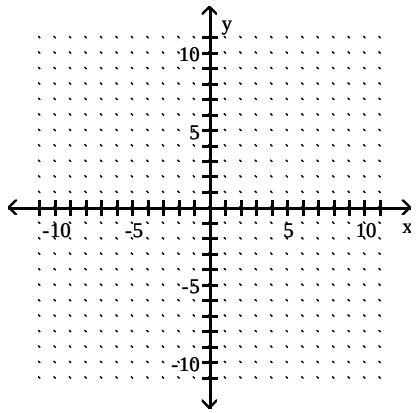
16) _____



17) $f(x) = 4(3)^x$ 17) _____

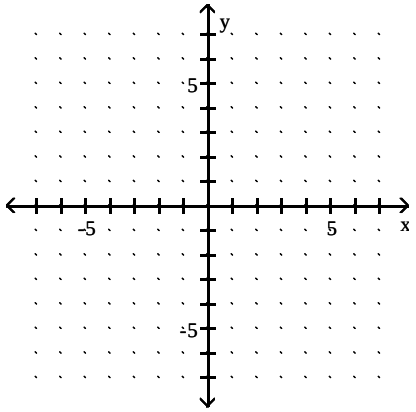


18) $f(x) = 12(\frac{2}{3})^x$ 18) _____

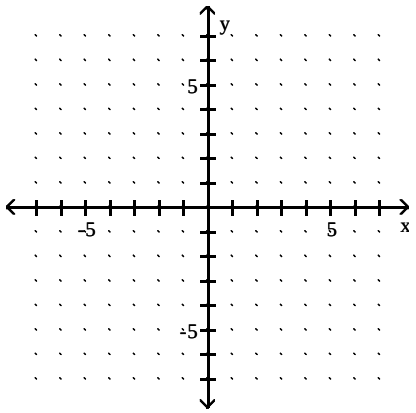


Sketch the graph of both functions on the same coordinate system.

19) $f(x) = 4(\frac{1}{5})^x$, $g(x) = -4(\frac{1}{5})^x$ 19) _____

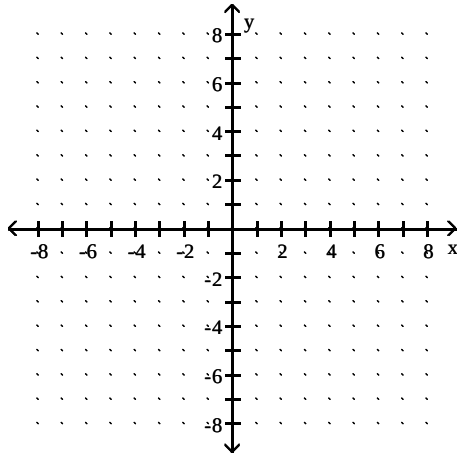


20) $f(x) = 3(\frac{1}{5})^x$, $g(x) = -3(\frac{1}{5})^x$ 20) _____

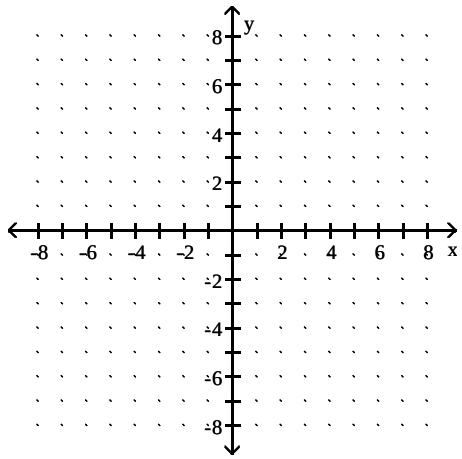


Graph the function by hand. Then use a graphing calculator to verify your graph. Find the domain and range of the function.

21) $f(x) = 3(9)^x$ 21) _____

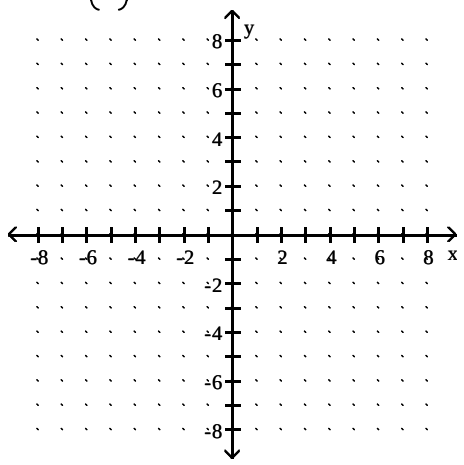


22) $f(x) = 5(9)^x$ 22) _____



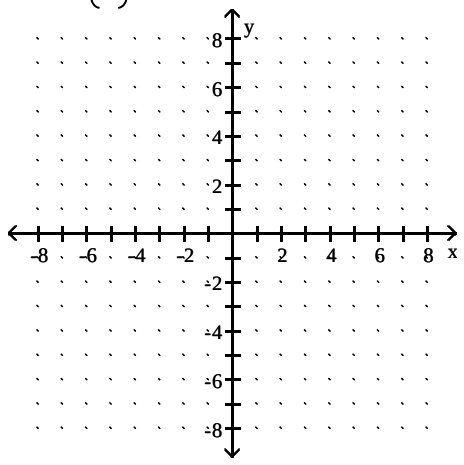
23) $f(x) = 9\left(\frac{1}{6}\right)^x$

23) _____



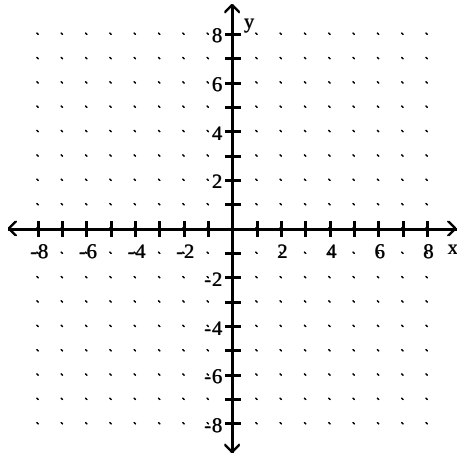
24) $f(x) = 7\left(\frac{1}{4}\right)^x$

24) _____



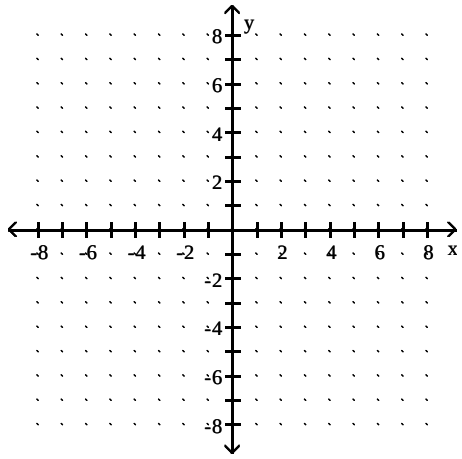
25) $f(x) = -6(5)^x$

25) _____



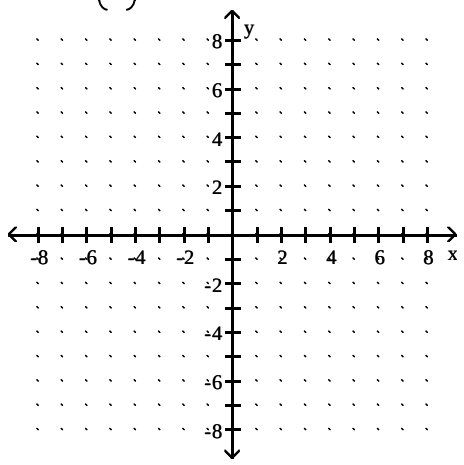
26) $f(x) = -4(6)^x$

26) _____



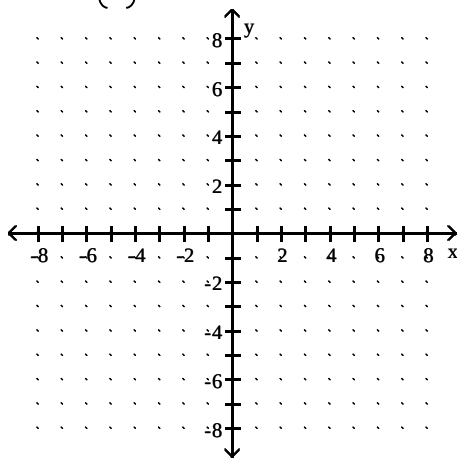
27) $f(x) = -4\left(\frac{1}{9}\right)^x$

27) _____

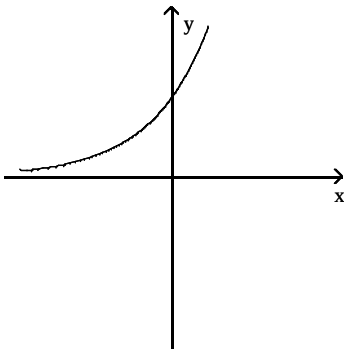


28) $f(x) = -6\left(\frac{1}{7}\right)^x$

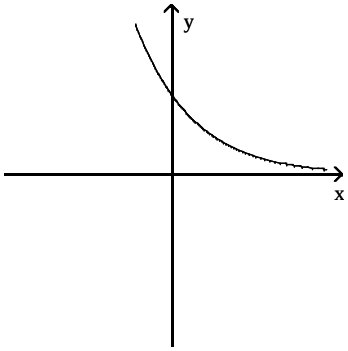
28) _____



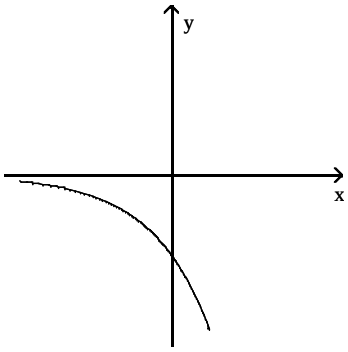
A graph of a function of the form $y = ab^x$ is given. What can you conclude about the constants a and b?

29) 

29) _____

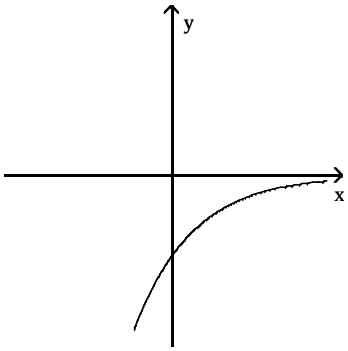
30) 

30) _____

31) 

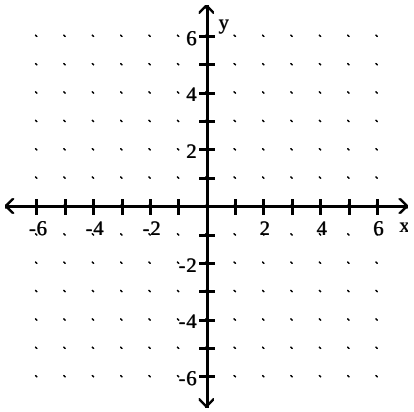
31) _____

32) 32) _____

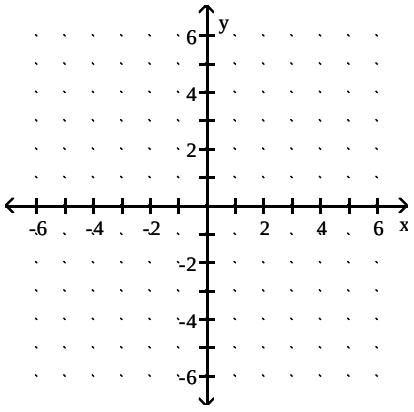


Graph the function.

