

Name _____

Find all complex-number solutions by completing the square.

1) $x^2 - 14x + 53 = 0$

1) _____

2) $x^2 + 8x + 41 = 0$

2) _____

3) $x^2 = 14x - 55$

3) _____

4) $x^2 = -6x - 19$

4) _____

5) $x^2 + x + 7 = 0$

5) _____

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

6) _____

7) $8x^2 - 3x + 1 = 0$

7) _____

8) $16x^2 - 3x + 1 = 0$

8) _____

$$9) 5x^2 - 7x + 7 = 0$$

9) _____

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

10) _____

$$11) 6x^2 + 5x = -8$$

11) _____

$$12) 7x^2 + 3x = -1$$

12) _____

$$13) 2p^2 - \frac{3}{2}p + 4 = 0$$

13) _____

$$14) 2p^2 - \frac{5}{3}p + \frac{4}{3} = 0$$

14) _____

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

$$15) x^2 + 6x + 25 = 0$$

15) _____

$$16) x^2 - 4x + 13 = 0$$

16) _____

$$17) x^2 = 18x - 92$$

17) _____

$$18) x^2 = -24x - 151$$

18) _____

$$19) x^2 + x + 9 = 0$$

19) _____

$$20) x^2 + x + 9 = 0$$

20) _____

$$21) 6x^2 - 5x + 5 = 0$$

21) _____

$$22) 9x^2 - 5x + 5 = 0$$

22) _____

$$23) x^2 - \frac{6}{5}x = -\frac{7}{10}$$

23) _____

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

24) _____

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

25) _____

$$26) 3p^2 - \frac{5}{2}p + 4 = 0$$

26) _____

Solve the equation.

