Math 098 Exam 1 Preparation Ch. 1, Ch.2, 3.1, & 3.5 v02
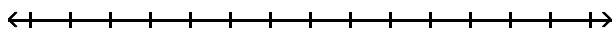NO BOOK/ NO NOTES/YES CALCUATOR
Dressler Winter 2016

Name_____

State the solution set of the inequality in interval notation and sketch its graph.
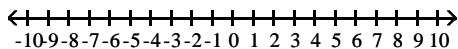
1) $7x + 2 > 6x - 4$

1) _____

Express the interval in set–builder notation and graph the interval on a number line.
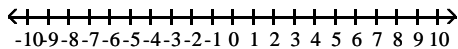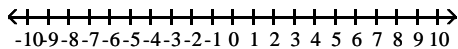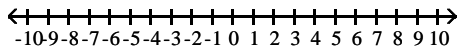
2) $(-1, 1]$

2) _____

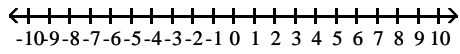
3) $(-5, 4]$

3) _____

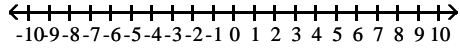4) $[-6, 9)$

4) _____

5) $[-2, 5)$

5) _____

6) $\left(-\infty, \dfrac{9}{2}\right]$
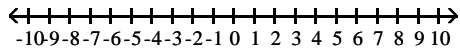
<-|-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+->
-10-9-8-7-6-5-4-3-2-1 0 1 2 3 4 5 6 7 8 9 10

6) _____

7) $\left(-\infty, \dfrac{6}{5}\right]$

<-|-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+->
-10-9-8-7-6-5-4-3-2-1 0 1 2 3 4 5 6 7 8 9 10

7) _____

8) [–1, 7]

<-|-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+->
-10-9-8-7-6-5-4-3-2-1 0 1 2 3 4 5 6 7 8 9 10

8) _____

9) [–2, 4]

<-|-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+->
-10-9-8-7-6-5-4-3-2-1 0 1 2 3 4 5 6 7 8 9 10

9) _____

10) (–6, ∞)

<-|-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+->
-10-9-8-7-6-5-4-3-2-1 0 1 2 3 4 5 6 7 8 9 10

10) _____

11) (–4, ∞)

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-10-9-8-7-6-5-4-3-2-1 0 1 2 3 4 5 6 7 8 9 10
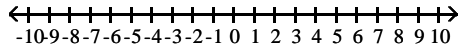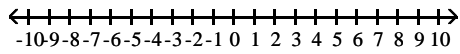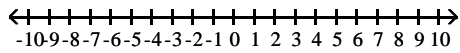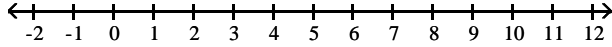
11) _____

Solve the compound inequality. Other than $\varnothing$, use interval notation to express the solution set and graph the solution set on a number line.
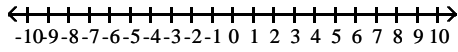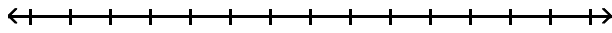
12) $15 < 5x \le 30$

12) _____

13) $-2 < x - 1 \le 4$
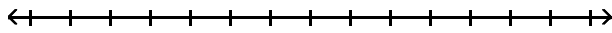

13) _____

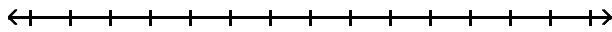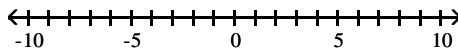14) $17 \le 5x - 3 \le 27$

14) _____

15) $-13 \le -2x - 1 < -9$

15) _____

16) $-16 \le -2x - 4 \le -8$

16) _____

17) $-4 \le -4x - 12 < 4$

17) _____

18) $1 \le \dfrac{5}{2}x - 4 < 11$

18) _____

-5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
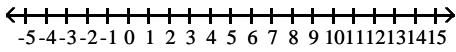
Use graphs to find the set.

19) $(-9, 0) \cap [-4, 10]$

19) _____

20) $(-8, 0) \cap [-4, 7]$

20) _____

21) $(-9, 0) \cup [-4, 6]$

21) _____

22) $(-10, 0) \cup [-4, 2]$

22) _____

23) $(-\infty, 2) \cap [-6, 14)$

23) _____

24) $(-\infty, 2) \cap [-7, 14)$

24) _____

25) $(-\infty, 9) \cup [-2, 18)$

25) _____

26) $(-\infty, 9) \cup [-6, 12)$

26) _____

27) $(9, \infty) \cap [19, \infty)$ 27) _____

28) $(7, \infty) \cap [17, \infty)$ 28) _____
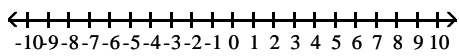
29) $(1, \infty) \cup [18, \infty)$ 29) _____

30) $(9, \infty) \cup [16, \infty)$ 30) _____

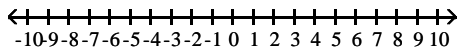**Express the interval in set–builder notation and graph the interval on a number line.**
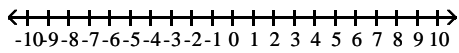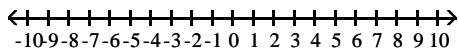
31) $[2, \infty)$ 31) _____

-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10

32) $[-8, \infty)$ 32) _____

-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10

33) $(-\infty, 2.5]$ 33) _____

-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10

34) $(-\infty, 2.5]$ 34) _____

-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9 10
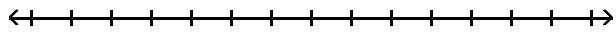
State the solution set of the inequality in interval notation and sketch its graph.

35) $3x + 4 > 2x + 2$

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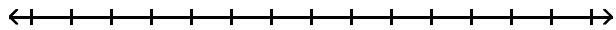
36) $8x + 5 \geq 7x - 2$

<←———┼———┼———┼———┼———┼———┼———┼———┼———┼———┼———┼———→>

37) $4x - 7 \geq 3x - 9$

<←———┼———┼———┼———┼———┼———┼———┼———┼———┼———┼———┼———→>

38) $12x + 16 > 4(2x + 1)$

<←———┼———┼———┼———┼———┼———┼———┼———┼———┼———┼———┼———→>

39) $14x - 8 > 2(6x + 1)$

<←———┼———┼———┼———┼———┼———┼———┼———┼———┼———┼———┼———→>
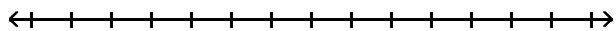
40) $-42x - 42 \leq -6(6x + 8)$

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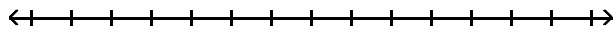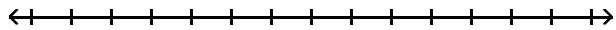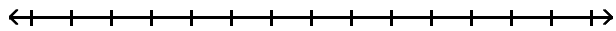
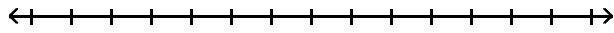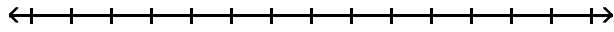41) $-24x - 12 \leq -6(3x + 6)$

41) _____

<--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|-->

42) $3x - 2 \geq 2x - 9$

42) _____

<--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|-->

Solve.

