Math 098 Exam 3 Preparation Part2 Ch. 7 & 8 v01
NO BOOK/ NO NOTES/YES CALCUATOR
Dressler Summer 2017

Name_____

Find all complex–number solutions by completing the square.

1) $x^2 - 14x + 65 = 0$ 1) _____

2) $x^2 - 4x + 40 = 0$ 2) _____

3) $x^2 = 2x - 12$ 3) _____

4) $x^2 = -22x - 128$ 4) _____

5) $x^2 + x + 5 = 0$ 5) _____

6) $x^2 + x + 2 = 0$ 6) _____

7) $16x^2 - 7x + 1 = 0$ 7) _____

8) $8x^2 - 3x + 1 = 0$ 8) _____

9) $7x^2 - 3x + 6 = 0$ 9) _____

10) $6x^2 + 7x + 9 = 0$ 10) _____

11) $8x^2 + 7x = -6$ 11) _____

12) $4x^2 + 5x = -7$ 12) _____

13) $2p^2 - \frac{5}{3}p + \frac{8}{3} = 0$ 13) _____

14) $\frac{3}{2}p^2 - \frac{5}{2}p + \frac{3}{2} = 0$ 14) _____

Find all complex–number solutions by using the quadratic formula.

15) $x^2 + 10x + 41 = 0$ 15) _____

16) $x^2 - 6x + 25 = 0$ 16) _____

17) $x^2 = -10x - 35$ 17) _____

18) $x^2 = -2x - 4$ 18) _____

19) $x^2 + x + 7 = 0$ 19) _____

20) $x^2 + x + 3 = 0$ 20) _____

21) $5x^2 - 3x + 5 = 0$ 21) _____

22) $2x^2 + 7x + 8 = 0$ 22) _____

23) $x^2 - \frac{2}{3}x = -\frac{7}{6}$ 23) _____

24) $x^2 - \frac{1}{5}x = -\frac{7}{10}$ 24) _____

25) $\frac{2}{3}p^2 - \frac{5}{3}p + \frac{4}{3} = 0$ 25) _____

26) $2p^2 - \frac{3}{2}p + \frac{3}{2} = 0$ 26) _____

Solve the equation.

27) $16x^4 - 41x^2 + 25 = 0$ 27) _____

28) $36x^4 - 85x^2 + 49 = 0$ 28) _____

29) $25x^4 - 61x^2 + 36 = 0$ 29) _____

30) $(3x - 6)^2 - 9(3x - 6) + 14 = 0$ 30) _____

31) $(2x - 6)^2 + 4(2x - 6) - 5 = 0$ 31) _____

32) $(4x - 7)^2 + 10(4x - 7) + 24 = 0$ 32) _____

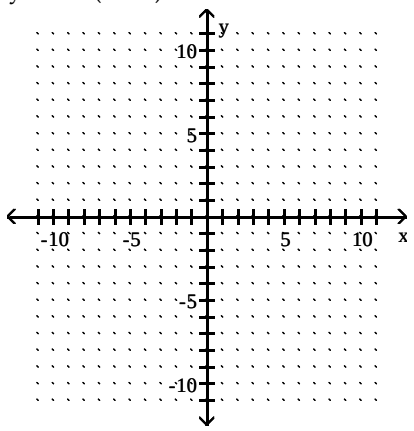
33) $(-4x - 1)^2 = -9(-4x - 1) - 14$ 33) _____

34) $(8x + 6)^2 = -9(8x + 6) - 8$ 34) _____

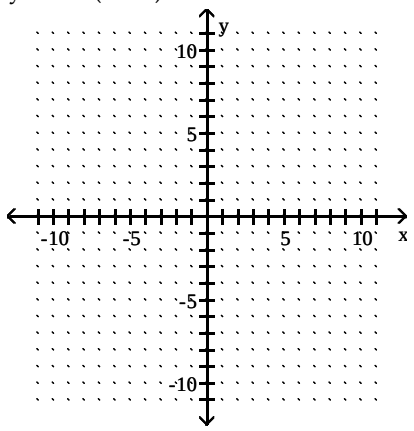
35) $(5x + 6)^2 = 3(5x + 6) + 40$ 35) _____

Sketch the graph of the quadratic function. Give the vertex and axis of symmetry.