27) $36x^4 - 85x^2 + 49 = 0$

27) _____

28) $16x^4 - 41x^2 + 25 = 0$

28) _____

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

29) _____

30) $(2x - 6)^2 - 4(2x - 6) - 5 = 0$

30) _____

31) $(2x - 2)^2 - 8(2x - 2) + 15 = 0$

31) _____

32) $(4x - 5)^2 - 2(4x - 5) - 8 = 0$

32) _____

33) $(-5x + 6)^2 = 5(-5x + 6) - 6$

33) _____

34) $(-8x + 8)^2 = -11(-8x + 8) - 28$

34) _____

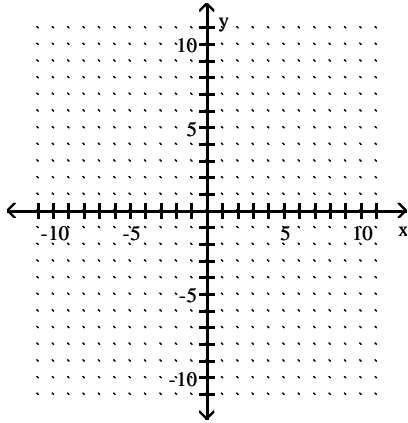
35) $(2x - 9)^2 = -10(2x - 9) - 21$

35) _____

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

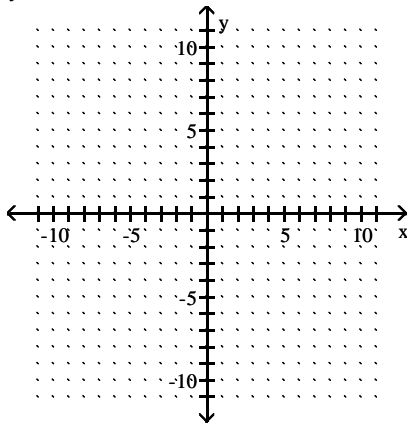
36) $y + 9 = (x - 3)^2$

36) _____



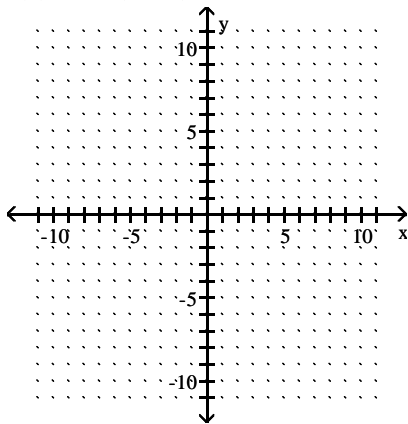
37) $y + 4 = (x - 1)^2$

37) _____



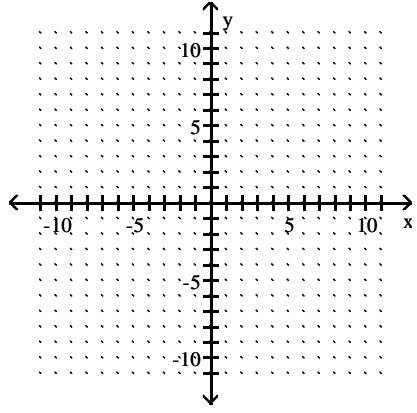
38) $f(x) = 1 - (x - 1)^2$

38) _____



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

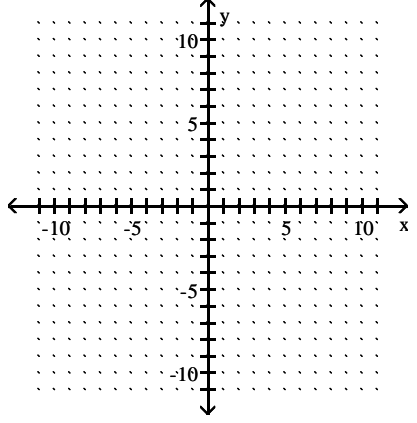
39) _____



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

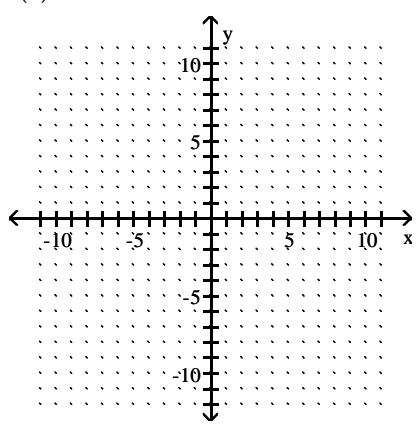
40) $f(x) = 4 + 5x + x^2$

40) _____



41) $f(x) = -3x^2 + 30x - 79$

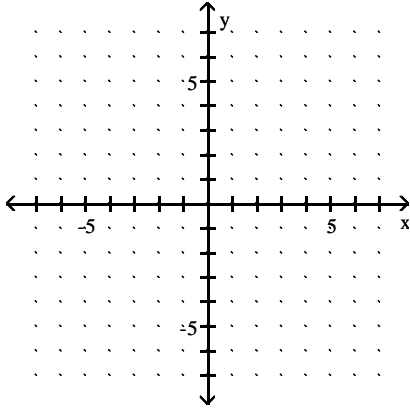
41) _____



Sketch the graph of the given function.