43) Kevin invested part of his $10,000 bonus in a certificate of deposit that paid 6% annual interest, and the remainder in a mutual fund that paid 11% annual interest. If his total interest for that year was $800, how much did Kevin invest in the mutual fund?

43) _____

44) Kevin invested part of his $10,000 bonus in a certificate of deposit that paid 6% annual interest, and the remainder in a mutual fund that paid 11% annual interest. If his total interest for that year was $700, how much did Kevin invest in the mutual fund?

44) _____

45) Melissa invested a sum of money at 3% annual interest. She invested three times that sum at 5% annual interest. If her total yearly interest from both investments was $3600, how much was invested at 3%?

45) _____

46) A bank loaned out $57,000, part of it at the rate of 11% per year and the rest at a rate of 8% per year. If the interest received was $5310, how much was loaned at 11%?
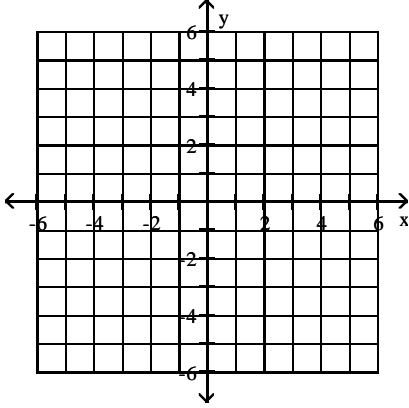
46) _____

47) A bank loaned out $69,000, part of it at the rate of 15% per year and the rest at a rate of 4% per year. If the interest received was $5730, how much was loaned at 15%?
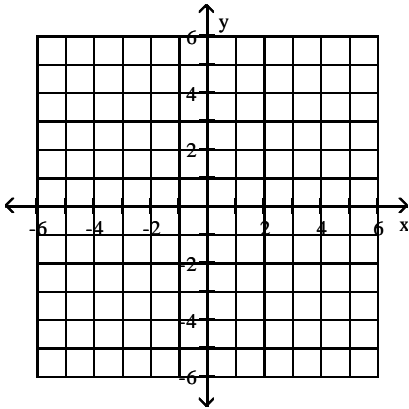
47) _____

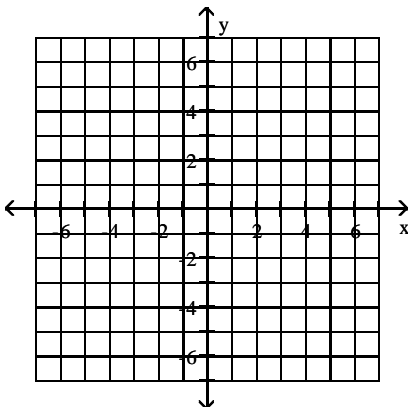**Graph the equation.**

48) y = x – 1

48) _____

49) y = x – 3

49) _____
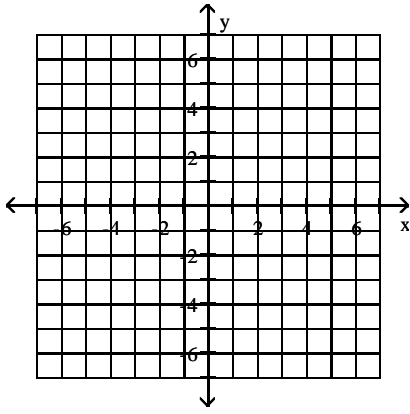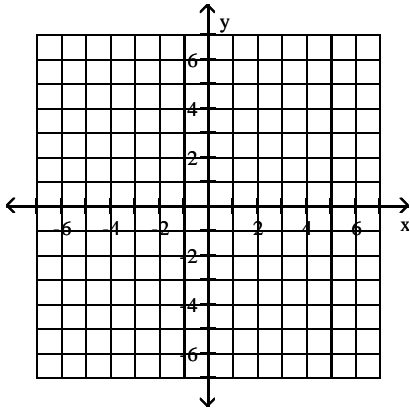
50) y = 3x – 2

