

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

Solve the equation (Section 2.1).

1) $\frac{1}{4}(8x - 12) = 6\left(\frac{x}{3} - \frac{1}{2}\right) + 6$ 1) _____

2) $-\frac{1}{7}(x + 14) + \frac{1}{4}(x + 4) = x - 2$ 2) _____

3) $\frac{x+7}{5} + \frac{x-1}{2} = \frac{8}{5}$ 3) _____

Solve (Section 2.2).

4) The three most prominent buildings in a city, Washington Center, Lincoln Galleria, and Jefferson Square Tower, have a total height of 1800 feet. Find the height of each building if Jefferson Square Tower is three times as tall as Lincoln Galleria and Washington Center is 450 feet taller than Lincoln Galleria. 4) _____

5) A publisher printed 90 million pages in its production process last year. If this represents a 125% over the number of pages printed the previous year, how many pages were printed the previous year? (Round to the nearest hundredth million, if necessary.) 5) _____

6) The sum of three consecutive even integers is 330. Find the integers. 6) _____

Solve the formula for the specified variable (Section 2.3).

7) $A = \frac{1}{2}h(B + b)$ for B 7) _____

8) $P = 2L + 2W$ for W 8) _____

9) $F = \frac{9}{5}C + 32$ for C 9) _____

Find the domain and the range of the relation. Then determine whether the relation is a function (Section 3.2).

10) $\{(29, -2), (4, -1), (4, 0), (5, 1), (13, 3)\}$ 10) _____

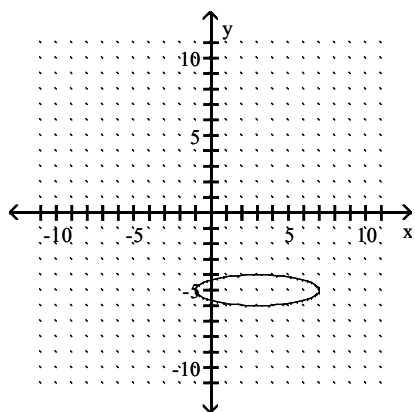
11) $\{(-3, -6), (1, 5), (5, -3), (7, -2)\}$ 11) _____

12) $\{(-3, 7), (-2, 2), (0, -2), (2, 2), (4, 14)\}$ 12) _____

Find the domain and the Range. Use the vertical line test to determine whether the graph is the graph of a function (Section 3.2).

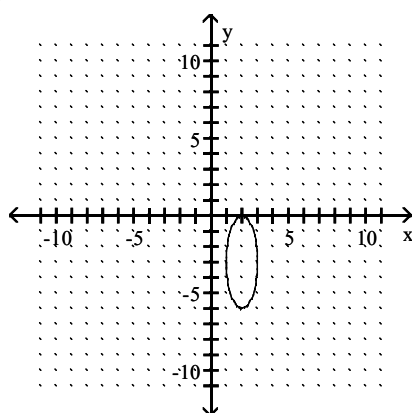
13)

13) _____



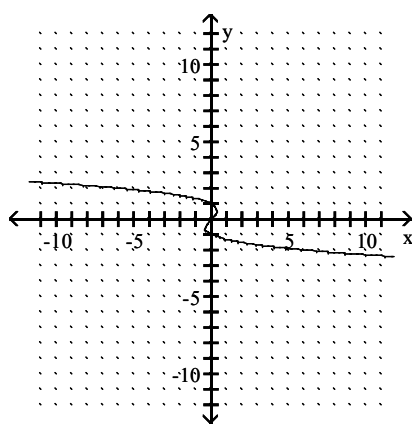
14)

14) _____



15)

15) _____



Find the indicated value (Section 3.2).

16) Find $f(1)$ when $f(x) = 2x^2 - 4x - 1$.

16) _____

17) Find $f(-4)$ when $f(x) = 2x^2 + 5x - 6$.

17) _____

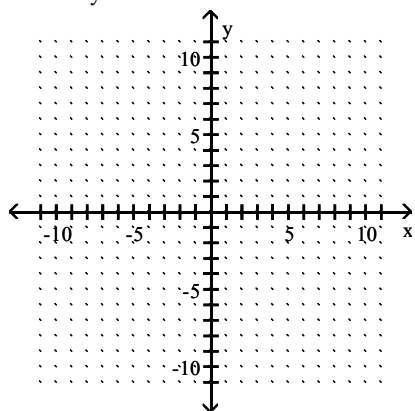
18) Find $f(4)$ when $f(x) = 6x^2 + 4x$.

18) _____

Graph the function by finding x- and y-intercepts (Section 3.3).