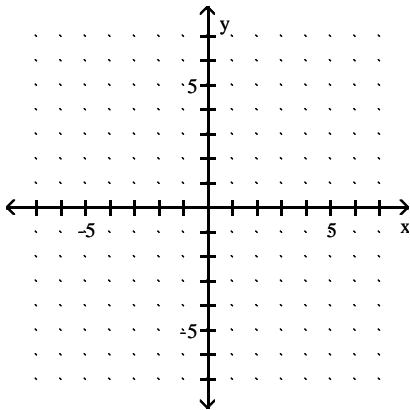
42) $y = 4^x$

42) _____



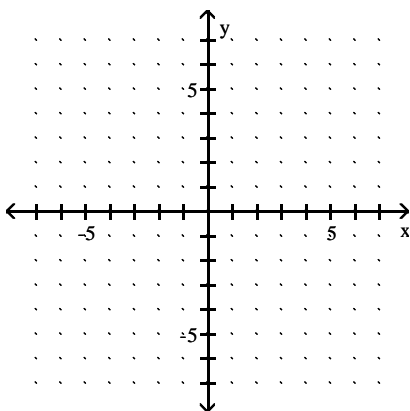
43) $y = 4^x$

43) _____



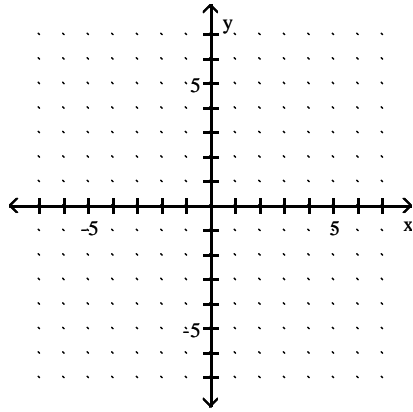
44) $y = 3^x$

44) _____



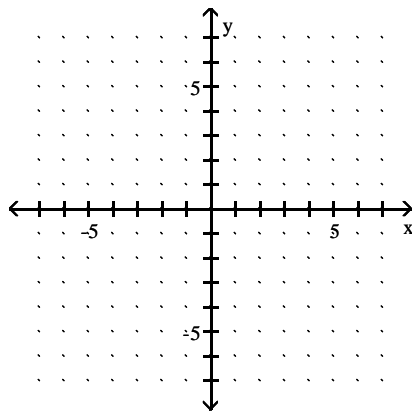
45) $y = \left(\frac{1}{4}\right)^x$

45) _____



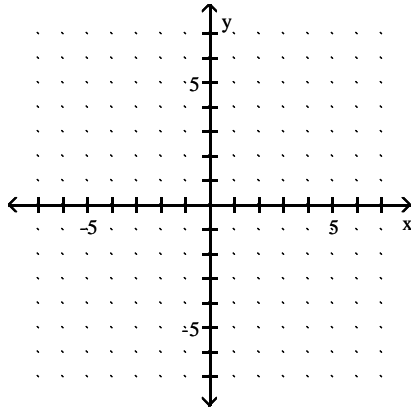
46) $y = \left(\frac{1}{5}\right)^x$

46) _____



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

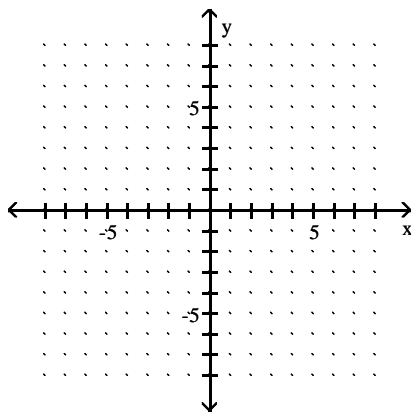
47) _____



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.