50) _____
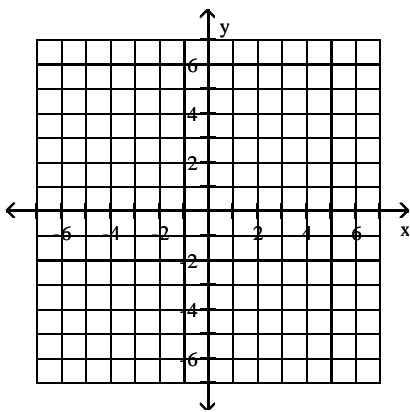
51) y = 3x + 2

51) _____

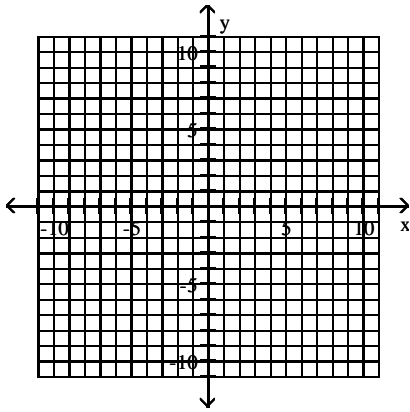52) $y = -\dfrac{1}{5}x + 4$

52) _____

53) $y = -\dfrac{1}{2}x - 4$

53) _____
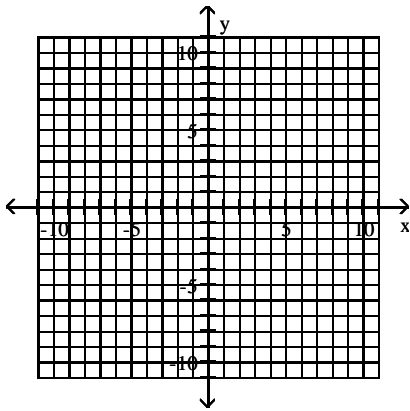
54) $y = x^2 + 5$

54) _____
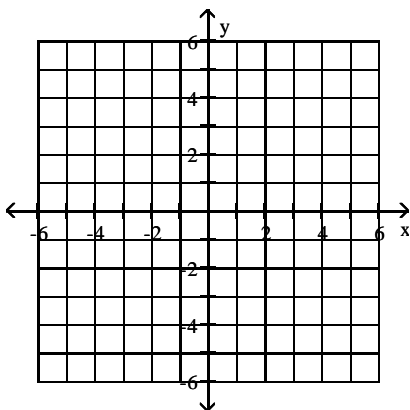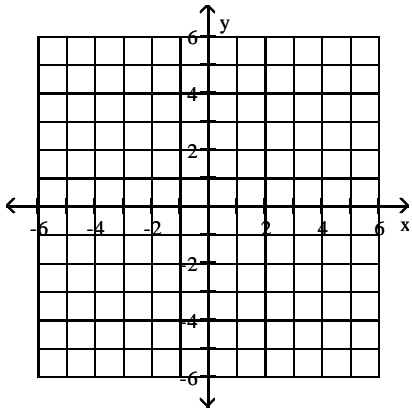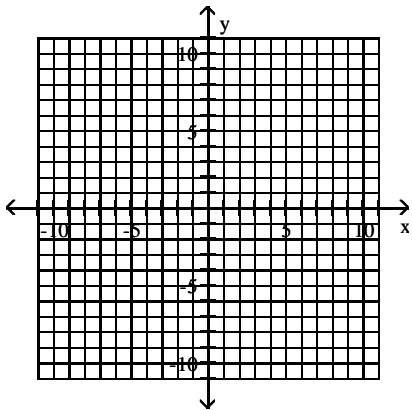
55) $y = x^2 - 5$