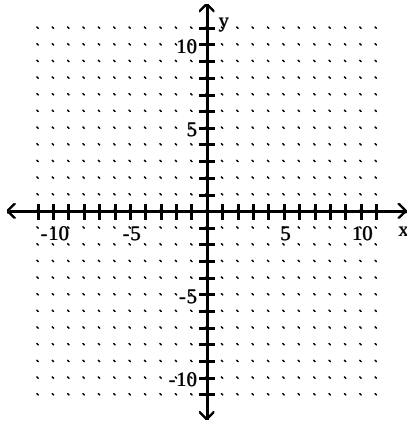
36) $y + 1 = (x + 1)^2$ 36) _____



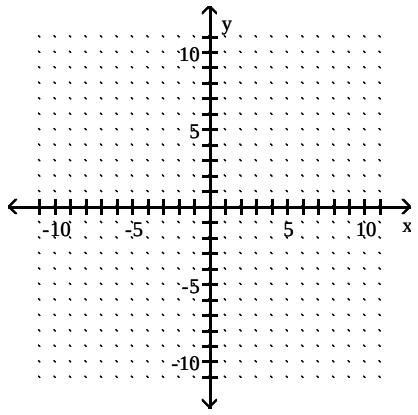
37) $y + 4 = (x + 1)^2$ 37) _____



38) $f(x) = 1 - (x + 1)^2$ 38) _____

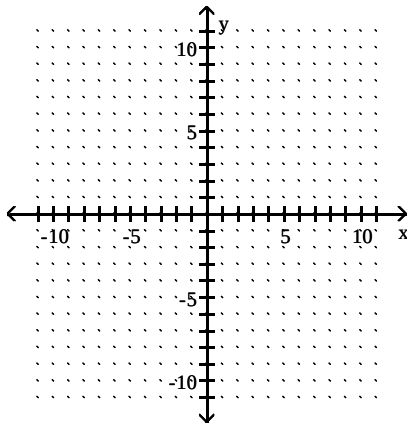


39) $f(x) = 3(x - 1)^2 + 4$ 39) _____

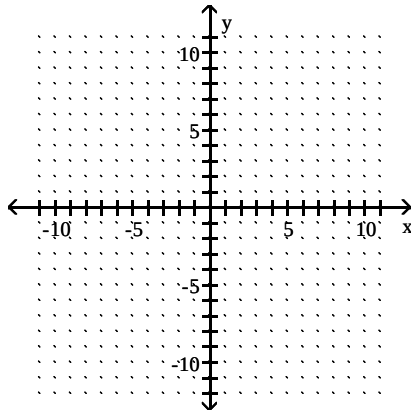


Sketch the graph of the quadratic function. Identify the vertex, intercepts, and the equation for the axis of symmetry.

40) $f(x) = 6 + 5x + x^2$ 40) _____

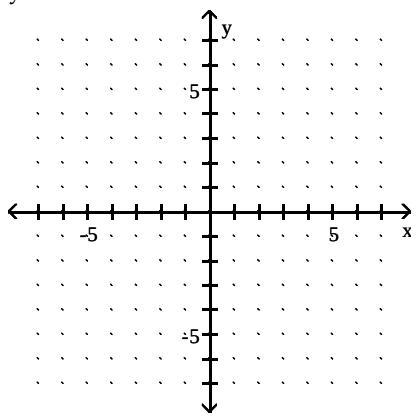


41) $f(x) = 4x^2 + 16x + 20$ 41) _____

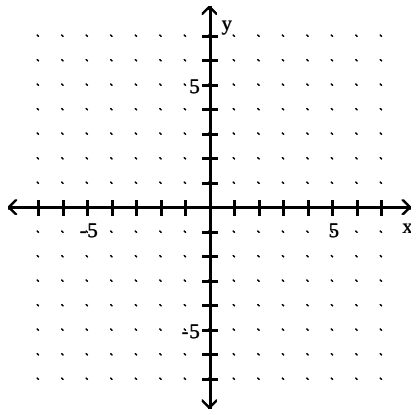


Sketch the graph of the given function.