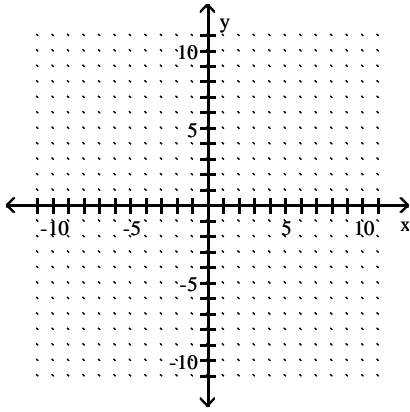
48) $f(x) = 2(9)^x$

48) _____



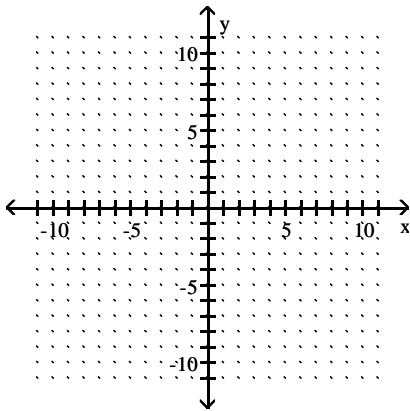
49) $f(x) = 3x$

49) _____



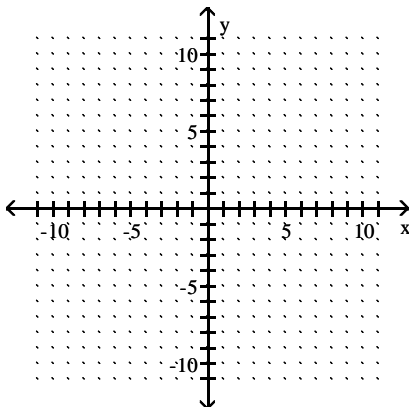
50) $f(x) = 2x - 4$

50) _____



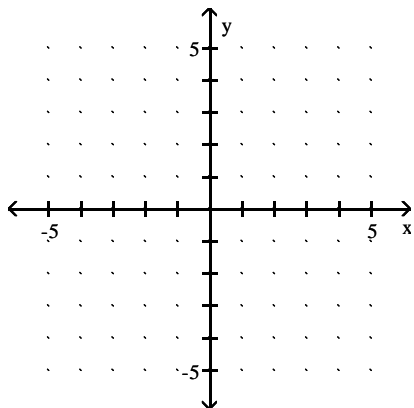
51) $f(x) = \frac{1}{2}x + 4$

51) _____



52) $f(x) = 5\left(\frac{1}{8}\right)^x$

52) _____



Find the logarithm.

53) $\log_4(64)$

53) _____

54) $\log_2(8)$

54) _____

55) $\log(100)$

55) _____

56) $\log(1000)$

56) _____

57) $\log_8(1)$

57) _____

58) $\log_5(1)$

58) _____

59) $\log_7(\sqrt{7})$

59) _____

60) $\log_{12}(\sqrt{12})$

60) _____

61) $\log_7(7)$

61) _____

62) $\log_3(3)$

62) _____

63) $\log_3\left(\frac{1}{27}\right)$

63) _____

64) $\log_3\left(\frac{1}{9}\right)$

64) _____

65) $\log_{25}(5)$

65) _____

66) $\log_8(2)$

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) _____

$72) \log_b\left(\frac{1}{b^3}\right)$

72) _____

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

73) _____

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

$74) 8 \ln(a) - 5 \ln(b)$

74) _____

$75) 9 \ln(a) - 7 \ln(b)$

75) _____

$76) 4 \ln(a) - 9 \ln(b)$

76) _____

$$77) 5 \ln(x - 9) - 4 \ln(x)$$

77) _____

$$78) 2 \ln(x - 4) - 7 \ln(x)$$

78) _____

$$79) 6 \ln(x - 11) - 7 \ln(x)$$

79) _____

$$80) 4 \ln(x^2) + 3 \ln(4x)$$

80) _____

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

81) _____

$$82) 2 \ln(x^2) + 2 \ln(4x)$$

82) _____

$$83) 2 \ln(w^2) - \ln(7w^8)$$

83) _____

$$84) 2 \ln(w^2) - \ln(5w^8)$$

84) _____

$$85) 2 \ln(w^2) - \ln(5w^9)$$

85) _____

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

86) $e^{2x} = 7$

86) _____

87) $e^{5x} = 7$

87) _____

88) $e^{(x+3)} = 7$

88) _____

89) $e^{(x+6)} = 3$

89) _____

90) $\ln(3x) + \ln(7x) = 5$

90) _____

91) $\ln(9x) + \ln(7x) = 2$

91) _____

92) $-4 \ln(8x^2) + 5 \ln(7x^4) = 2$

92) _____

93) $5 \ln(4x^2) - 3 \ln(6x^3) = 2$

93) _____

94) $e^{3x-9} \cdot e^{4x} = 100$

94) _____

95) $e^{3x - 7} \cdot e^{4x} = 119$

95) _____

Evaluate. Round your result to the fourth decimal place.