55) _____
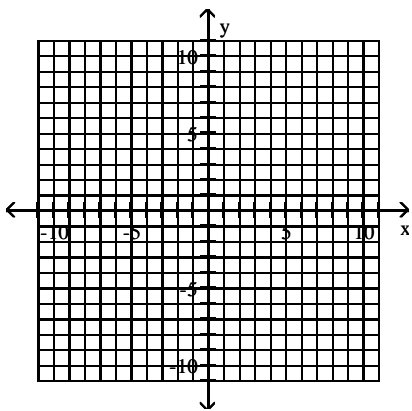
56) $y = x^3 + 2$

56) _____

57) $y = x^3 + 5$

57) _____

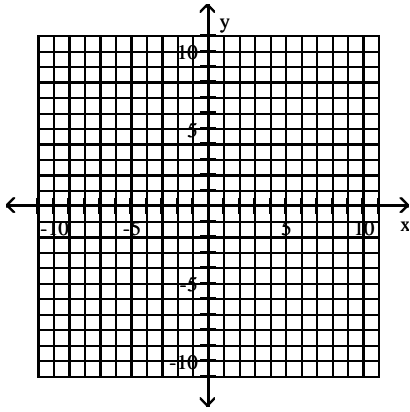58) $y = -|x| + 2$

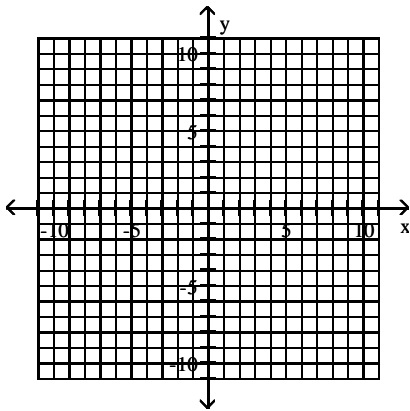58) _____

59) $y = -|x| + 1$

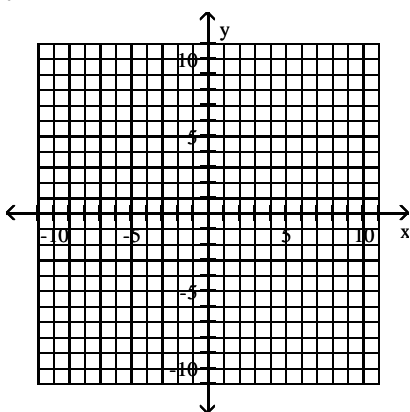59) _____

60) $y = -3|x|$
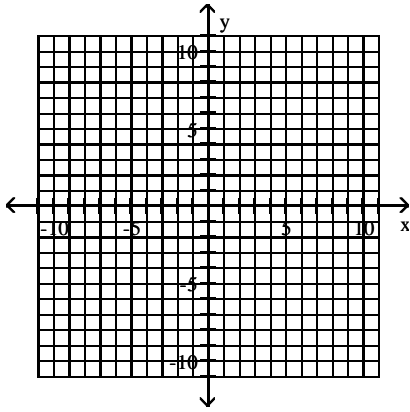
60) _____

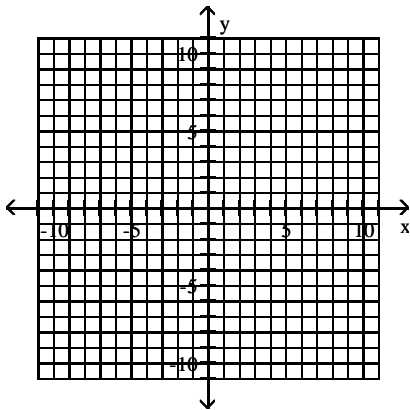61) $y = -5|x|$

61) _____

62) $y = 3$
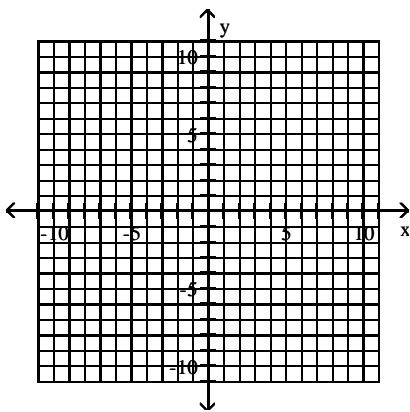
62) _____

63) $y = 2$

63) _____

64) $y = \dfrac{1}{x}$

64) _____
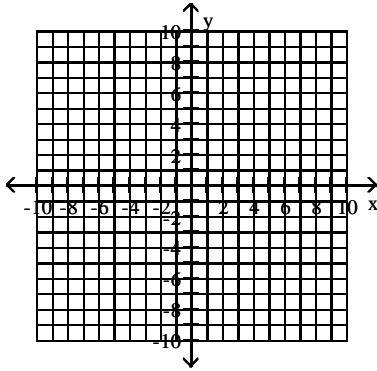
65) $y = \dfrac{1}{x}$

65) _____

Begin by graphing the standard absolute value function f(x) = |x|. Then use transformations of this graph to graph the given function.
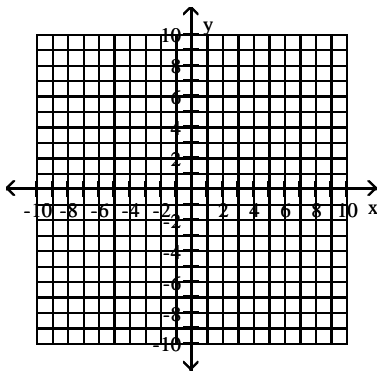
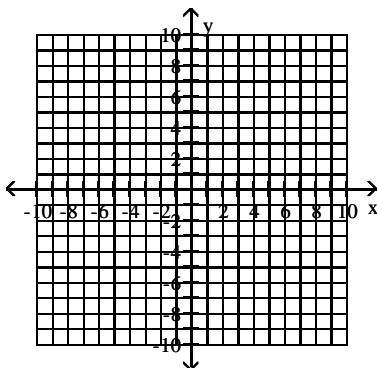66) $g(x) = |x| + 2$

66) _____

67) $g(x) = |x| + 3$

67) _____

Begin by graphing the standard function f(x) = x^3 Then use transformations of this graph to graph the given function.
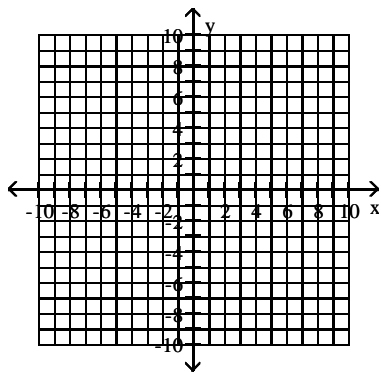
68) $g(x) = x^3 + 3$

68) _____

69) $g(x) = x^3 - 3$

69) _____

Determine the domain and range of the relation. State whether the relation is a function or not a function.

70)

input	2	6	2	2
output	14	1	5	7

70) _____

71)

input	2	5	2	8
output	7	3	5	4

71) _____

72)

input	-2	-1	1	2
output	2	5	2	5

72) _____

73)

input	-9	-3	3	9
output	6	12	6	12

73) _____

Solve the problem.

74) Some values for a relation are given in the table. Is the relation a function?

x	y
1	5
2	9
3	2
3	4
4	7

74) _____

75) Some values for a relation are given in the table. Is the relation a function?

x	y
5	3
6	4
7	6
8	6
9	15

75) _____

Given functions f and g, perform the indicated operations.

76) $f(x) = 3x - 7,$ $g(x) = 7x + 5$
Find fg.

76) _____

77) $f(x) = 4x - 5,$ $g(x) = 6x - 2$
Find f − g.

77) _____

78) $f(x) = 2 - 4x,$ $g(x) = -6x + 4$
Find f + g.

78) _____

79) $f(x) = 9x - 9,$ $g(x) = 5x - 8$
Find fg.

79) _____

Find the domain of the function.

80) $\dfrac{x}{\sqrt{x-6}}$

80) _____

81) $\dfrac{x}{\sqrt{x-8}}$

81) _____

82) $f(x) = \dfrac{1}{x-8}$

82) _____

83) $f(x) = \dfrac{1}{x+2}$

83) _____

84) $f(x) = \dfrac{-3x}{x+5}$

84) _____

85) $f(x) = \dfrac{-8x}{x+3}$

85) _____

86) $f(x) = x - \dfrac{6}{x+3}$

86) _____

87) $f(x) = x - \dfrac{7}{x-6}$

87) _____

88) $f(x) = \dfrac{1}{x - 8} + \dfrac{4}{x - 4}$

88) _____

89) $f(x) = \dfrac{1}{x - 5} + \dfrac{4}{x - 3}$

89) _____

For the given functions f and g , find the indicated composition.

90) $f(x) = 16x^2 - 2x,\ \ g(x) = 8x - 6$
$(f \circ g)(3)$

90) _____

91) $f(x) = 11x^2 - 2x,\ \ g(x) = 18x - 7$
$(f \circ g)(1)$

91) _____

92) $f(x) = x^2 - 2x + 5,\ \ \ \ g(x) = x^2 - 2x - 5$
$(f \circ g)(-4)$

92) _____

93) $f(x) = x^2 + 2x + 2,\ \ \ \ g(x) = x^2 + 2x + 1$
$(f \circ g)(-3)$

93) _____

94) $f(x) = 8x + 12,\ \ \ \ g(x) = 4x - 1$
$(f \circ g)(x)$

94) _____

95) $f(x) = 8x + 6,\ \ \ \ g(x) = 2x - 1$
$(f \circ g)(x)$

95) _____

96) $f(x) = -6x + 2$, $g(x) = 3x + 3$
  $(g \circ f)(x)$

96) _____

97) $f(x) = -2x + 4$, $g(x) = 6x + 8$
  $(g \circ f)(x)$

97) _____

98) $f(x) = \dfrac{4}{x + 3}$, $g(x) = \dfrac{7}{5x}$
  $(f \circ g)(x)$

98) _____

99) $f(x) = \dfrac{3}{x - 3}$, $g(x) = \dfrac{8}{3x}$
  $(f \circ g)(x)$

99) _____

100) $f(x) = \dfrac{x - 9}{8}$, $g(x) = 8x + 9$
  $(g \circ f)(x)$

100) _____

101) $f(x) = \dfrac{x - 4}{8}$, $g(x) = 8x + 4$
  $(g \circ f)(x)$

101) _____

102) $f(x) = 4x^2 + 6x + 3$, $g(x) = 6x - 7$
  $(g \circ f)(x)$

102) _____

103) $f(x) = 4x^2 + 5x + 3$, $g(x) = 5x - 5$
  $(g \circ f)(x)$

103) _____

Decide whether the relation is a function.

104) {(−1, −1), (1, −6), (6, −7), (9, 8), (12, −7)}

104) _____

105) {(−4, −2), (−3, 9), (4, 8), (4, −1)}

105) _____

106) {(−5, −7), (−3, 3), (1, −5), (5, 1)}

106) _____

Find the slope of the line passing through the pair of points or state that the slope is undefined.

107) (16, −4) and (4, 15)

107) _____

108) (−1, 19) and (9, −4)

108) _____

109) (4, −5), (−4, −8)

109) _____

110) (−7, −8), (9, 1)

110) _____

111) (1, −6) and (1, 2)

111) _____

112) (4, −8) and (4, −1)

112) _____

Find the slope of the line, or state that the slope is undefined.