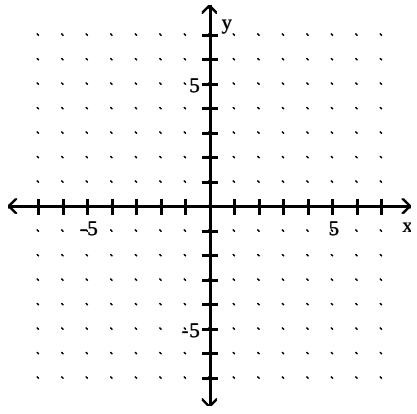
42) $y = 5^x$ 42) _____



43) $y = 2^x$ 43) _____

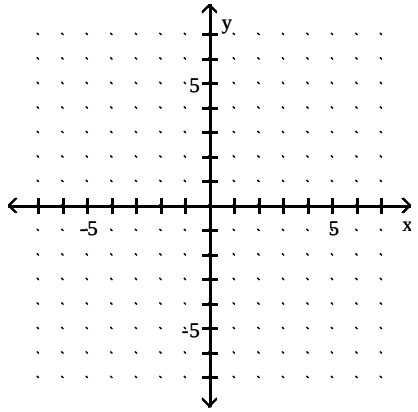


44) $y = 5^x$ 44) _____



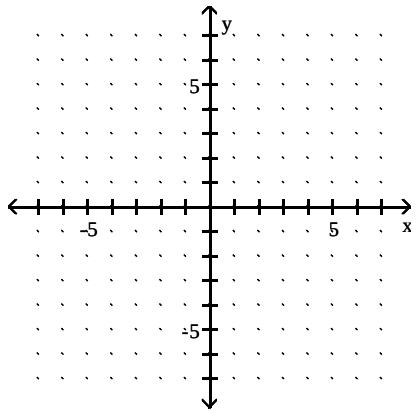
45) $y = (\frac{1}{5})^x$

45) _____

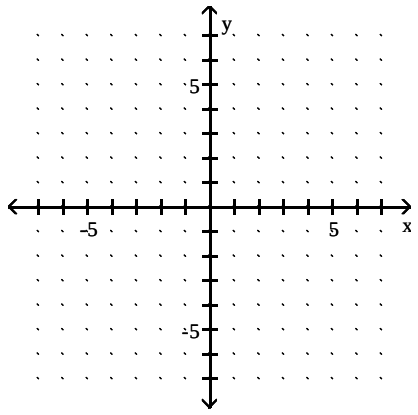


46) $y = (\frac{1}{2})^x$

46) _____

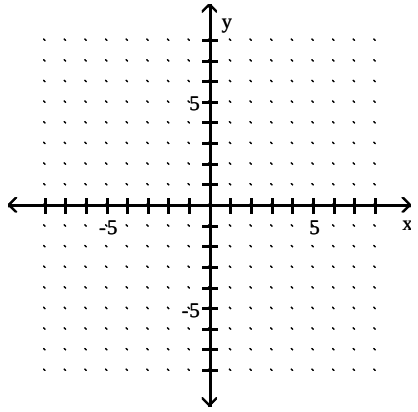


47) $y = (\frac{1}{3})^x$ 47) _____



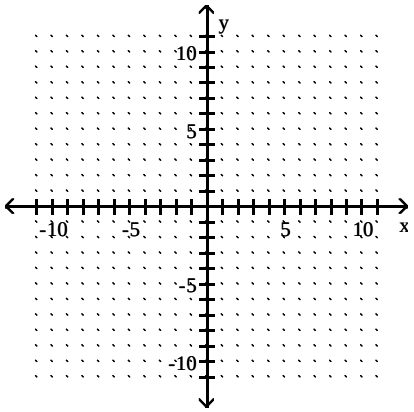
Sketch the graph of the given function, its inverse, and y = x on the same set of axes. Graph the function with a solid line, and graph y = x and the function's inverse using dotted lines.