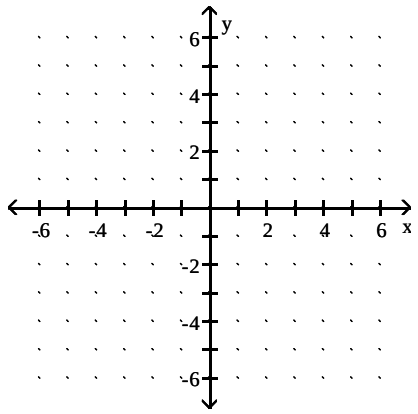
33) Use the graph of $f(x) = 3^x$ to obtain the graph of $g(x) = 3^{(x - 3)}$. 33) _____



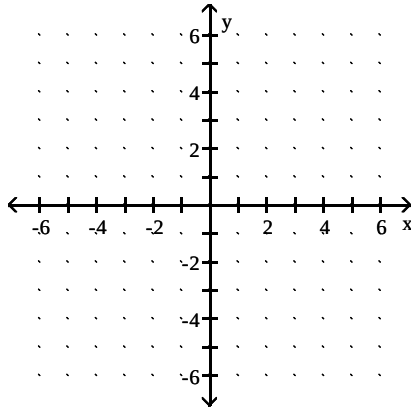
34) Use the graph of $f(x) = 5^x$ to obtain the graph of $g(x) = 5^{(x - 4)}$. 34) _____



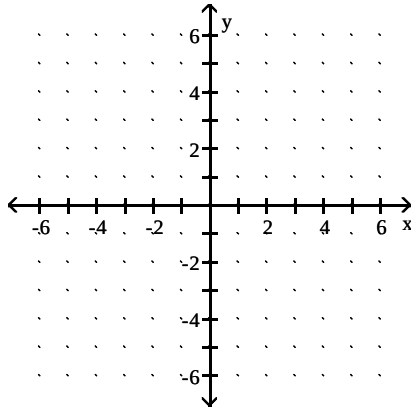
35) Use the graph of $f(x) = 5^x$ to obtain the graph of $g(x) = 5^x + 1$. 35) _____



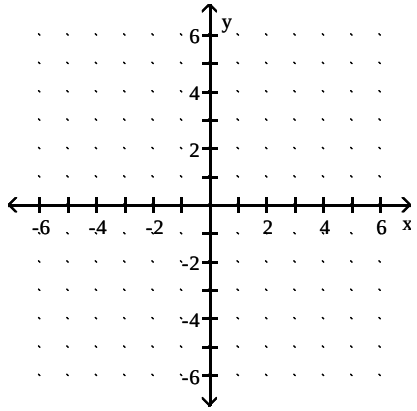
36) Use the graph of $f(x) = 4^x$ to obtain the graph of $g(x) = 4^{(x-2)} - 2$. 36) _____



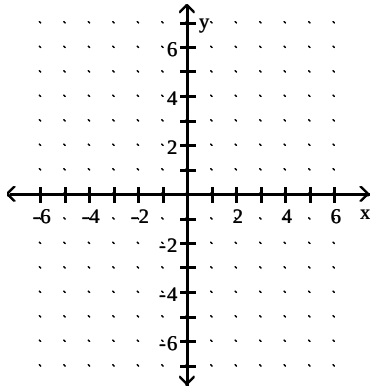
37) Use the graph of $f(x) = 2^x$ to obtain the graph of $g(x) = 2^{-x}$. 37) _____



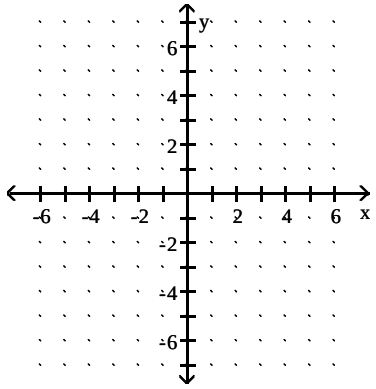
38) Use the graph of $f(x) = 5^x$ to obtain the graph of $g(x) = -5^x$. 38) _____



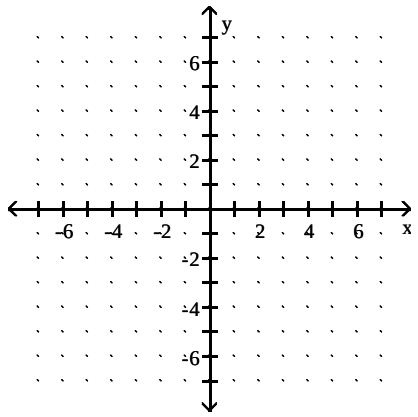
39) Use the graph of $f(x) = 4^x$ to obtain the graph of $g(x) = \frac{1}{4} \cdot 4^x$. 39) _____



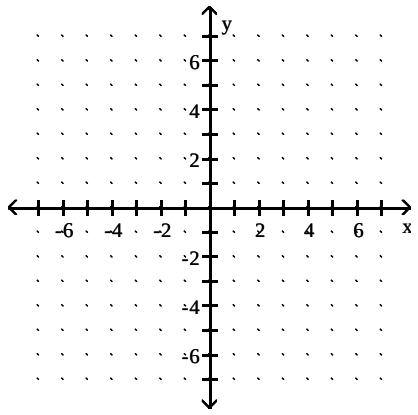
40) Use the graph of $f(x) = 3^x$ to obtain the graph of $g(x) = 3 \cdot 3^x$. 40) _____



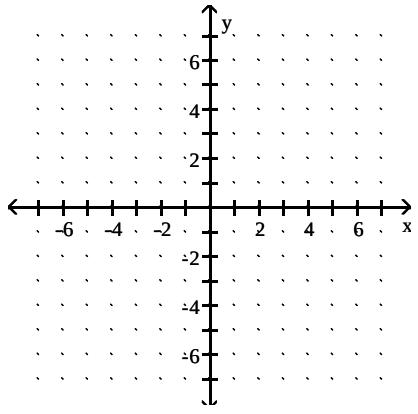
41) Use the graph of $f(x) = e^x$ to obtain the graph of $g(x) = e^{2x}$. 41) _____



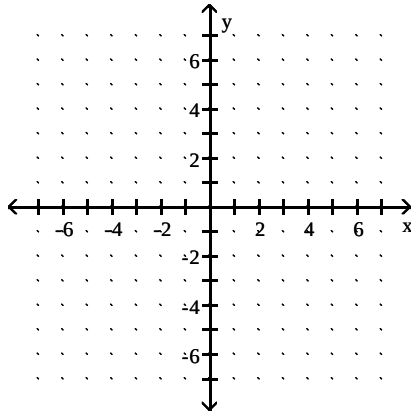
42) Use the graph of $f(x) = e^x$ to obtain the graph of $g(x) = e^{(x-1)}$. 42) _____



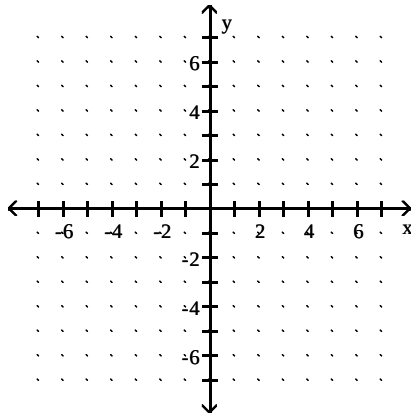
43) Use the graph of $f(x) = e^x$ to obtain the graph of $g(x) = 5e^x$. 43) _____



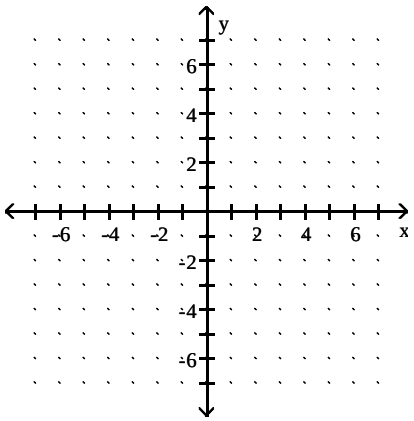
44) Use the graph of $f(x) = e^x$ to obtain the graph of $g(x) = e^x + 4$. 44) _____



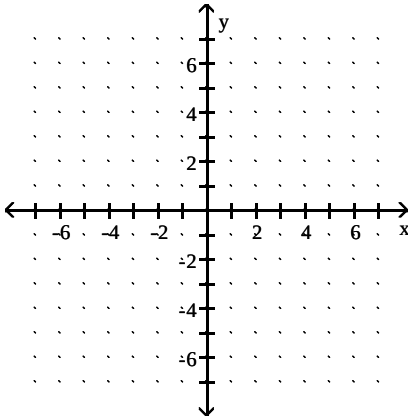
45) Use the graph of $f(x) = e^x$ to obtain the graph of $g(x) = e^{(x + 3)} + 2$. 45) _____



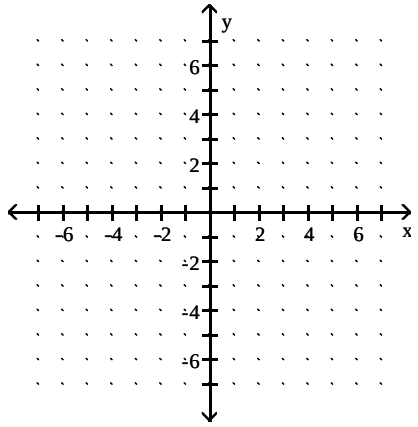
46) Use the graph of $f(x) = e^x$ to obtain the graph of $g(x) = e^{-x}$. 46) _____



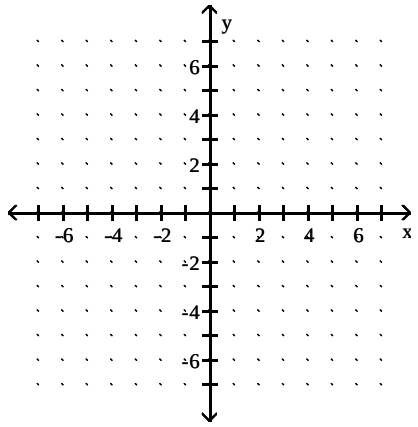
47) Use the graph of $f(x) = e^x$ to obtain the graph of $g(x) = -e^x$. 47) _____