113)

114)
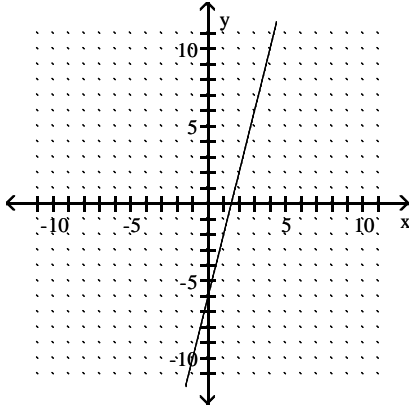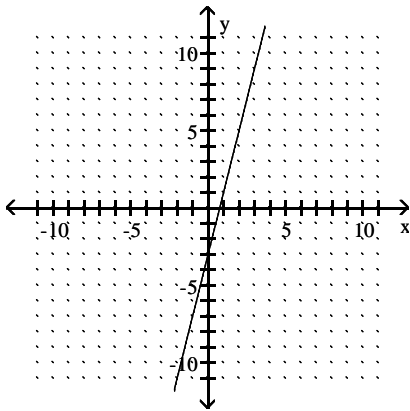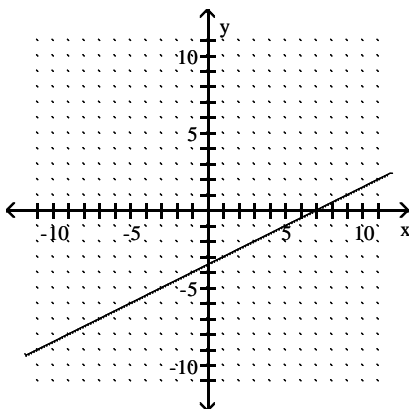
115)

116)
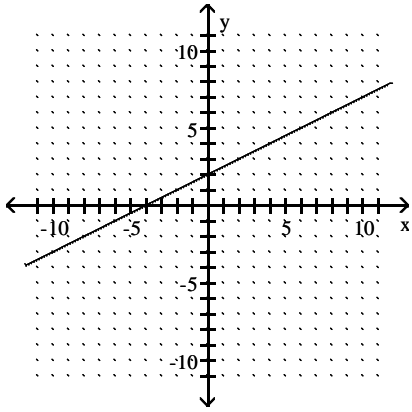
116) _____

117)

117) _____

118)

118) _____

119)
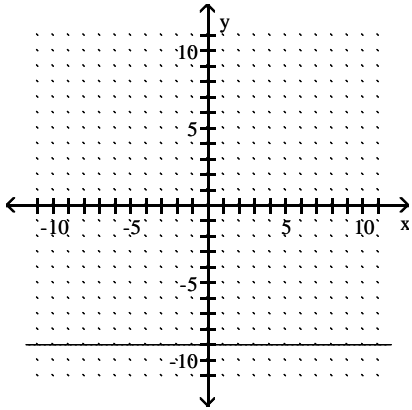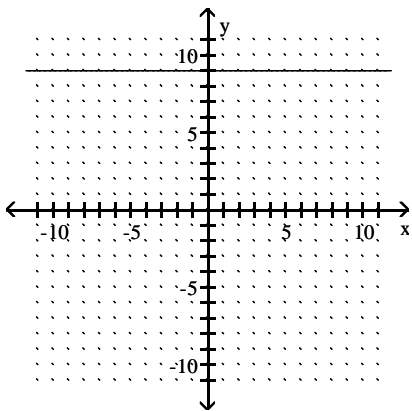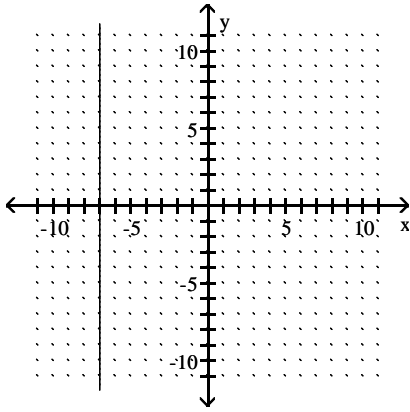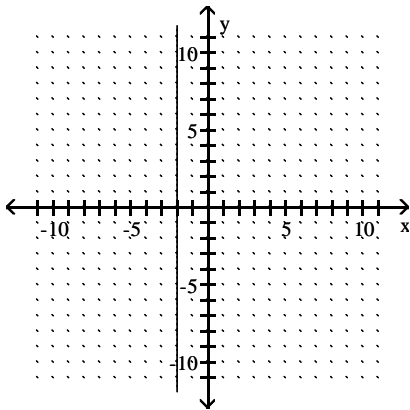
120)

Solve the system by the addition method. If there is no solution or an infinite number of solutions, so state. Use set notation to express the solution set.

121) $\begin{cases} x + y = -2 \\ x - y = -4 \end{cases}$

121) _____

122) $\begin{cases} x + y = 2 \\ x - y = -14 \end{cases}$

122) _____

123) $\begin{cases} x - 3y = -18 \\ 2x - 3y = -12 \end{cases}$

123) _____

124) $\begin{cases} -6x + 7y = -21 \\ -3x + 3y = -9 \end{cases}$

124) _____

125) $\begin{cases} -7x - 7y = -63 \\ -3x - 5y = -45 \end{cases}$

125) _____

126) $\begin{cases} \dfrac{1}{2}x + \dfrac{1}{2}y = 0 \\ \dfrac{1}{3}x - \dfrac{1}{3}y = 4 \end{cases}$

126) _____

127) $\begin{cases} \dfrac{1}{2}x + \dfrac{1}{2}y = 1 \\ \dfrac{1}{2}x - \dfrac{1}{2}y = 6 \end{cases}$

127) _____

Solve the problem.

128) Devon purchased tickets to an air show for 5 adults and 2 children. The total cost was $163. The cost of a child's ticket was $6 less than the cost of an adult's ticket. Find the price of an adult's ticket and a child's ticket.

128) _____

129) Devon purchased tickets to an air show for 6 adults and 2 children. The total cost was $114. The cost of a child's ticket was $7 less than the cost of an adult's ticket. Find the price of an adult's ticket and a child's ticket.

129) _____

130) A barge takes 3 hours to move (at a constant rate) downstream for 27 miles, helped by a current of 3 miles per hour. If the barge's engines are set at the same pace, find the time of its return trip against the current.

130) _____

131) A barge takes 2 hours to move (at a constant rate) downstream for 16 miles, helped by a current of 3 miles per hour. If the barge's engines are set at the same pace, find the time of its return trip against the current.

131) _____

132) Khang and Hector live 33.6 miles apart in southeastern Missouri. They decide to bicycle towards each other and meet somewhere in between. Hector's rate of speed is 40% of Khang's. They start out at the same time and meet 3 hours later. Find Hector's rate of speed.