48) $f(x) = 3(6)^x$ 48) _____



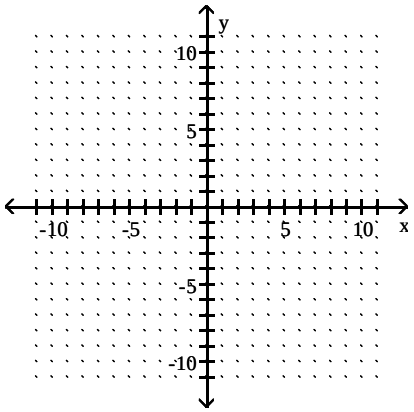
49) f(x) = 2x

49) _____



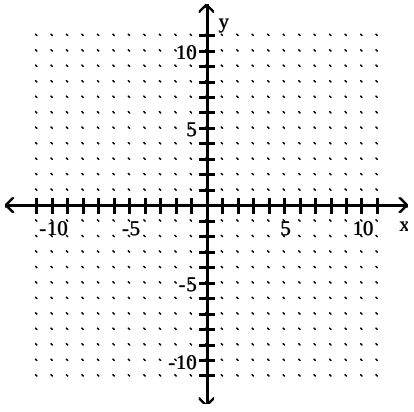
50) f(x) = 2x - 2

50) _____

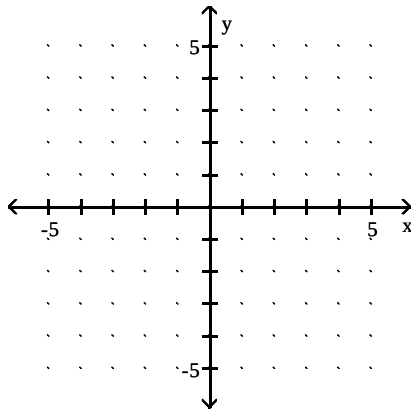


51) f(x) = $\frac{1}{2}$x - 2

51) _____



52) $f(x) = 5(\frac{1}{3})^x$ 52) _____



Find the logarithm.

53) $\log_3(27)$ 53) _____

54) $\log_4(16)$ 54) _____

55) $\log(1000)$ 55) _____

56) $\log(10{,}000)$ 56) _____

57) $\log_{11}(1)$ 57) _____

58) $\log_2(1)$ 58) _____

59) $\log_8(\sqrt{8})$ 59) _____

60) $\log_5(\sqrt{5})$ 60) _____

61) $\log_9(9)$ 61) _____

62) $\log_5(5)$ 62) _____

63) $\log_4(\frac{1}{16})$ 63) _____

64) $\log_5(\frac{1}{25})$ 64) _____

65) $\log_{125}(5)$ 65) _____

66) $\log_9(3)$ 66) _____

67) $\log_2(\log_2(16))$ 67) _____

68) $\log_b(\sqrt{b})$ 68) _____

69) $\log_b(\sqrt{b})$ 69) _____

70) $\log_b(b)$ 70) _____

71) $\log_b(1)$ 71) _____

72) $\log_b\left(\frac{1}{b^6}\right)$ 72) _____

73) $\log_b\left(\frac{1}{b^5}\right)$ 73) _____

Simplify. Write the expression as a single logarithm with a coefficient of 1.

74) 4 ln(a) – 5 ln(b) 74) _____

75) 7 ln(a) – 2 ln(b) 75) _____

76) 7 ln(a) – 9 ln(b) 76) _____

77) $4 \ln(x - 12) - 3 \ln(x)$ 77) _____

78) $7 \ln(x - 3) - 4 \ln(x)$ 78) _____

79) $5 \ln(x - 3) - 8 \ln(x)$ 79) _____

80) $2 \ln (x^2) + 2 \ln (3x)$ 80) _____

81) $3 \ln (x^2) + 2 \ln (5x)$ 81) _____

82) $2 \ln (x^2) + 2 \ln (6x)$ 82) _____

83) $2 \ln (w^2) - \ln (2w^9)$ 83) _____

84) $2 \ln (w^2) - \ln (3w^8)$ 84) _____

85) $2 \ln (w^2) - \ln (7w^8)$ 85) _____

Solve the equation. Round the solution to four decimal places, if necessary.