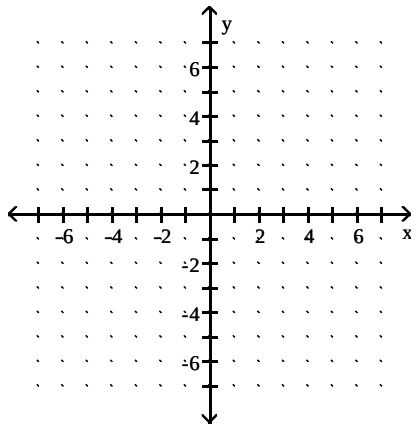
48) Use the graph of $f(x) = e^x$ to obtain the graph of $g(x) = \frac{1}{4}e^x$. 48) _____



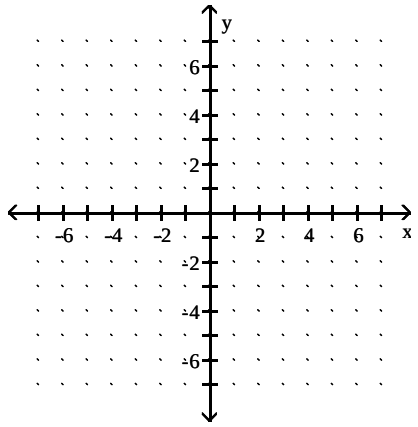
49) Use the graph of $f(x) = e^x$ to obtain the graph of $g(x) = \frac{1}{2}e^x$. 49) _____



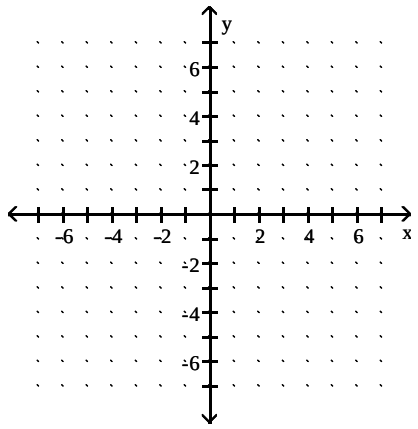
50) Use the graph of $f(x) = e^x$ to obtain the graph of $g(x) = e^{(x/4)} + 2$. 50) _____



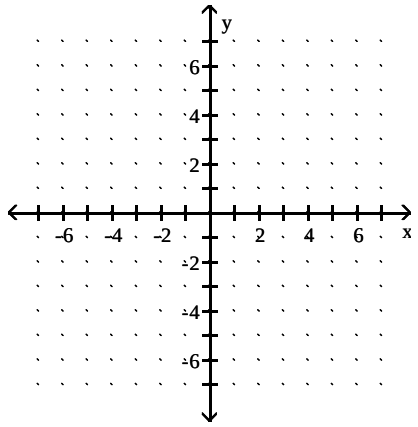
51) Use the graph of $f(x) = e^x$ to obtain the graph of $g(x) = e^{(x/3)} + 3$. 51) _____



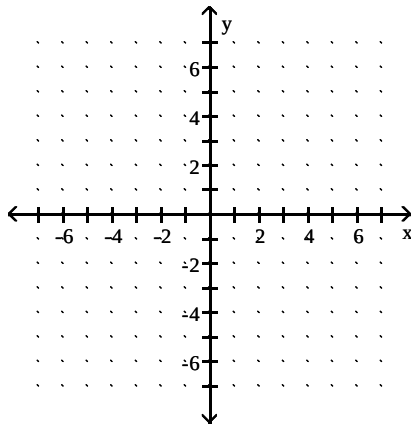
52) Use the graph of $f(x) = e^x$ to obtain the graph of $g(x) = e^{x/4} - 4$. 52) _____



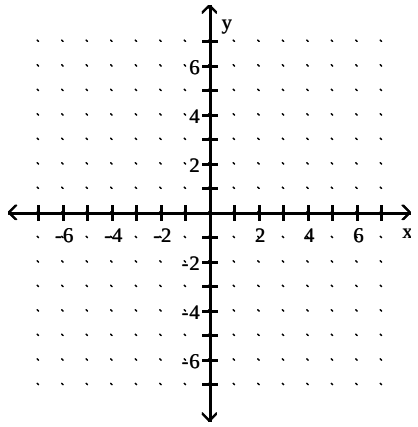
53) Use the graph of $f(x) = e^x$ to obtain the graph of $g(x) = e^{x/4} - 2$. 53) _____



54) Use the graph of $f(x) = e^x$ to obtain the graph of $g(x) = e^{x/2} - 4$. 54) _____



55) Use the graph of $f(x) = e^x$ to obtain the graph of $g(x) = e^{x/3} + 3$. 55) _____



Solve the problem.

56) The rabbit population in a forest area grows at the rate of 5% monthly. If there are 220 rabbits in April, find how many rabbits (rounded to the nearest whole number) should be expected by next April. Use $y = 220(2.7)^{0.05t}$. 56) _____

57) The function $f(x) = 800(0.5)^{x/90}$ models the amount in pounds of a particular radioactive material stored in a concrete vault, where x is the number of years since the material was put into the vault. Find the amount of radioactive material in the vault after 160 years. Round to the nearest whole number. 57) _____

58) A city is growing at the rate of 0.6% annually. If there were 2,913,000 residents in the city in 1994, find how many (to the nearest ten–thousand) are living in that city in 2000. Use $y = 2{,}913{,}000(2.7)^{0.006t}$. 58) _____

59) The formula $S = A\left(\frac{(1 + r)^{t + 1} - 1}{r}\right)$ models the value of a retirement account, where A = the number of dollars added to the retirement account each year, r = the annual interest rate, and S = the value of the retirement account after t years. If the interest rate is 7%, how much will the account be worth after 40 years if $600 is added each year? Round to the nearest whole number. 59) _____

Approximate the number using a calculator. Round your answer to three decimal places.

60) $e^{2.6}$ 60) _____

61) $e^{-2.1}$ 61) _____

62) $e^{3.8}$ 62) _____

63) $e^{-1.2}$ 63) _____

Solve the problem.

64) The size of the coyote population at a national park increases at the rate of 5.1% per year. If the size of the current population is 132, find how many coyotes there should be in 7 years. Use the function $f(x) = 132e^{0.051t}$ and round to the nearest whole number. 64) _____

65) The population in a particular country is growing at the rate of 2.3% per year. If 10,184,000 people lived there in 1999, how many will there be in the year 2005? Use $f(x) = y_0e^{0.023t}$ and round to the nearest ten–thousand. 65) _____

66) The function $D(h) = 6e^{-0.4h}$ can be used to determine the milligrams D of a certain drug in a patient's bloodstream h hours after the drug has been given. How many milligrams (to two decimals) will be present after 8 hours? 66) _____

67) A sample of 800 g of lead–210 decays to polonium–210 according to the function given by $A(t) = 800e^{-0.032t}$, where t is time in years. What is the amount of the sample after 10 years (to the nearest g)? 67) _____

Use the compound interest formulas $A = P\left(1 + \frac{r}{n}\right)^{nt}$ and $A = Pe^{rt}$ to solve.

68) Find the accumulated value of an investment of $15,000 at 6% compounded annually for 20 years. 68) _____

69) Find the accumulated value of an investment of $16,000 at 3% compounded annually for 17 years. 69) _____

70) Find the accumulated value of an investment of $14,000 at 10% compounded semiannually for 10 years. 70) _____

71) Find the accumulated value of an investment of $14,000 at 5% compounded semiannually for 11 years. 71) _____

72) Find the accumulated value of an investment of $600 at 8% compounded quarterly for 4 years. 72) _____

73) Find the accumulated value of an investment of $1000 at 12% compounded quarterly for 2 years. 73) _____

74) Find the accumulated value of an investment of $880 at 3% compounded annually for 12 years. 74) _____

75) Find the accumulated value of an investment of $1650 at 6% compounded annually for 19 years. 75) _____

76) Find the accumulated value of an investment of $5000 at 7% compounded continuously for 6 years. 76) _____

77) Find the accumulated value of an investment of $8000 at 7% compounded continuously for 3 years. 77) _____

78) Find the accumulated value of an investment of $5000 at 5% compounded monthly for 8 years. 78) _____

79) Suppose that you have $11,000 to invest. Which investment yields the greater return over 6 years: 7.5% compounded continuously or 7.6% compounded semiannually? 79) _____

80) Suppose that you have $3000 to invest. Which investment yields the greater return over 9 years: 6.25% compounded continuously or 6.3% compounded semiannually? 80) _____

81) Suppose that you have $6000 to invest. Which investment yields the greater return over 5 years: 5.4% compounded monthly or 5.5% compounded quarterly? 81) _____

82) Suppose that you have $6000 to invest. Which investment yields the greater return over 7 years: 7.2% compounded monthly or 7.3% compounded quarterly? 82) _____

Write the equation in its equivalent exponential form.

83) $\log_5 25 = 2$ 83) _____

84) $\log_3 9 = 2$ 84) _____

85) $\log_4 64 = 3$ 85) _____

86) $\log_4 x = 2$ 86) _____

87) $\log_5 x = 3$ 87) _____

88) $\log_b 243 = 5$ 88) _____

89) $\log_b 25 = 2$ 89) _____

90) $\log_b 4 = 2$ 90) _____

91) $\log_4 64 = x$ 91) _____

92) $\log_8 64 = x$ 92) _____

Write the equation in its equivalent logarithmic form.

93) $4^2 = 16$ 93) _____

94) $3^2 = 9$ 94) _____

95) $5^{-2} = \frac{1}{25}$ 95) _____

96) $2^{-3} = \frac{1}{8}$ 96) _____

97) $4^2 = x$ 97) _____

98) $3^2 = x$ 98) _____

99) $\sqrt[3]{216} = 6$ 99) _____

100) $\sqrt[3]{64} = 4$ 100) _____

101) $15^3 = y$ 101) _____

102) $12^3 = y$ 102) _____

103) $a^4 = 38{,}416$ 103) _____

104) $c^3 = 64$ 104) _____

105) $13^x = 169$ 105) _____

106) $8^x = 512$ 106) _____

Evaluate the expression without using a calculator.