96) $\log_5(9)$

96) _____

97) $\log_2(17)$

97) _____

98) $\log_{21}(362)$

98) _____

99) $\log_{25}(347)$

99) _____

100) $\log_{18}(49)$

100) _____

101) $\log_{20}(86.4)$

101) _____

102) $\log_{0.6}(19)$

102) _____

103) $\log_{0.2}(15)$

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 110 years? 104) _____

105) The function $y = 600e^{-0.00693x}$ 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 600 pounds of the material are initially put into the vault, how many pounds will be left after 130 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 $f(t) = 3100e^{0.057t}$. 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 $f(t) = 3300e^{0.058t}$. 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 $f(t) = 9100e^{0.063t}$. When will the account be worth \$16,043? 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 $f(t) = 7600e^{0.05t}$. When will the account be worth \$8830? 109) _____

Answer Key

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1) $x = 7 \pm 2i$

2) $x = -4 \pm 5i$

3) $x = 7 \pm i\sqrt{6}$

4) $x = -3 \pm i\sqrt{10}$

5) $\frac{-1 \pm 3i\sqrt{3}}{2}$

6) $\frac{-1 \pm i\sqrt{19}}{2}$

7) $\frac{3 \pm i\sqrt{23}}{16}$

8) $\frac{3 \pm i\sqrt{55}}{32}$

9) $\frac{7 \pm i\sqrt{91}}{10}$

10) $\frac{-7 \pm i\sqrt{23}}{18}$

11) $\frac{-5 \pm i\sqrt{167}}{12}$

12) $\frac{-3 \pm i\sqrt{19}}{14}$

13) $\frac{3 \pm i\sqrt{119}}{8}$

14) $\frac{5 \pm i\sqrt{71}}{12}$

15) $-3 \pm 4i$

16) $2 \pm 3i$

17) $9 \pm i\sqrt{11}$

18) $-12 \pm i\sqrt{7}$

19) $\frac{-1 \pm i\sqrt{35}}{2}$

20) $\frac{-1 \pm i\sqrt{35}}{2}$

21) $\frac{5 \pm i\sqrt{95}}{12}$

22) $\frac{5 \pm i\sqrt{155}}{18}$

23) $\frac{6 \pm i\sqrt{34}}{10}$

24) $\frac{2 \pm i\sqrt{6}}{10}$

25) $\frac{5 \pm i\sqrt{119}}{12}$

Answer Key

Testname: EXAM 3 (FINAL) PREPARATION CH 7 & CH 8V01UPDATED

26) $\frac{5 \pm i\sqrt{167}}{12}$

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

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

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

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

31) $\left\{\frac{7}{2}, \frac{5}{2}\right\}$

32) $\left\{\frac{3}{4}, \frac{9}{4}\right\}$

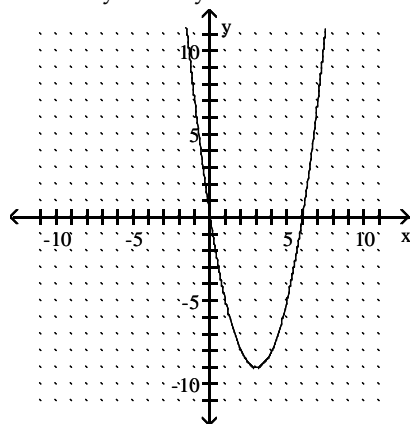
33) $\left\{\frac{3}{5}, \frac{4}{5}\right\}$