86) $e^{4x} = 6$ 86) _____

87) $e^{2x} = 4$ 87) _____

88) $e^{(x + 2)} = 4$ 88) _____

89) $e^{(x + 5)} = 8$ 89) _____

90) $\ln (2x) + \ln (5x) = 4$ 90) _____

91) $\ln (8x) + \ln (9x) = 4$ 91) _____

92) $5 \ln (4x^4) - 3 \ln (3x^5) = 9$ 92) _____

93) $4 \ln (6x^2) - 4 \ln (8x^3) = 4$ 93) _____

94) $e^{3x - 1} \cdot e^{5x} = 146$ 94) _____

95) $e^{4x - 1} \cdot e^{4x} = 110$ 95) _____

Evaluate. Round your result to the fourth decimal place.

96) $\log_{10}(23)$ 96) _____

97) $\log_{4}(7)$ 97) _____

98) $\log_{29}(356)$ 98) _____

99) $\log_{22}(326)$ 99) _____

100) $\log_{18}(38)$ 100) _____

101) $\log_{20}(77.2)$ 101) _____

102) $\log_{0.5}(15)$ 102) _____

103) $\log_{0.7}(17)$ 103) _____

Solve the problem.

104) The function $y = 400e^{-0.00693x}$ 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. If 400 pounds of the material are initially put into the vault, how many pounds will be left after 90 years? 104) _____

105) The function $y = 200e^{-0.0077x}$ 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. If 200 pounds of the material are initially put into the vault, how many pounds will be left after 200 years? 105) _____

106) The value of a particular investment follows a pattern of exponential growth. In the year 2000, you invested money in a money market account. The value of your investment t years after 2000 is given by the exponential growth model $f(t) = 5200e^{0.065t}$. How much did you initially invest in the account? 106) _____

107) The value of a particular investment follows a pattern of exponential growth. In the year 2000, you invested money in a money market account. The value of your investment t years after 2000 is given by the exponential growth model $f(t) = 3500e^{0.055t}$. How much did you initially invest in the account? 107) _____

108) The value of a particular investment follows a pattern of exponential growth. In the year 2000, you invested money in a money market account. The value of your investment t years after 2000 is given by the exponential growth model $f(t) = 6000e^{0.057t}$. When will the account be worth \$10,610? 108) _____

109) The value of a particular investment follows a pattern of exponential growth. In the year 2000, you invested money in a money market account. The value of your investment t years after 2000 is given by the exponential growth model $f(t) = 8300e^{0.046t}$. When will the account be worth \$9528? 109) _____

1) $x = 7 \pm 4i$
2) $x = 2 \pm 6i$
3) $x = 1 \pm i\sqrt{11}$
4) $x = -11 \pm i\sqrt{7}$
5) $\frac{-1 \pm i\sqrt{19}}{2}$
6) $\frac{-1 \pm i\sqrt{7}}{2}$
7) $\frac{7 \pm i\sqrt{15}}{32}$
8) $\frac{3 \pm i\sqrt{23}}{16}$
9) $\frac{3 \pm i\sqrt{159}}{14}$
10) $\frac{-7 \pm i\sqrt{167}}{12}$
11) $\frac{-7 \pm i\sqrt{143}}{16}$
12) $\frac{-5 \pm i\sqrt{87}}{8}$
13) $\frac{5 \pm i\sqrt{167}}{12}$
14) $\frac{5 \pm i\sqrt{11}}{6}$
15) $-5 \pm 4i$
16) $3 \pm 4i$
17) $-5 \pm i\sqrt{10}$
18) $-1 \pm i\sqrt{3}$
19) $\frac{-1 \pm 3i\sqrt{3}}{2}$
20) $\frac{-1 \pm i\sqrt{11}}{2}$
21) $\frac{3 \pm i\sqrt{91}}{10}$
22) $\frac{-7 \pm i\sqrt{15}}{4}$
23) $\frac{2 \pm i\sqrt{38}}{6}$
24) $\frac{1 \pm i\sqrt{69}}{10}$
25) $\frac{5 \pm i\sqrt{7}}{4}$