107) $\log_4 16$ 107) _____

108) $\log_4 64$ 108) _____

109) $\log_2 4$ 109) _____

110) $\log_{10} 100$ 110) _____

111) $\log_{10} 1000$ 111) _____

112) $\log_{10} 10{,}000$ 112) _____

113) $\log_8 512$ 113) _____

114) $\log_7 343$ 114) _____

115) $\log_8 64$ 115) _____

116) $\log_{11} \sqrt{11}$ 116) _____

117) $\log_5 \sqrt{5}$ 117) _____

118) $\log_{12} \sqrt{12}$ 118) _____

119) $\log_2 \frac{1}{8}$ 119) _____

120) $\log_5 \frac{1}{125}$ 120) _____

121) $\log_4 \frac{1}{16}$ 121) _____

122) $\log_4 2$ 122) _____

123) $\log_{27} 3$ 123) _____

124) $\log_{16} 4$ 124) _____

125) $\log_4 \frac{1}{4}$ 125) _____

126) $\log_5 \frac{1}{5}$ 126) _____

127) $\log_2 \frac{1}{2}$ 127) _____

128) $\log_4 \frac{1}{\sqrt{4}}$ 128) _____

129) $\log_{10} \frac{1}{\sqrt{10}}$ 129) _____

130) $\log_3 \frac{1}{\sqrt{3}}$ 130) _____

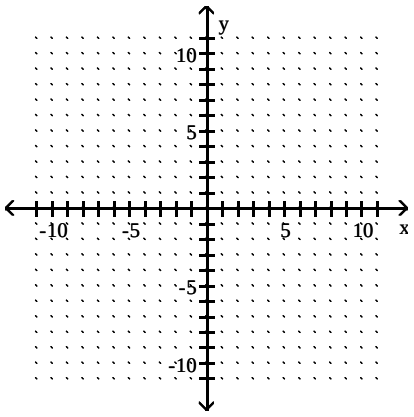
131) $\log_9 3$ 131) _____

132) $\log_8 \frac{1}{8}$ 132) _____

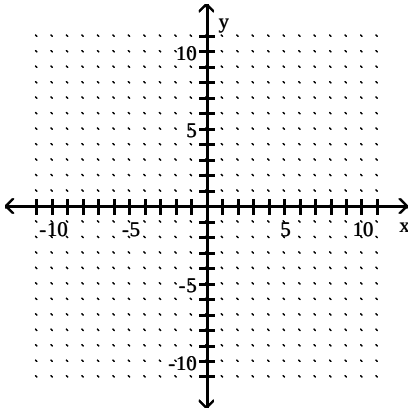
133) $\log_8 \frac{1}{\sqrt{8}}$ 133) _____

Graph the function.

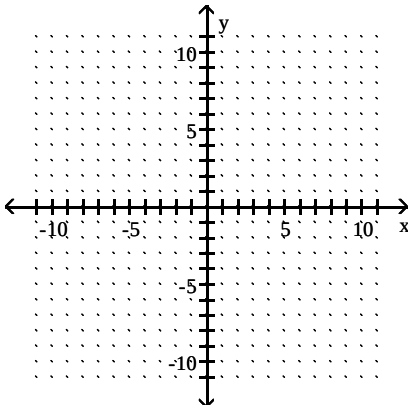
134) Use the graph of $\log_2 x$ to obtain the graph of $f(x) = \log_2 (x + 2)$. 134) _____



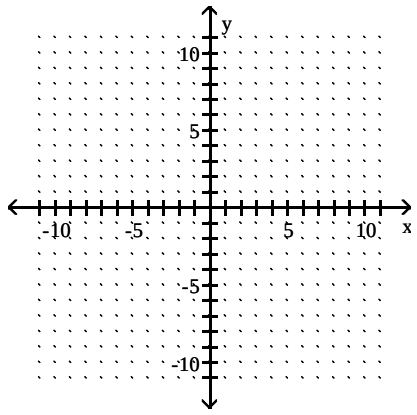
135) Use the graph of $\log_3 x$ to obtain the graph of $f(x) = \log_3 (x - 1)$. 135) _____



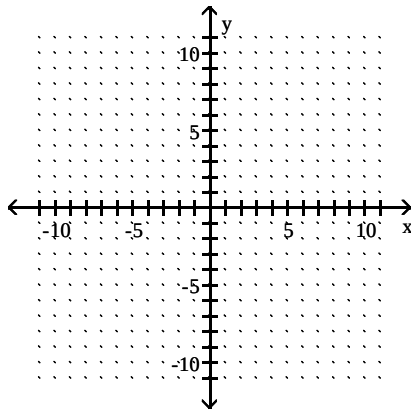
136) Use the graph of $\log_5 x$ to obtain the graph of $f(x) = -2 + \log_5 x$. 136) _____



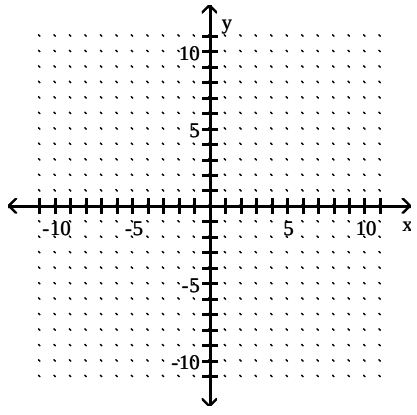
137) Use the graph of $\log_5 x$ to obtain the graph of $f(x) = 2 + \log_5 x$. 137) _____



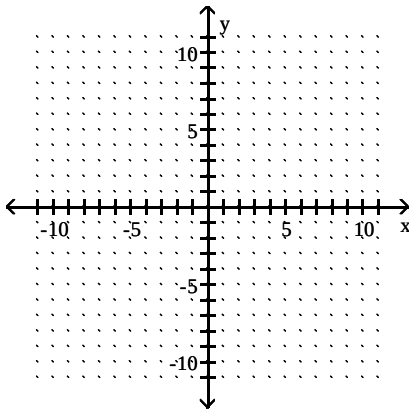
138) Use the graph of $\log_2 x$ to obtain the graph of $f(x) = -2 \log_2 x$. 138) _____



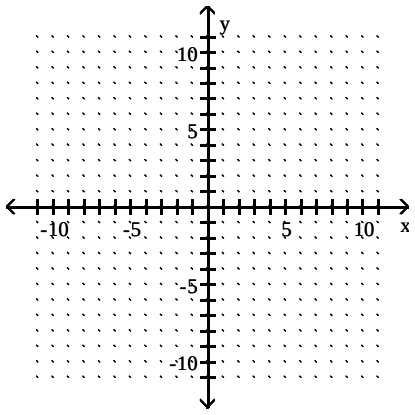
139) Use the graph of $\log_5 x$ to obtain the graph of $f(x) = 2 \log_5 x$. 139) _____



140) Use the graph of $\log_3 x$ to obtain the graph of $f(x) = -\frac{1}{3}\log_3 x$. 140) _____

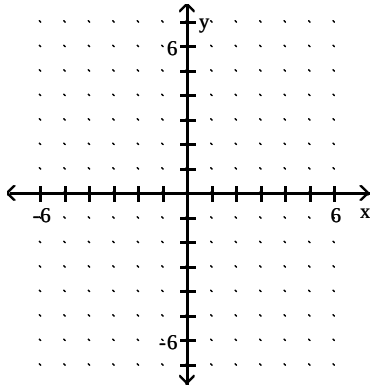


141) Use the graph of $\log_2 x$ to obtain the graph of $f(x) = -\frac{1}{2}\log_2 x$. 141) _____

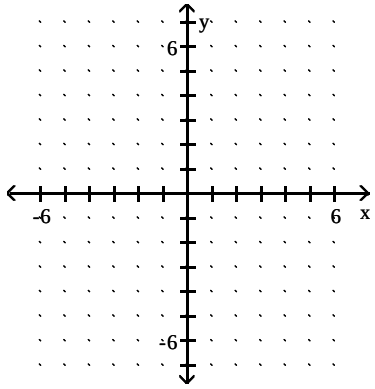


Graph the functions in the same rectangular coordinate system.

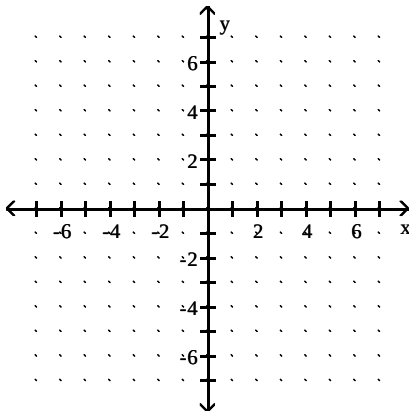
142) $f(x) = 5^x$ and $g(x) = \log_5 x$ 142) _____



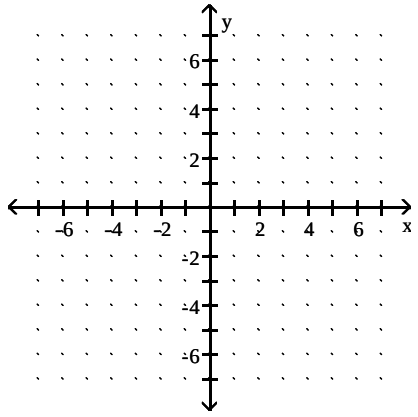
143) $f(x) = 2^x$ and $g(x) = \log_2 x$ 143) _____



144) $f(x) = \left(\frac{1}{3}\right)^x$ and $g(x) = \log_{1/3} x$ 144) _____

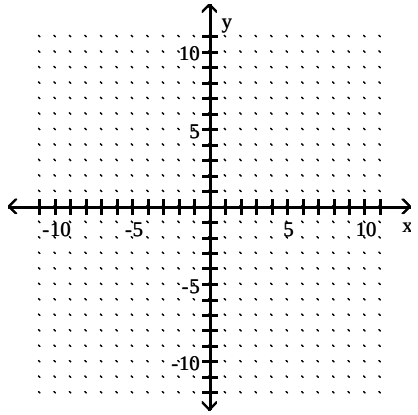


145) $f(x) = \left(\frac{1}{4}\right)^x$ and $g(x) = \log_{1/4} x$ 145) _____

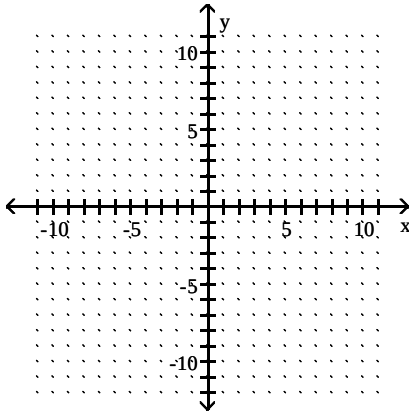


Graph the function.