34) $\left\{\frac{15}{8}, \frac{3}{2}\right\}$

35) $\{3, 1\}$

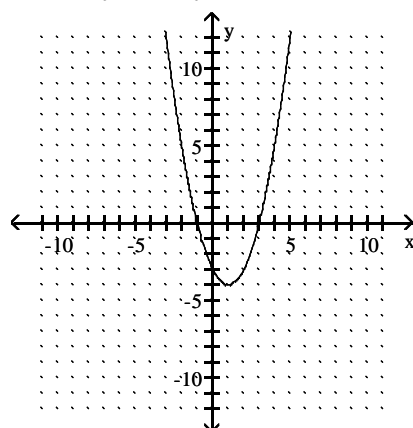
36) vertex: $(3, -9)$

axis of symmetry: $x = 3$



37) vertex: $(1, -4)$

axis of symmetry: $x = 1$

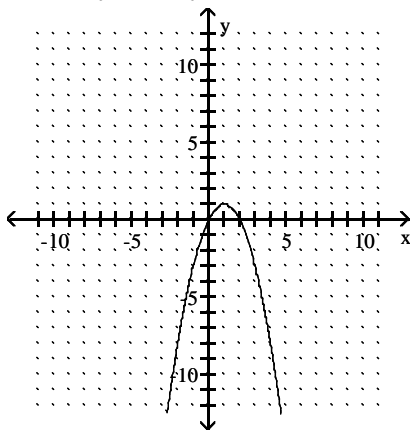


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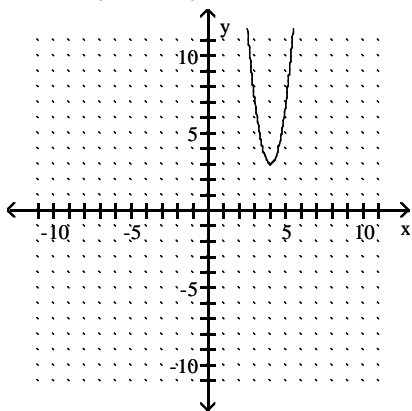
38) vertex: (1, 1)

axis of symmetry: $x = 1$



39) vertex: (4, 3)

axis of symmetry: $x = 4$

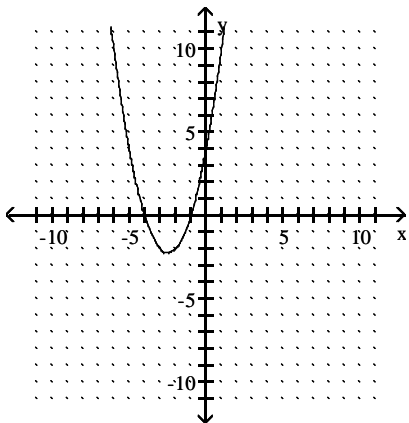


40) vertex: $\left(-\frac{5}{2}, -\frac{9}{4}\right)$

x-intercepts: (-1, 0) and (-4, 0)

y-intercept: (0, 4)

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



Answer Key

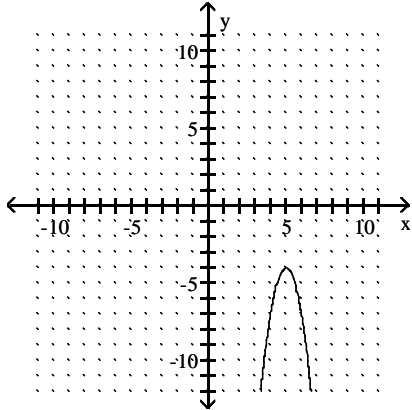
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41) vertex: (5, -4)

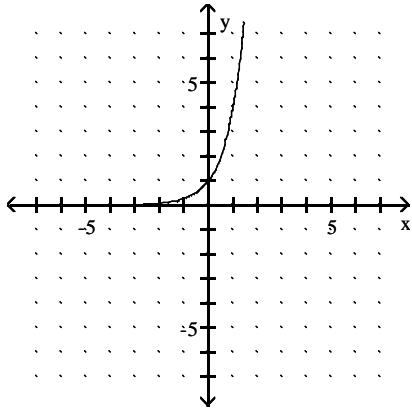
x-intercepts: none

y-intercept: (0, -79)