26) $\frac{3 \pm i\sqrt{39}}{8}$

27) $\left\{-\frac{5}{4}, -1, 1, \frac{5}{4}\right\}$

28) $\left\{-\frac{7}{6}, -1, 1, \frac{7}{6}\right\}$

29) $\left\{-\frac{6}{5}, -1, 1, \frac{6}{5}\right\}$

30) $\left\{\frac{13}{3}, \frac{8}{3}\right\}$

31) $\left\{\frac{1}{2}, \frac{7}{2}\right\}$

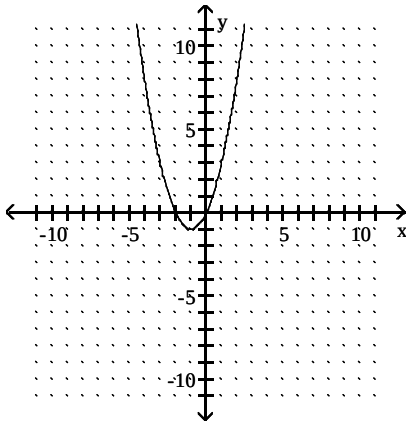
32) $\left\{\frac{3}{4}, \frac{1}{4}\right\}$

33) $\left\{\frac{3}{2}, \frac{1}{4}\right\}$

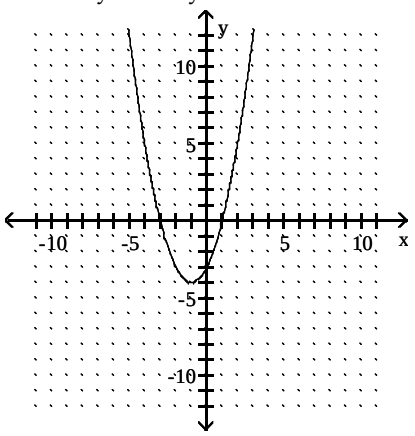
34) $\left\{-\frac{7}{4}, -\frac{7}{8}\right\}$

35) $\left\{\frac{2}{5}, -\frac{11}{5}\right\}$

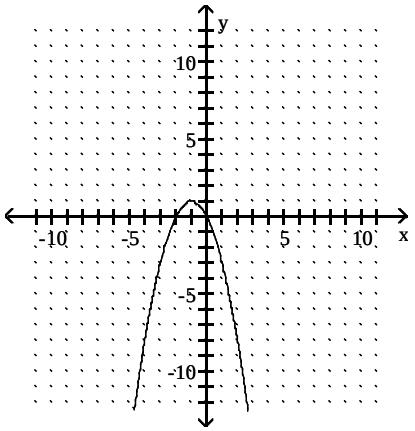
36) vertex: (– 1, – 1)
axis of symmetry: x = – 1



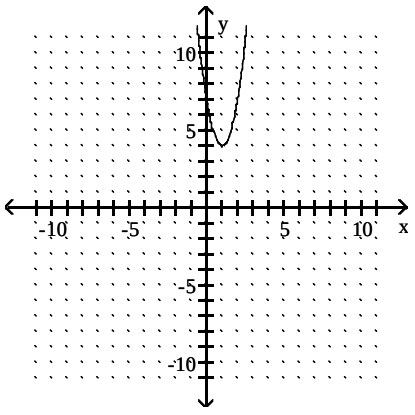
37) vertex: (– 1, – 4)
axis of symmetry: x = – 1



38) vertex: (– 1, 1)
axis of symmetry: x = – 1



39) vertex: (1, 4)
axis of symmetry: x = 1

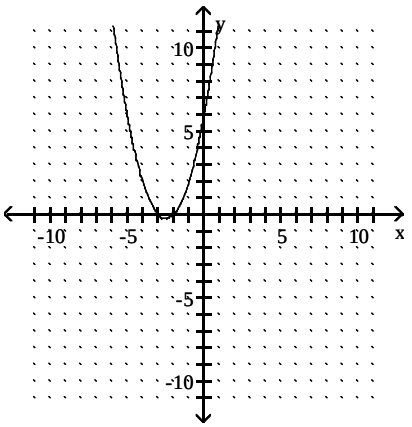


40) vertex: $\left(-\frac{5}{2}, -\frac{1}{4}\right)$

x–intercepts: (–3, 0) and (–2, 0)

y–intercept: (0, 6)