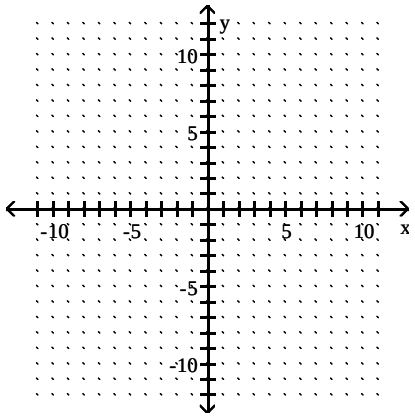
146) Use the graph of $f(x) = \log x$ to obtain the graph of $g(x) = \log (x - 4)$. 146) _____



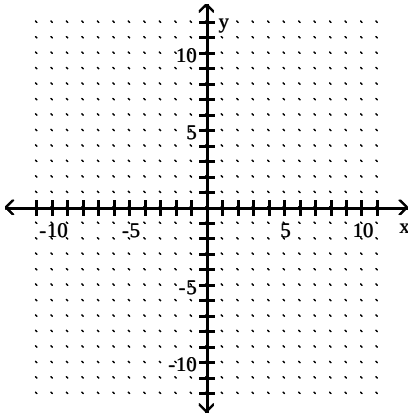
147) Use the graph of f(x) = log x to obtain the graph of g(x) = log (x – 1). 147) _____



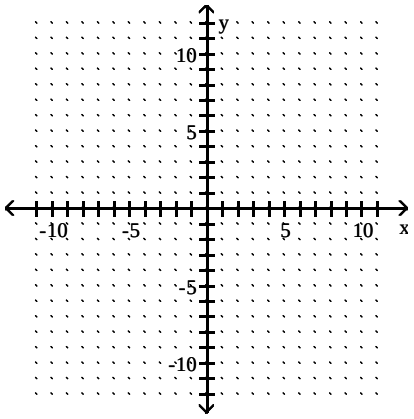
148) Use the graph of f(x) = log x to obtain the graph of g(x) = log x – 5. 148) _____



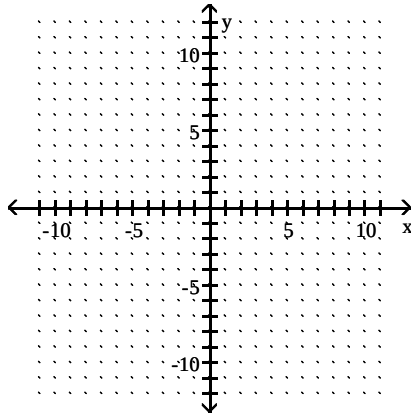
149) Use the graph of f(x) = log x to obtain the graph of g(x) = log x + 5. 149) _____



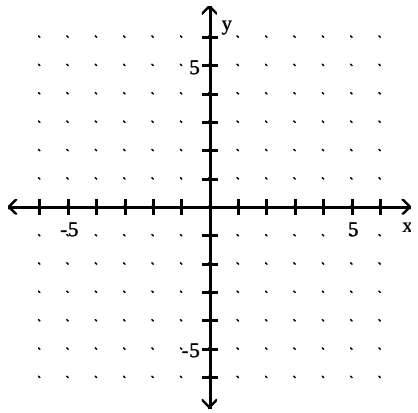
150) Use the graph of f(x) = log x to obtain the graph of g(x) = 2 – log x. 150) _____



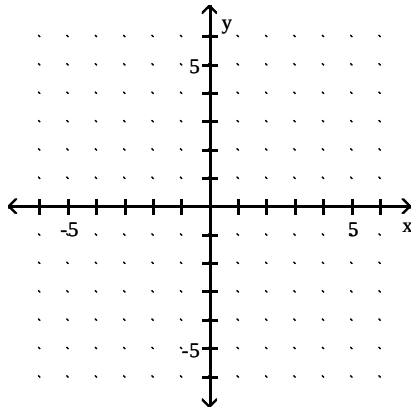
151) Use the graph of f(x) = log x to obtain the graph of g(x) = 3 – log x. 151) _____



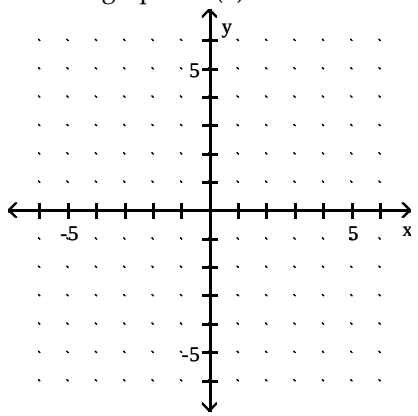
152) Use the graph of f(x) = ln x to obtain the graph of g(x) = 4 ln x. 152) _____



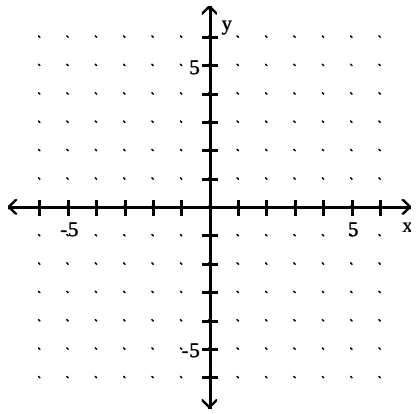
153) Use the graph of f(x) = ln x to obtain the graph of g(x) = 3 ln x. 153) _____



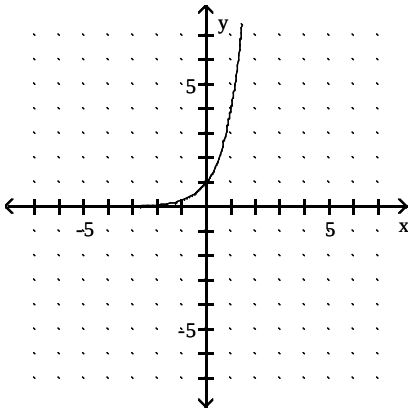
154) Use the graph of f(x) = ln x to obtain the graph of g(x) = 1 – ln x. 154) _____



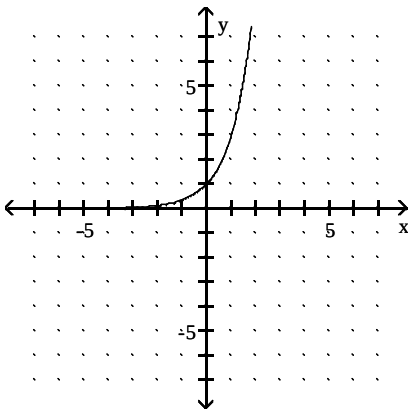
155) Use the graph of f(x) = ln x to obtain the graph of g(x) = –4 – ln x. 155) _____



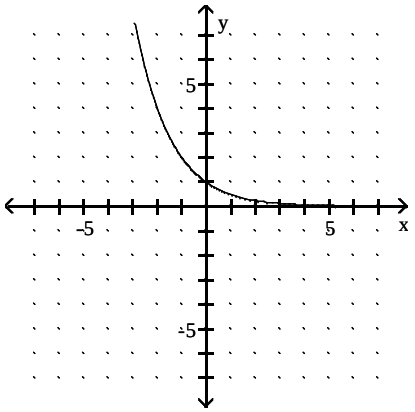
1) 4
2) 2
3) 2
4) 1
5) -4
6) 1
7) 1
8) 3
9) 2
10) 4
11)



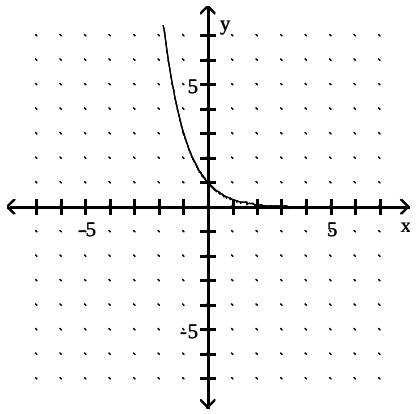
12)



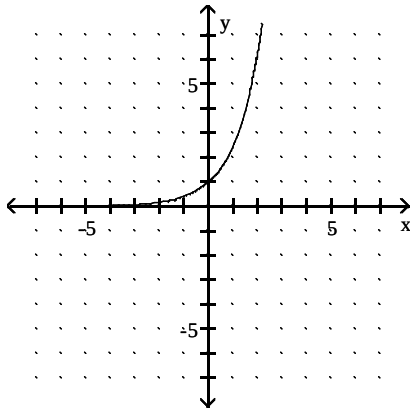
13)



14)



15)



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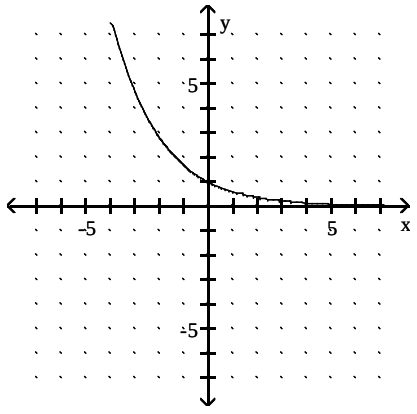
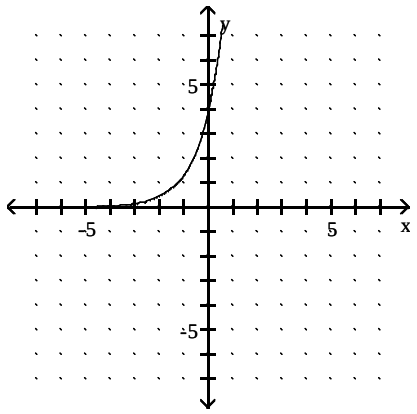
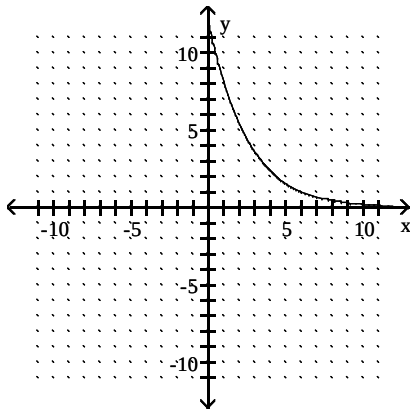


17)



18)



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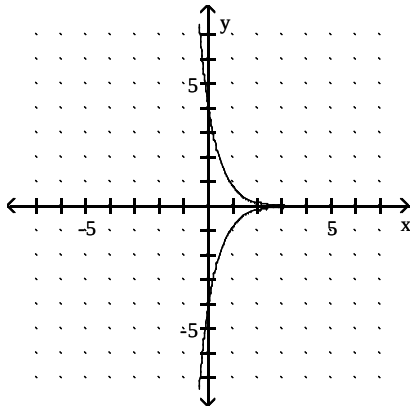
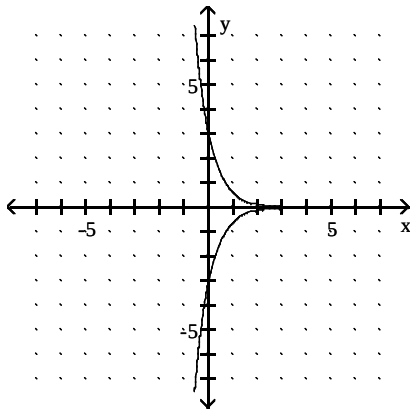
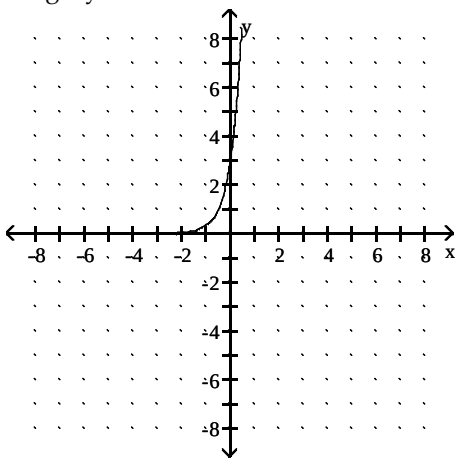


20)