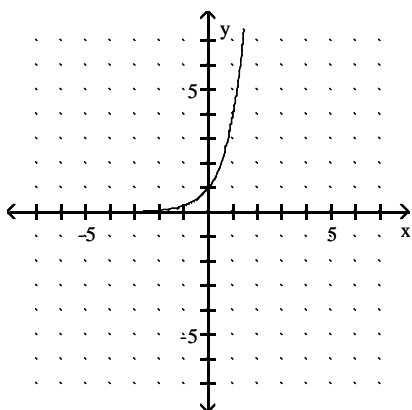
axis of symmetry: $x = 5$



42)



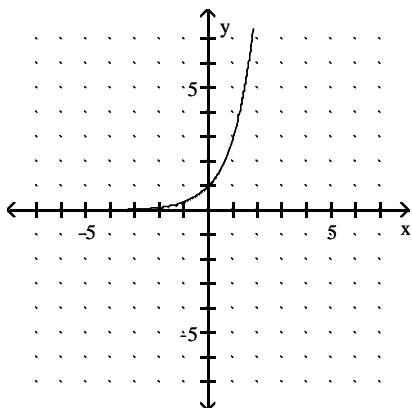
43)



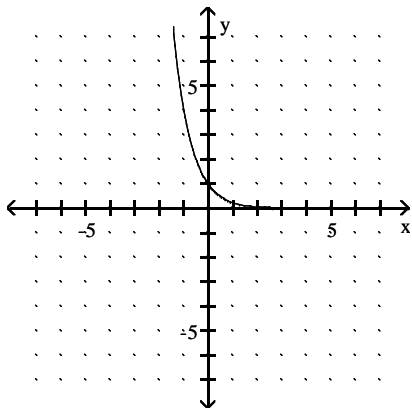
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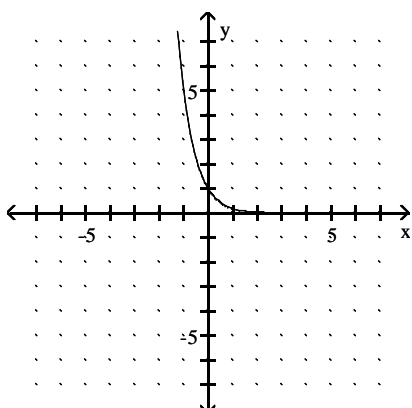
44)



45)



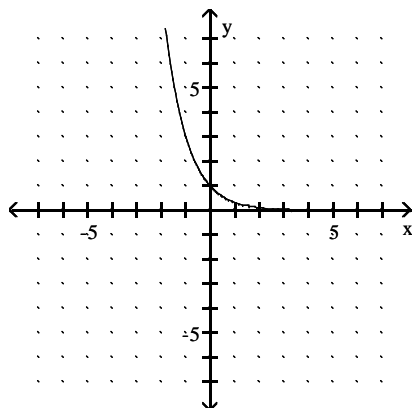
46)



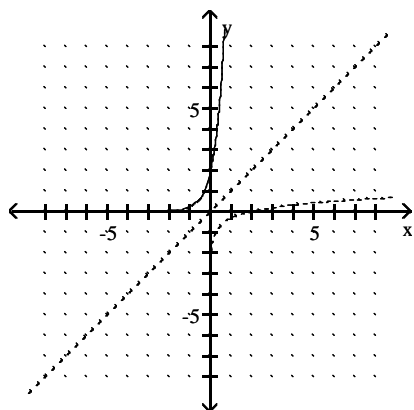
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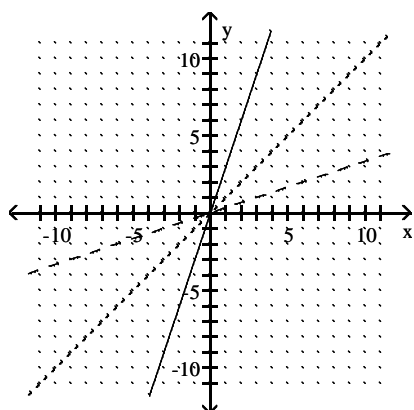
47)