axis of symmetry: $x = -\frac{5}{2}$

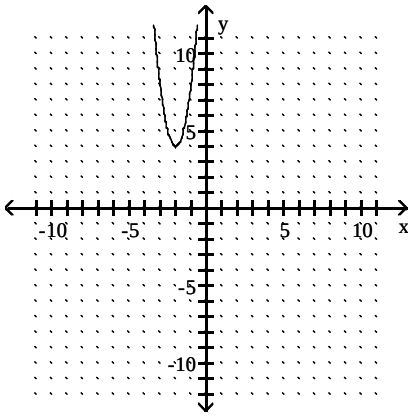


41) vertex: (–2, 4)

x–intercepts: none

y–intercept: (0, 20)

axis of symmetry: x = –2



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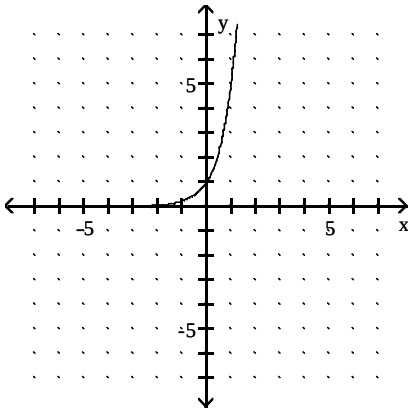

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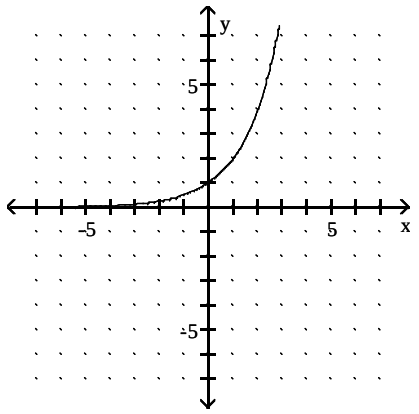

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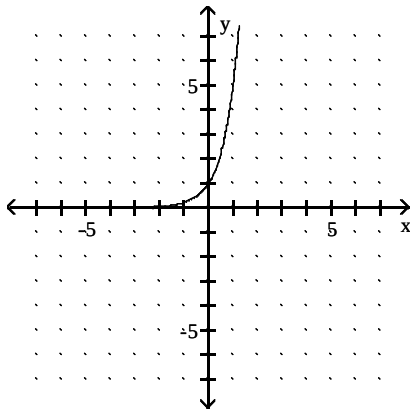

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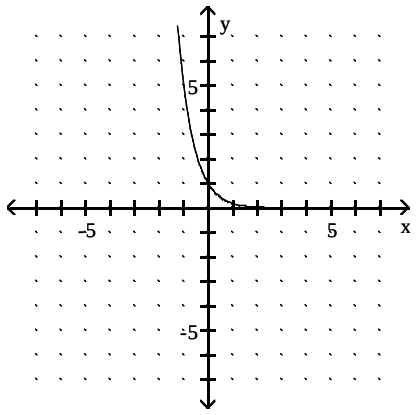

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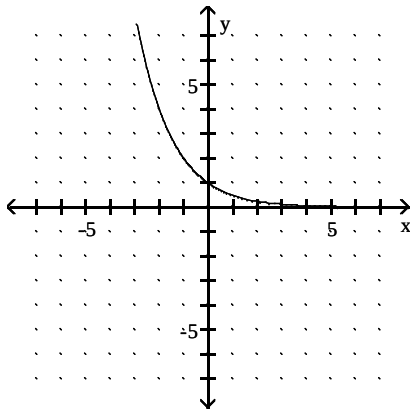

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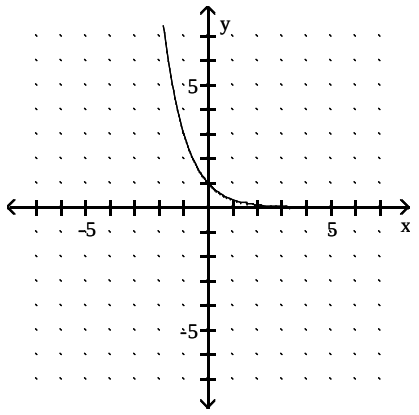
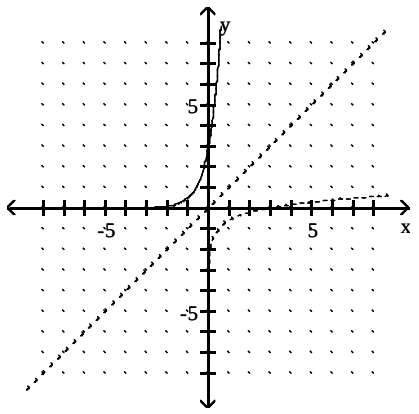