21) domain: all real numbers;
range: $y > 0$



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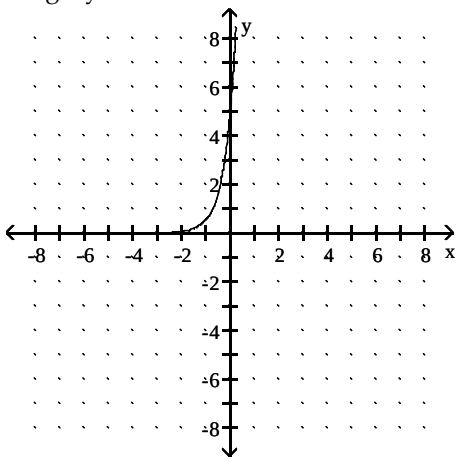
range: $y > 0$



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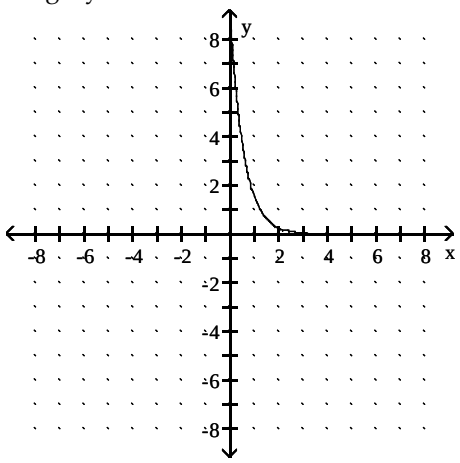
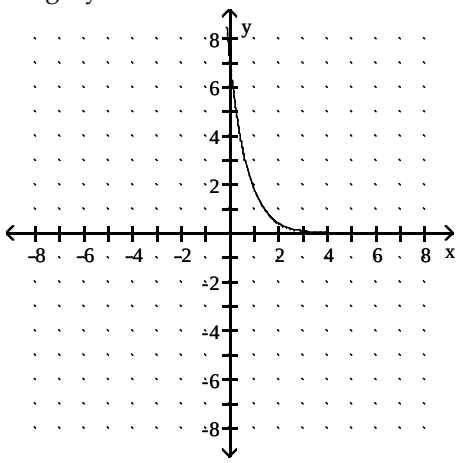
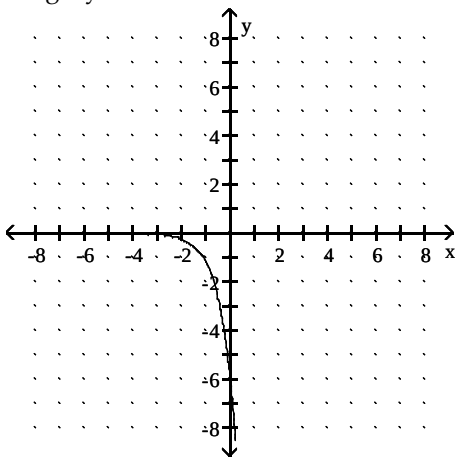
range: $y > 0$



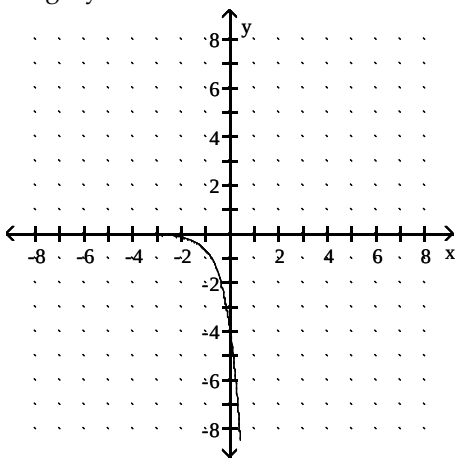
24) domain: all real numbers;
range: $y > 0$



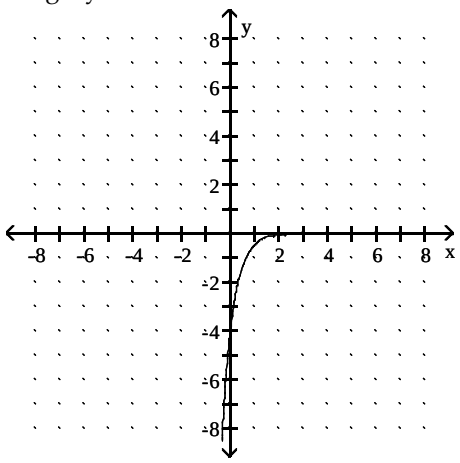
25) domain: all real numbers;
range: $y < 0$



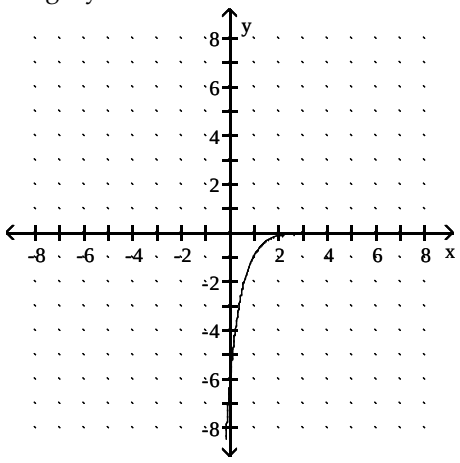
26) domain: all real numbers;
range: $y < 0$



27) domain: all real numbers;
range: $y < 0$

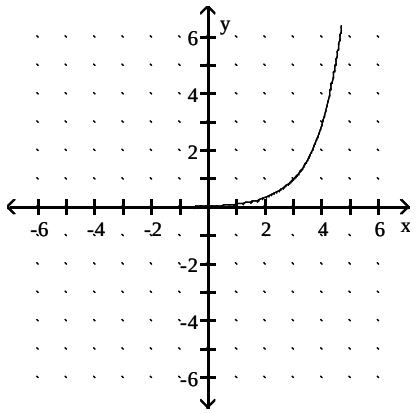


28) domain: all real numbers;
range: $y < 0$



29) $a > 0,\ b > 1$
30) $a > 0,\ 0 < b < 1$
31) $a < 0,\ b > 1$
32) $a < 0,\ 0 < b < 1$

33)



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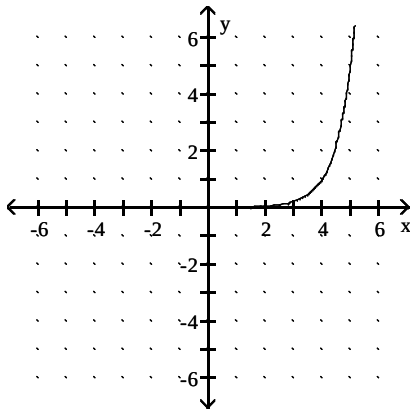

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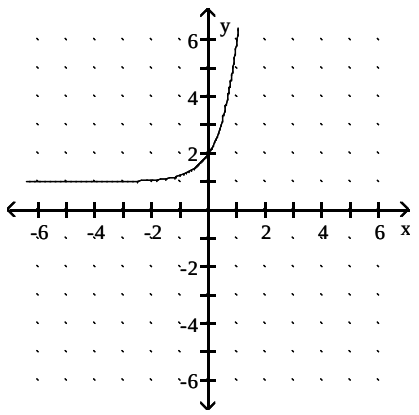

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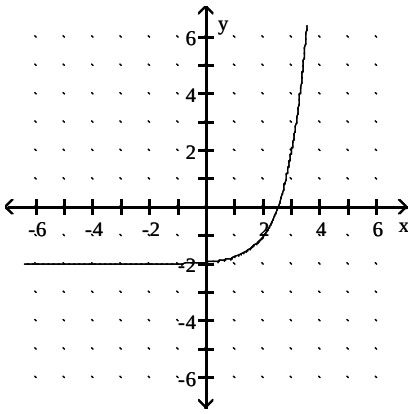

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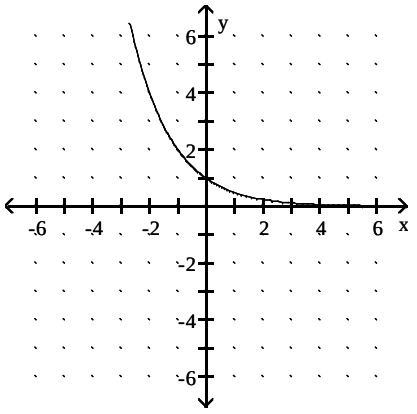

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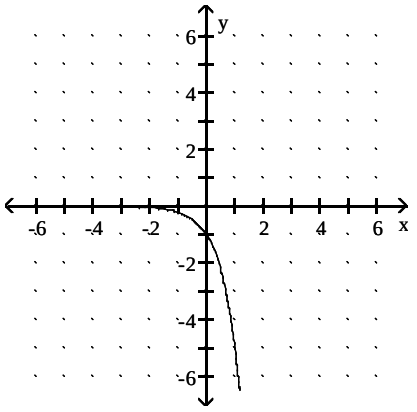

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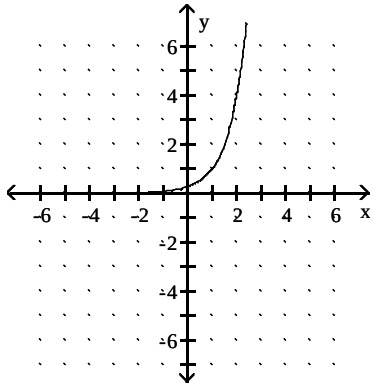
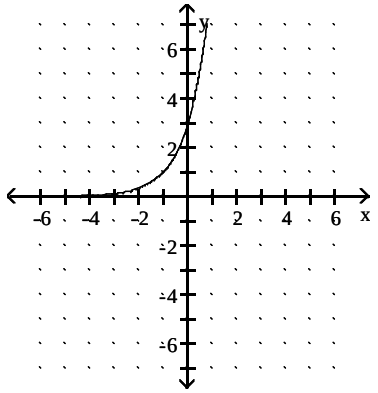
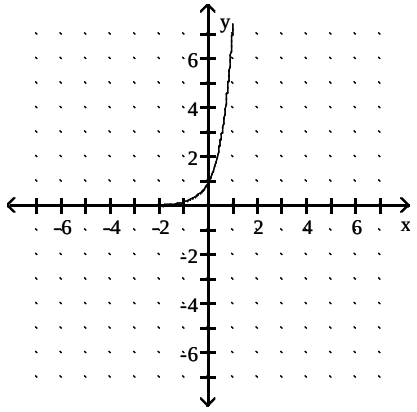

y
x
6
4
2
-2
-4
-6
-6
-4
-2
2
4
6

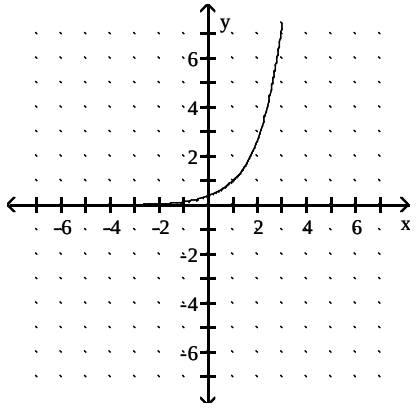
40)


y
x
6
4
2
-2
-4
-6
-6
-4
-2
2
4
6

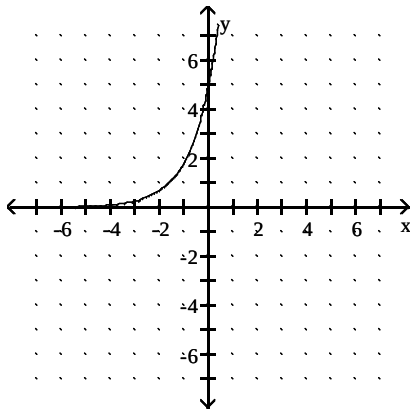
41)


y
x
6
4
2
-2
-4
-6
-6
-4
-2
2
4
6

42)


y
x
6
4
2
-2
-4
-6
-6
-4
-2
2
4
6

43)