132) _____

133) Khang and Hector live 81.6 miles apart in southeastern Missouri. They decide to bicycle towards each other and meet somewhere in between. Hector's rate of speed is 70% of Khang's. They start out at the same time and meet 4 hours later. Find Hector's rate of speed.

133) _____

134) Doreen and Irena plan to leave their houses at the same time, roller blade towards each other, and meet for lunch after 2 hours on the road. Doreen can maintain a speed of 6.3 miles per hour, which is 90% of Irena's speed. If they meet exactly as planned, what is the distance between their houses?

134) _____

135) Doreen and Irena plan to leave their houses at the same time, roller blade towards each other, and meet for lunch after 3 hours on the road. Doreen can maintain a speed of 2.4 miles per hour, which is 40% of Irena's speed. If they meet exactly as planned, what is the distance between their houses?

135) _____

1) (−6, ∞)
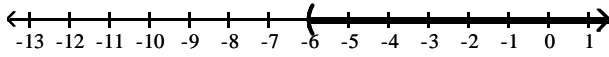
2) {x | −1 < x ≤ 1}
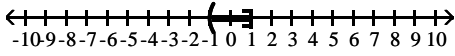
3) {x | −5 < x ≤ 4}
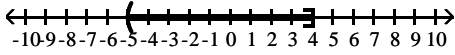
4) {x | −6 ≤ x < 9}
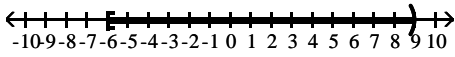
5) {x | −2 ≤ x < 5}
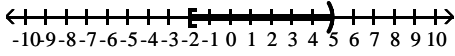
6) $\left\{ x \mid x < \dfrac{9}{2} \right\}$
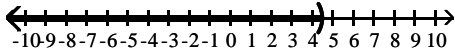
7) $\left\{ x \mid x < \dfrac{6}{5} \right\}$
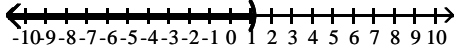
8) {x | −1 ≤ x ≤ 7}
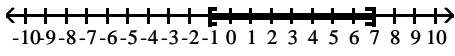
9) {x | −2 ≤ x ≤ 4}
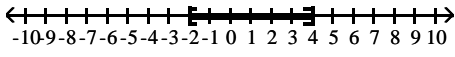
10) {x | x > −6}
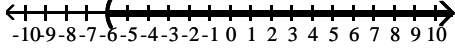
11) {x | x > −4}
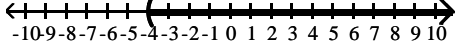
12) (3, 6]
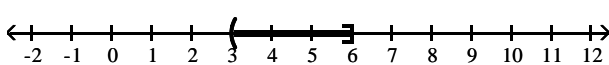
13) (−1, 5]
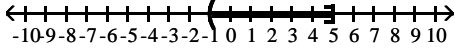
14) [4, 6]
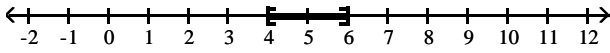
15) (4, 6]
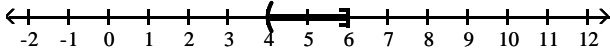
16) [2, 6]
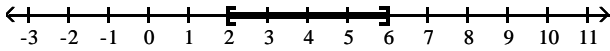
17) (–4, –2]
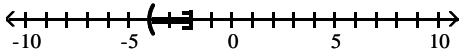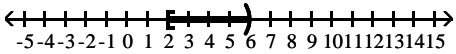
18) [2, 6)

19) [–4, 0)
20) [–4, 0)
21) (–9, 6]
22) (–10, 2]
23) [–6, 2)
24) [–7, 2)
25) (– ∞, 18)
26) (– ∞, 12)
27) [19, ∞)
28) [17, ∞)
29) (1, ∞)
30) (9, ∞)
31) {x | x ≥ 2}
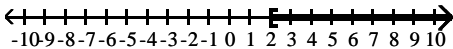
32) {x | x ≥ –8}
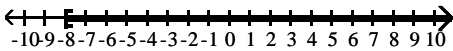
33) {x | x ≤ 2.5}
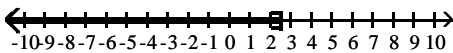
34) {x | x ≤ 2.5}
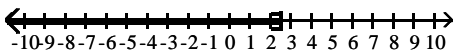
35) (–2, ∞)

36) [–7, ∞)
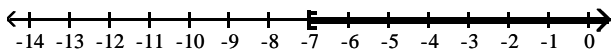
37) [–2, ∞)
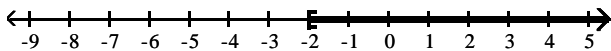
38) (–3, ∞)
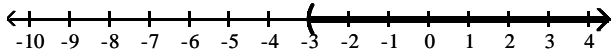
39) (5, ∞)
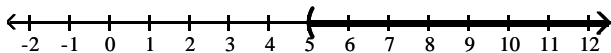
40) [1, ∞)
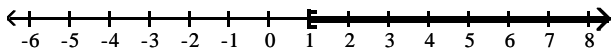
41) [4, ∞)
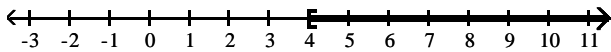
42) [–7, ∞)
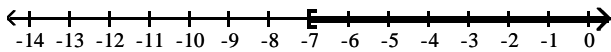
43) $4000
44) $2000
45) $20,000
46) $25,000
47) $27,000
48)
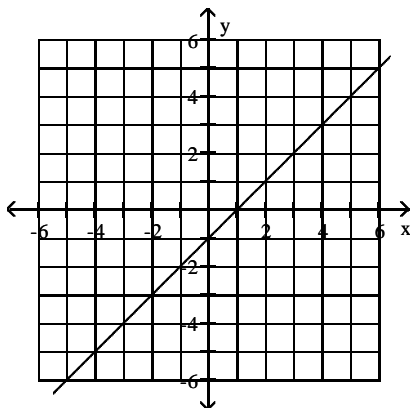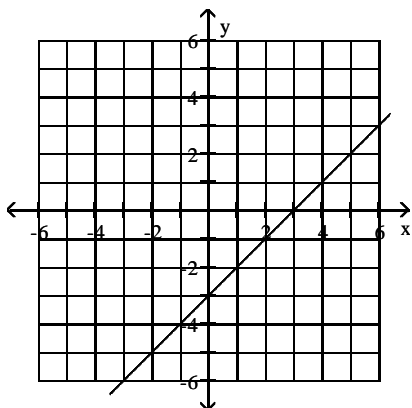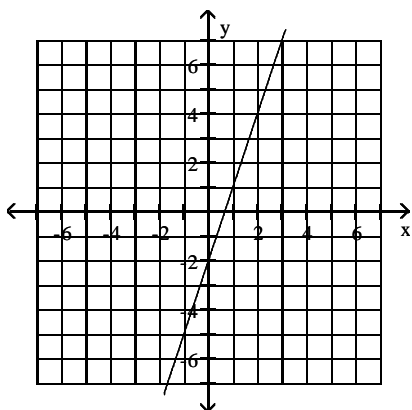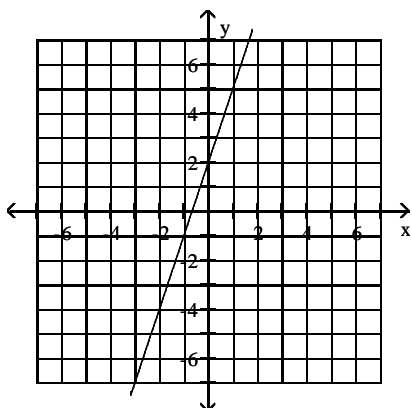
49)