48)



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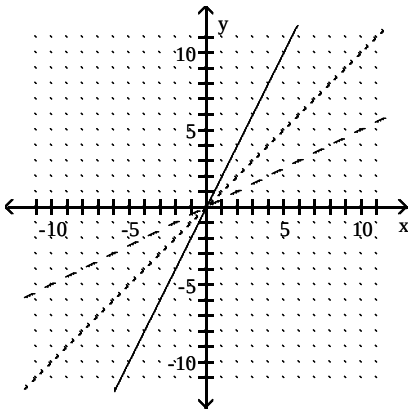
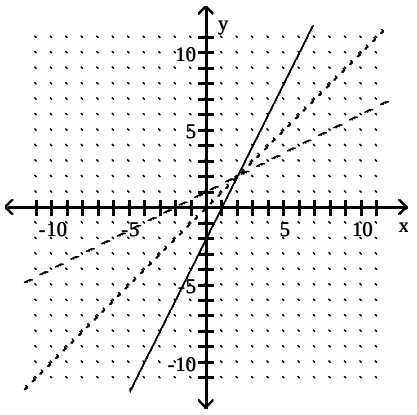


50)



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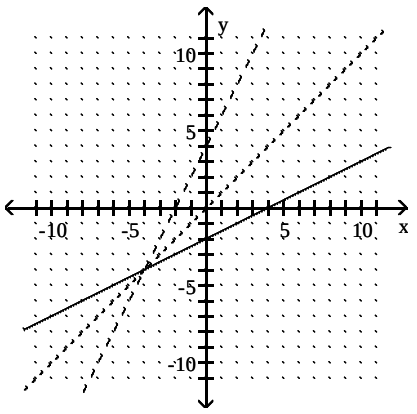

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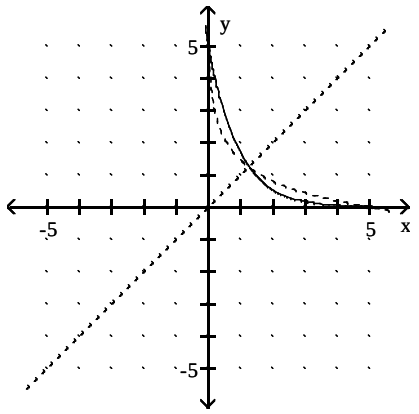

53) 3
54) 2
55) 3
56) 4
57) 0
58) 0
59) $\frac{1}{2}$
60) $\frac{1}{2}$
61) 1
62) 1
63) –2
64) –2
65) $\frac{1}{3}$
66) $\frac{1}{2}$
67) 2
68) $\frac{1}{2}$
69) $\frac{1}{2}$
70) 1
71) 0
72) –6
73) –5
74) $\ln\left(\frac{a^4}{b^5}\right)$
75) $\ln\left(\frac{a^7}{b^2}\right)$
76) $\ln\left(\frac{a^7}{b^9}\right)$

77) $\ln\left(\frac{(x-12)^4}{x^3}\right)$
78) $\ln\left(\frac{(x-3)^7}{x^4}\right)$
79) $\ln\left(\frac{(x-3)^5}{x^8}\right)$
80) $\ln(9x^6)$
81) $\ln(25x^8)$
82) $\ln(36x^6)$
83) $\ln\left(\frac{1}{2w^5}\right)$
84) $\ln\left(\frac{1}{3w^4}\right)$
85) $\ln\left(\frac{1}{7w^4}\right)$
86) 0.4479
87) 0.6931
88) -0.6137
89) -2.9206
90) 2.3366
91) 0.8708
92) 2.9238
93) 0.2759
94) 0.748
95) 0.7126
96) 1.3617
97) 1.4037
98) 1.7447
99) 1.8722
100) 1.2585
101) 1.4509
102) -3.9069
103) -7.9434
104) 214 pounds
105) 43 pounds
106) $5200.00
107) $3500.00
108) 2010
109) 2003