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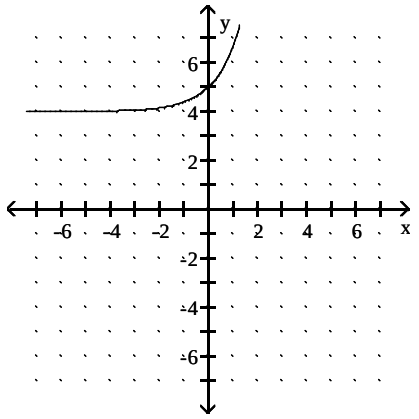

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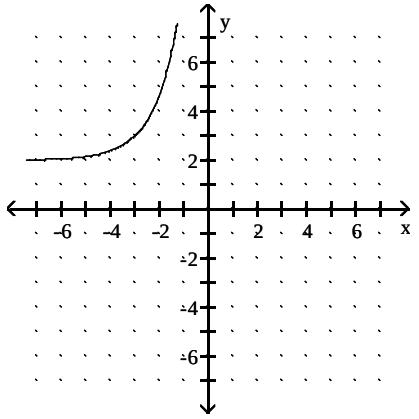

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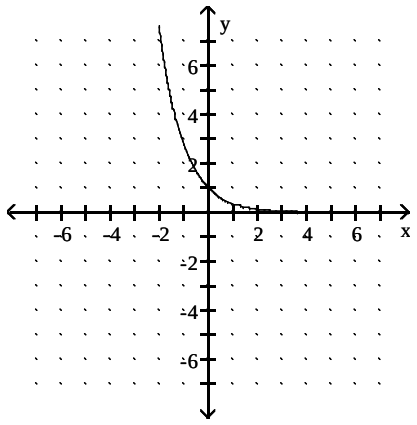

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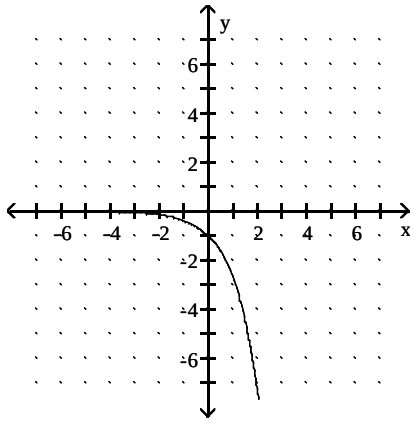

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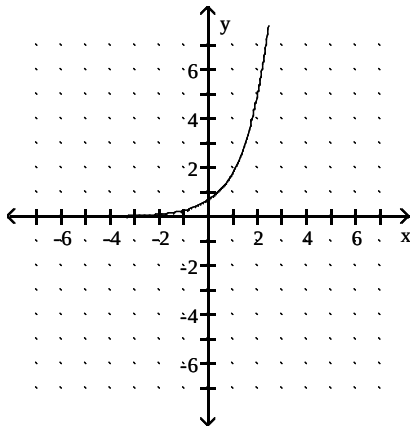

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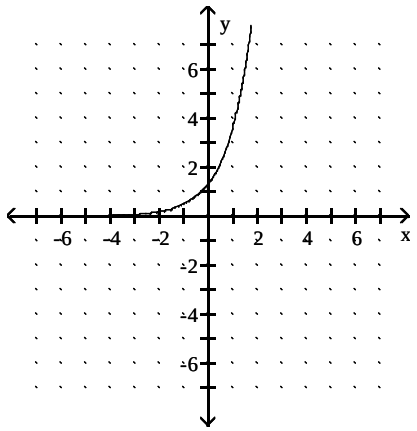

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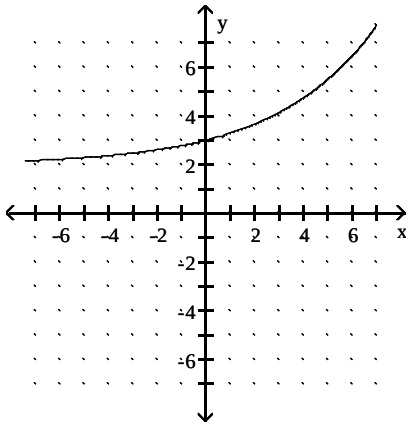

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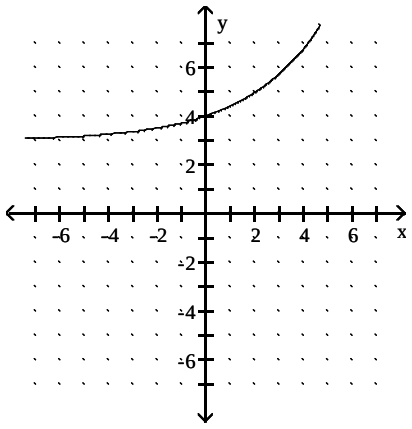

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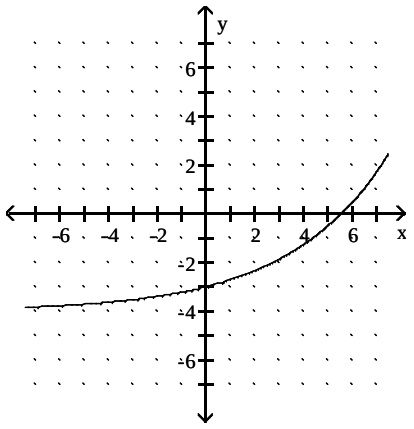

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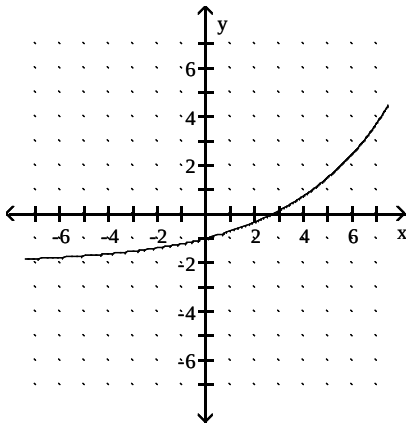

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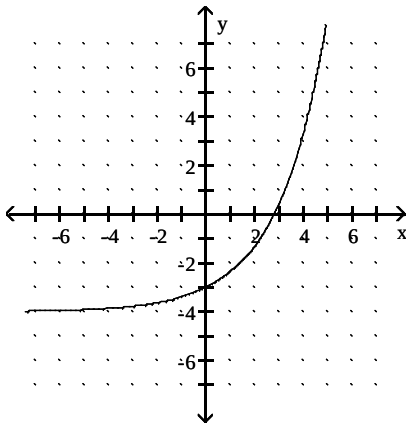

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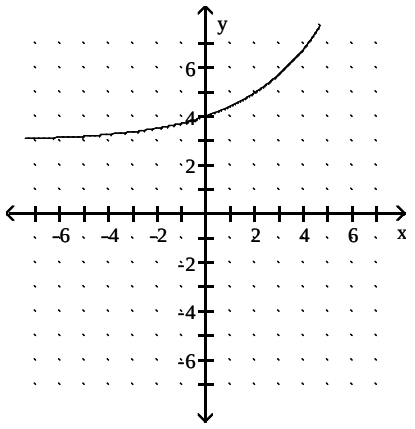


56) 399
57) 233 pounds
58) 3,020,000
59) $128,766
60) 13.464
61) 0.122
62) 44.701
63) 0.301
64) 189
65) 11,690,000
66) 0.24 mg
67) 581 g
68) $48,107.03
69) $26,445.56
70) $37,146.17
71) $24,102.00
72) $823.67
73) $1266.77
74) $1254.67
75) $4992.24
76) $7609.81
77) $9869.42
78) $7452.93
79) $11,000 invested at 7.5% compounded continuously over 6 years yields the greater return.
80) $3000 invested at 6.25% compounded continuously over 9 years yields the greater return.
81) $6000 invested at 5.5% compounded quarterly over 5 years yields the greater return.
82) $6000 invested at 7.3% compounded quarterly over 7 years yields the greater return.
83) $5^2 = 25$
84) $3^2 = 9$
85) $4^3 = 64$
86) $4^2 = x$
87) $5^3 = x$
88) $b^5 = 243$
89) $b^2 = 25$
90) $b^2 = 4$

91) $4^x = 64$
92) $8^x = 64$
93) $\log_4 16 = 2$
94) $\log_3 9 = 2$
95) $\log_5 \frac{1}{25} = -2$
96) $\log_2 \frac{1}{8} = -3$
97) $\log_4 x = 2$
98) $\log_3 x = 2$
99) $\log_{216} 6 = \frac{1}{3}$
100) $\log_{64} 4 = \frac{1}{3}$
101) $\log_{15} y = 3$
102) $\log_{12} y = 3$
103) $\log_a 38{,}416 = 4$
104) $\log_c 64 = 3$
105) $\log_{13} 169 = x$
106) $\log_8 512 = x$
107) 2
108) 3
109) 2
110) 2
111) 3
112) 4
113) 3
114) 3
115) 2
116) $\frac{1}{2}$
117) $\frac{1}{2}$
118) $\frac{1}{2}$
119) –3
120) –3
121) –2
122) $\frac{1}{2}$
123) $\frac{1}{3}$
124) $\frac{1}{2}$
125) –1

126) –1

127) –1

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

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

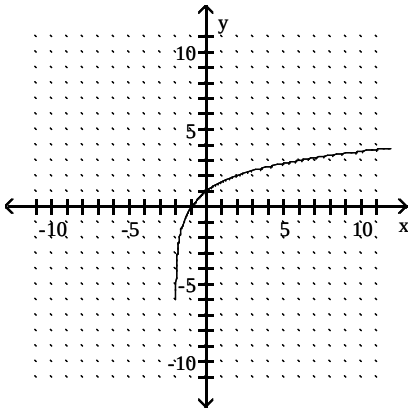
130) $-\frac{1}{2}$

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

132) –1

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

134)



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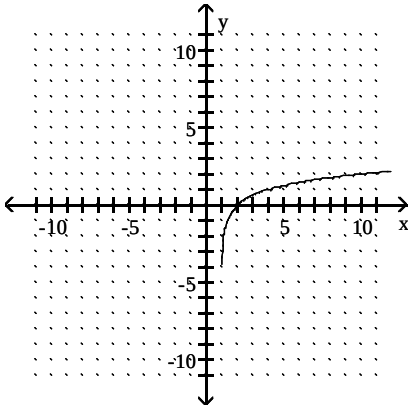