50)

51)

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63)

64)

65)

66)

67)
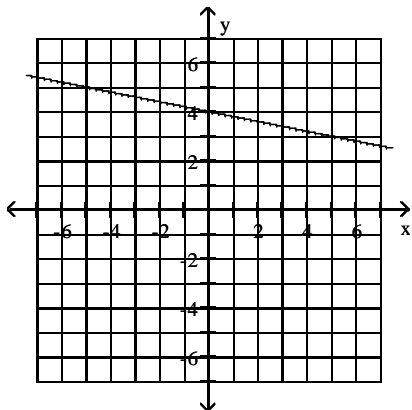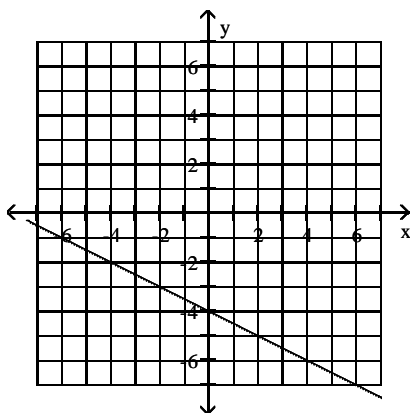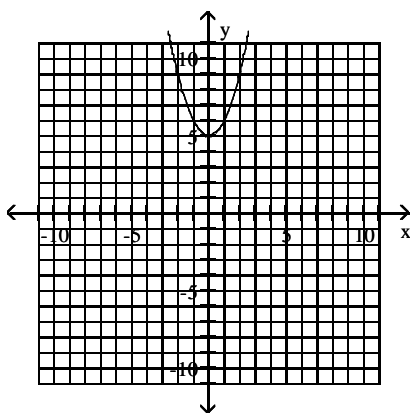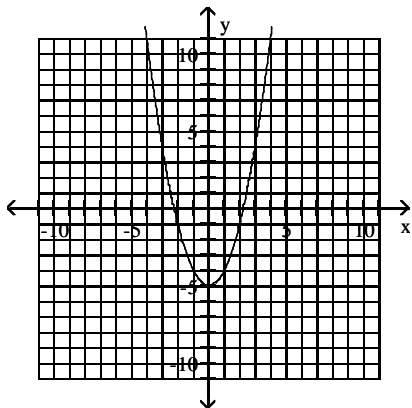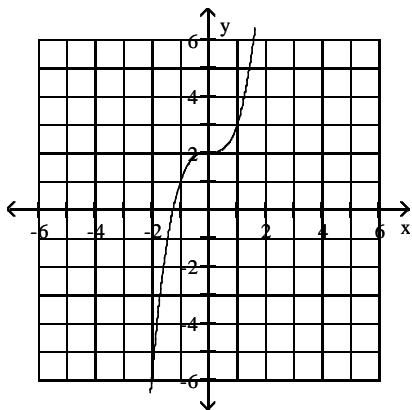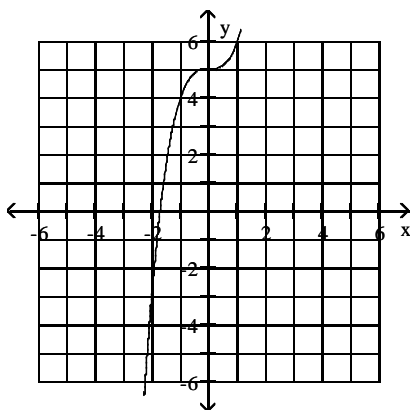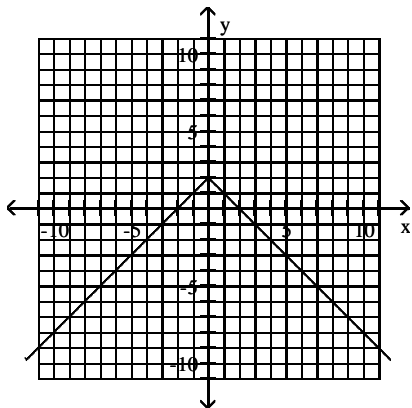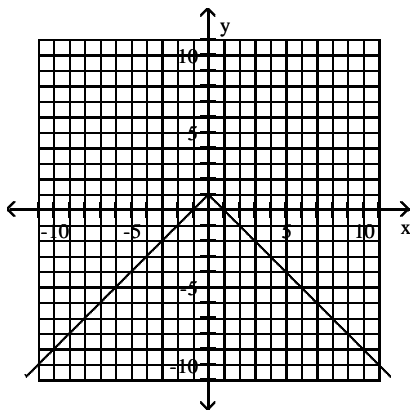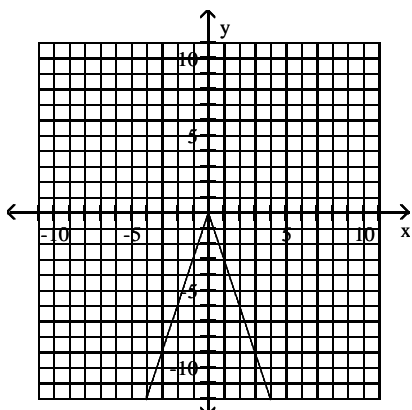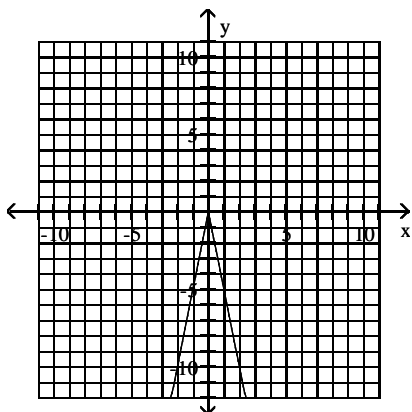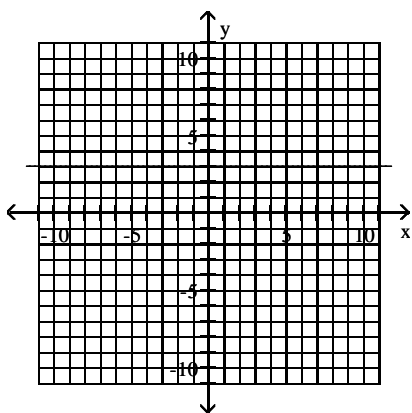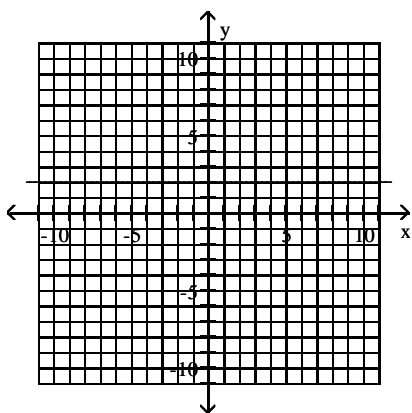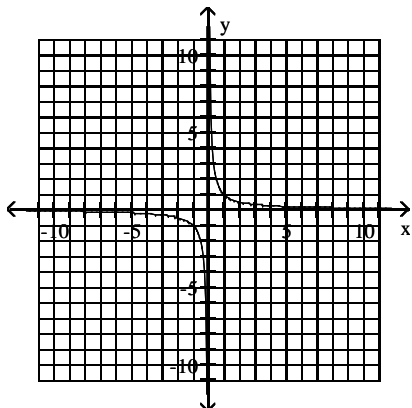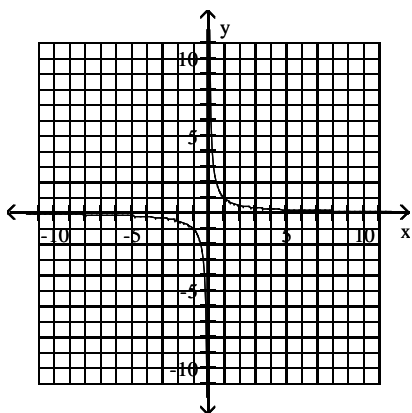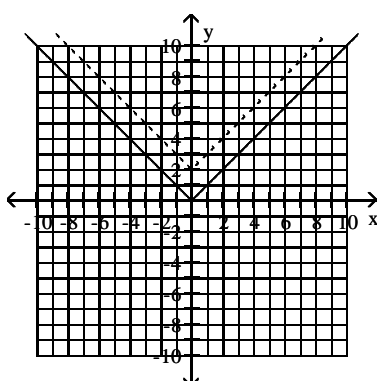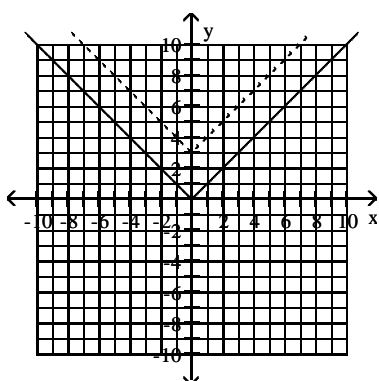
68)
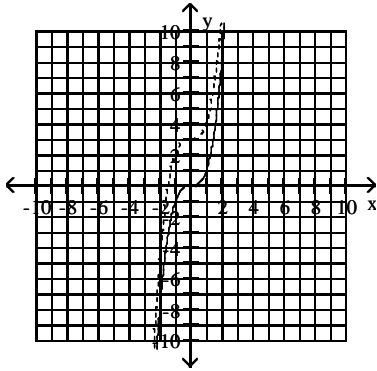
69)
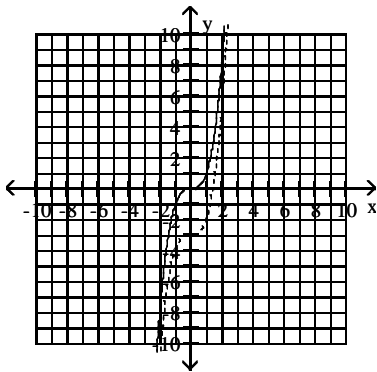
70) domain: {2, 2, 6}
    range: {5, 7, 1, 14}
    not a function