48)



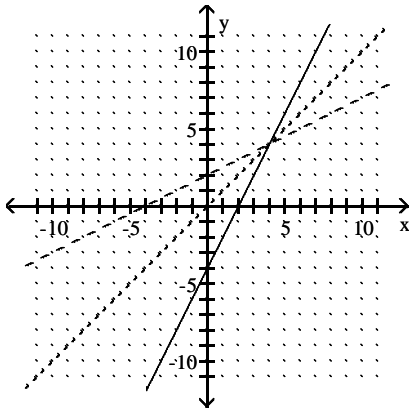
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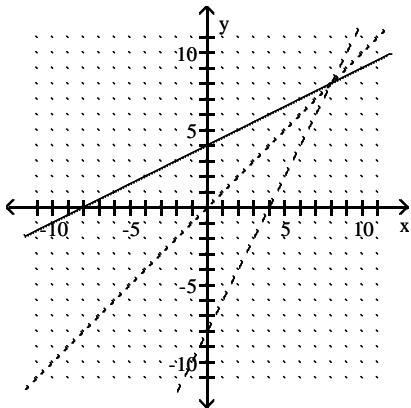
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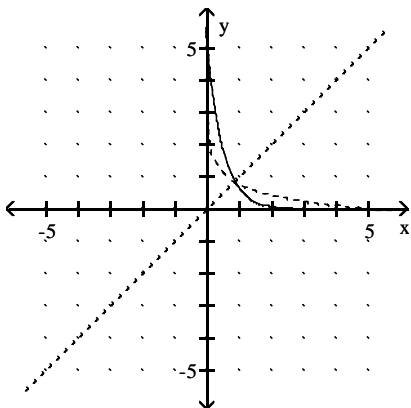
50)



51)



52)



53) 3

54) 3

55) 2

56) 3

57) 0

58) 0

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

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

61) 1

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Testname: EXAM 3 (FINAL) PREPARATION CH 7 & CH 8V01UPDATED

62) 1

63) -3

64) -2

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

66) $\frac{1}{3}$

67) 2

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

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

70) 1

71) 0

72) -3

73) -5

74) $\ln \left(\frac{a^8}{b^5} \right)$

75) $\ln \left(\frac{a^9}{b^7} \right)$

76) $\ln \left(\frac{a^4}{b^9} \right)$

77) $\ln \left(\frac{(x-9)^5}{x^4} \right)$

78) $\ln \left(\frac{(x-4)^2}{x^7} \right)$

79) $\ln \left(\frac{(x-11)^6}{x^7} \right)$

80) $\ln(64x^{11})$

81) $\ln(25x^6)$

82) $\ln(16x^6)$

83) $\ln \left(\frac{1}{7w^4} \right)$

84) $\ln \left(\frac{1}{5w^4} \right)$

85) $\ln \left(\frac{1}{5w^5} \right)$

86) 0.9730

87) 0.3892

88) -1.0541

89) -4.9014

90) 2.6584

91) 0.3425

92) 1.0502

Answer Key

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- 93) 1.5586
- 94) 1.9436
- 95) 1.6827
- 96) 1.3652
- 97) 4.0875
- 98) 1.9352
- 99) 1.8172
- 100) 1.3465
- 101) 1.4884
- 102) -5.7641
- 103) -1.6826
- 104) 187 pounds
- 105) 244 pounds
- 106) \$3100.00
- 107) \$3300.00
- 108) 2009
- 109) 2003