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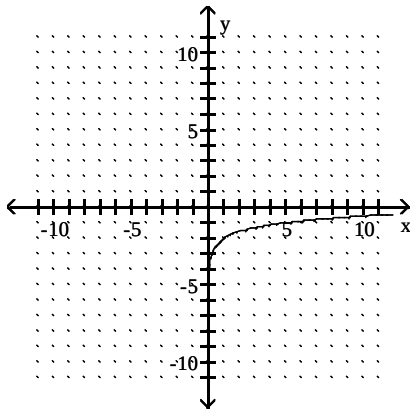

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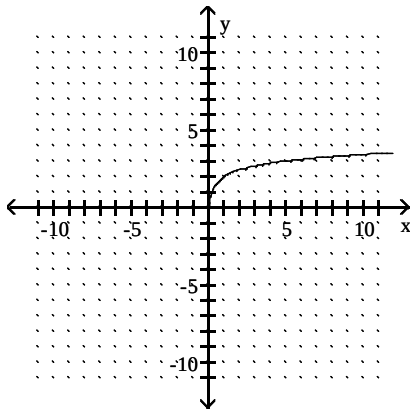

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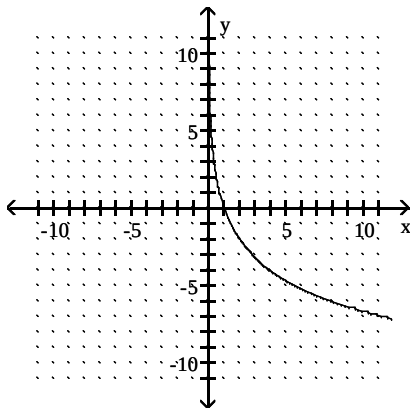

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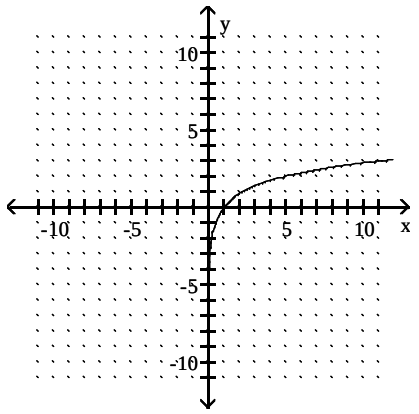

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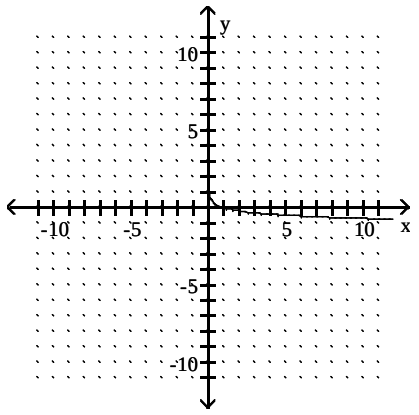

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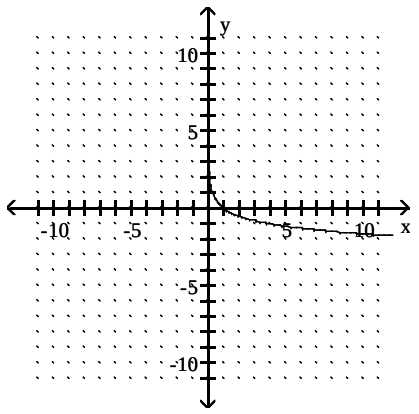

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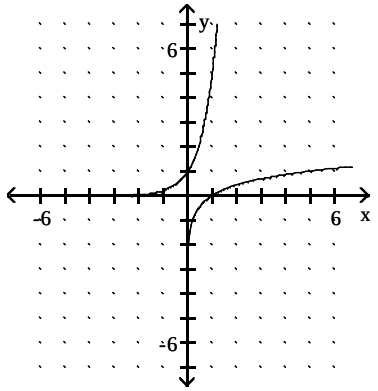

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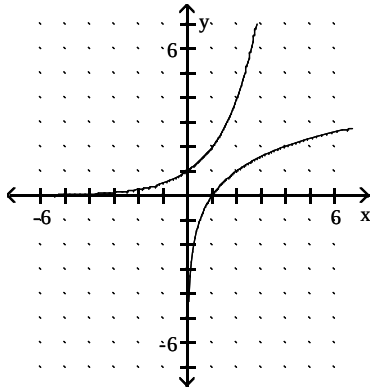

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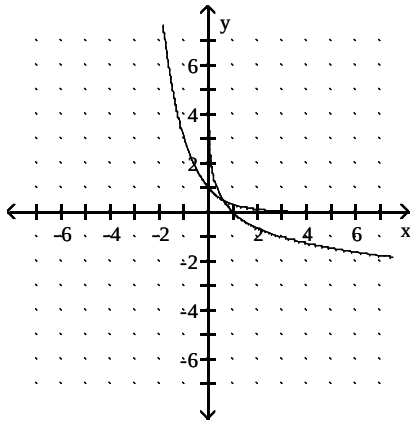

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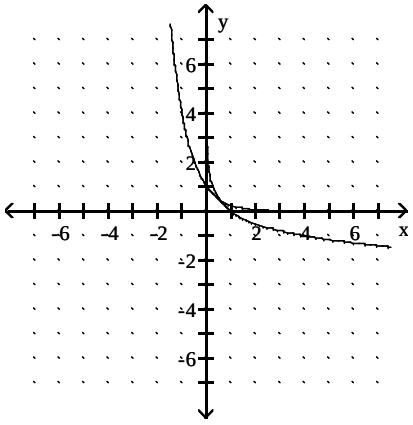

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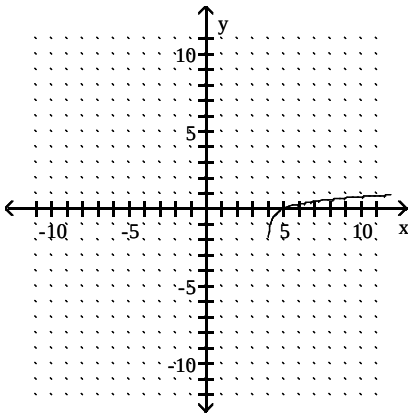

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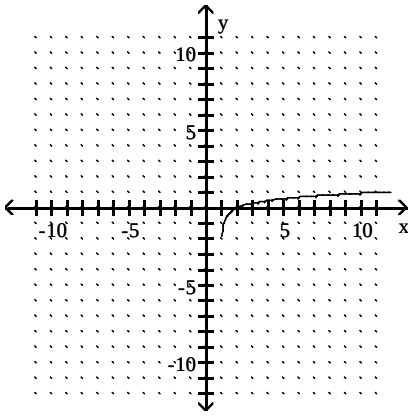

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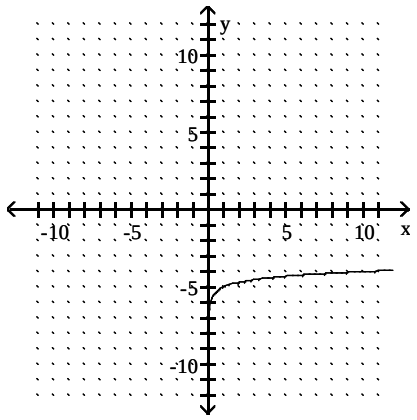

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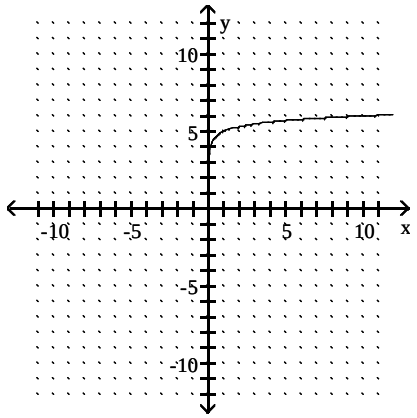

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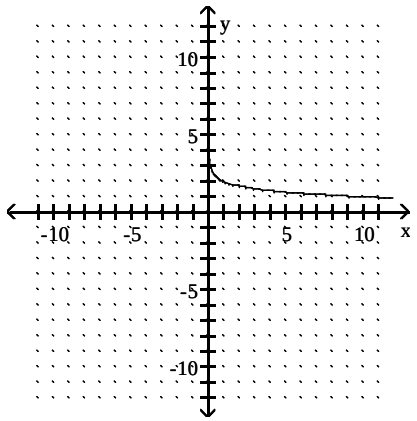

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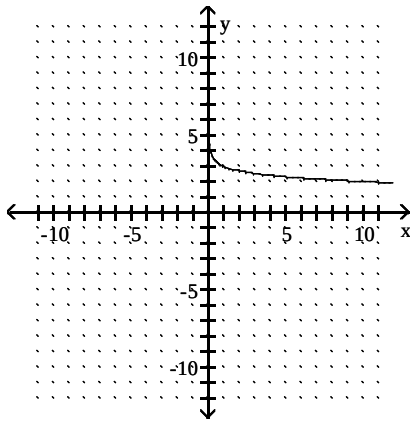

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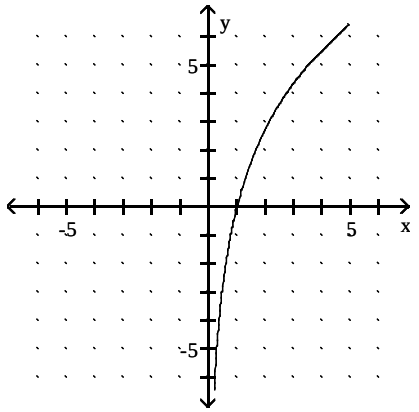
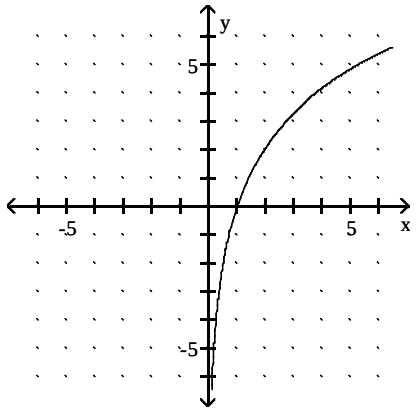
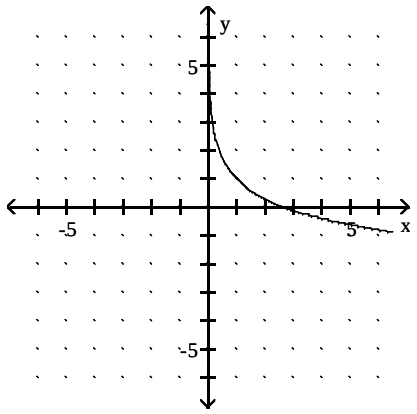


153)



154)



155)