71) domain: {2, 8, 5}
    range: {5, 4, 3, 7}
    not a function

72) domain: {-2,-1, 1, 2}
    range: { 2, 5}
    function

73) domain: {-9,-3, 3, 9}
    range: { 6, 12}
    function

74) No

75) Yes

76) $21x^2 - 34x - 35$

77) $-2x - 3$

78) $-10x + 6$

79) $45x^2 - 117x + 72$

80) $(6, \infty)$

81) $(8, \infty)$

82) $(-\infty, 8) \cup (8, \infty)$

83) $(-\infty, -2) \cup (-2, \infty)$

84) $(-\infty, -5) \cup (-5, \infty)$

85) $(-\infty, -3) \cup (-3, \infty)$

86) $(-\infty, -3) \cup (-3, \infty)$

87) $(-\infty, 6) \cup (6, \infty)$

88) $(-\infty, 4) \cup (4, 8) \cup (8, \infty)$

89) $(-\infty, 3) \cup (3, 5) \cup (5, \infty)$

90) 5148

91) 1309

92) 328

93) 26

94) $32x + 4$

95) $16x - 2$

96) $-18x + 9$

97) $-12x + 32$

98) $\dfrac{20x}{7 + 15x}$

99) $\dfrac{9x}{8 - 9x}$

100) x

101) x

102) $24x^2 + 36x + 11$

103) $20x^2 + 25x + 10$

104) Function

105) Not a function

106) Function

107) $-\dfrac{19}{12}$

108) $-\dfrac{23}{10}$

109) $\dfrac{3}{8}$

110) $\dfrac{9}{16}$

111) undefined

112) undefined

113) 4

114) 4

115) $\dfrac{1}{2}$

116) $\dfrac{1}{2}$

117) 0

118) 0

119) Undefined

120) Undefined

121) $\{(-3, 1)\}$

122) $\{(-6, 8)\}$

123) $\{(6, 8)\}$

124) $\{(0, -3)\}$

125) $\{(0, 9)\}$

126) $\{(6, -6)\}$

127) $\{(7, -5)\}$

128) adult's ticket: $25; child's ticket: $19
129) adult's ticket: $16; child's ticket: $9
130) 9 hours
131) 8 hours
132) 3.2 mph
133) 8.4 mph
134) 26.6 miles
135) 25.2 miles