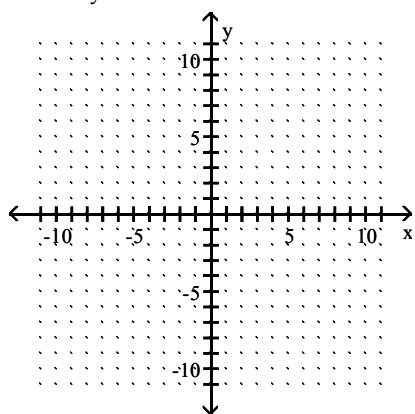
19) $3x - 12y = 12$

19) _____



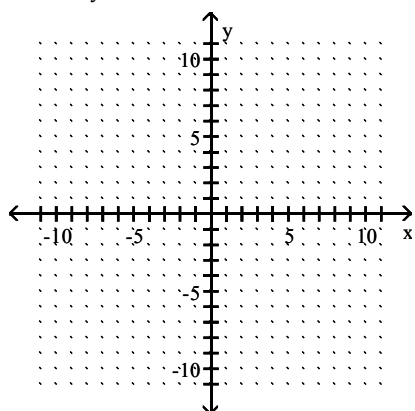
20) $2x + 10y = 10$

20) _____



21) $6x + 18y = 36$

21) _____



Determine whether the lines are parallel, perpendicular, or neither (Section 3.4).

22) $-12x + 6y = 7$

22) _____

$2x - y = 10$

23) $2x + 8y = 3$

23) _____

$4x - y = 10$

24) $x + 3y = -7$
 $3x + 3y = -3$

24) _____

Find an equation of the line. Write the equation using function notation (Section 3.5).

25) Through $(4, -22)$ and $(7, -46)$

25) _____

26) Through $(4, -29)$ and $(-8, 31)$

26) _____

27) Through $\left(1, \frac{7}{12}\right)$ and $\left(3, \frac{5}{4}\right)$

27) _____

Find an equation of the line. Write the equation in standard form (Section 3.5).

28) Through $(5, 4)$; parallel to $4x + 3y = 3$

28) _____

29) Through $(3, 4)$; perpendicular to $5x - 7y = 5$

29) _____

Find an equation of the line. Write the equation using function notation (Section 3.5).

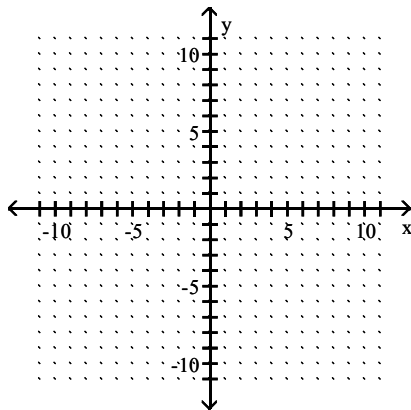
30) Through $(-3, -9)$; perpendicular to $5x + 9y = 17$

30) _____

Graph the inequality (Section 3.7).

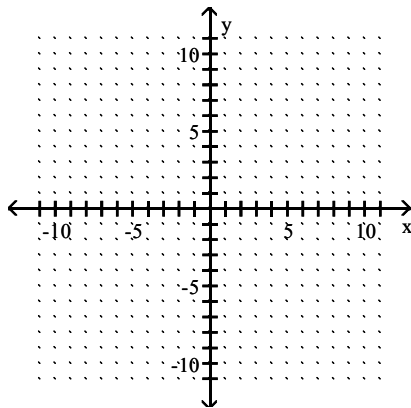
31) $x - y > -5$

31) _____



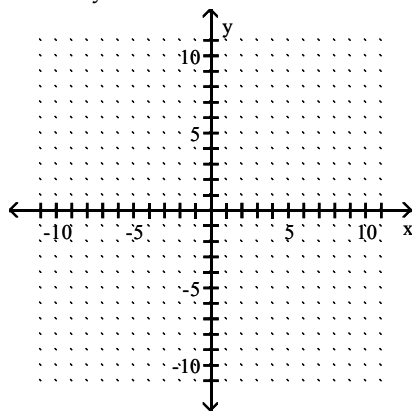
32) $-3x - 2y \geq -6$

32) _____



33) $-3x + 2y > -6$

33) _____



Solve the system of equations (Section 4.1).

34)
$$\begin{cases} 4x + 3y = 28 \\ 2x + 3y = 38 \end{cases}$$

34) _____

35)
$$\begin{cases} x - 3y = -13 \\ -6x - 3y = -48 \end{cases}$$

35) _____

36)
$$\begin{cases} -3x + 7y = -5 \\ -5x + 3y = 9 \end{cases}$$

36) _____

Solve (Section 4.3).

37) University Theater sold 497 tickets for a play. Tickets cost \$21 per adult and \$10 per senior citizen. If total receipts were \$6202, how many senior citizen tickets were sold?

37) _____

38) The manager of a bulk foods establishment sells a trail mix for \$5 per pound and premium cashews for \$13 per pound. The manager wishes to make a 40-pound trail mix-cashew mixture that will sell for \$11 per pound. How many pounds of each should be used?

38) _____

39) A vendor sells hot dogs and bags of potato chips. A customer buys 2 hot dogs and 2 bags of potato chips for \$6.50. Another customer buys 4 hot dogs and 5 bags of potato chips for \$14.25. Find the cost of each item.

39) _____

40) A chemist needs 160 milliliters of a 64% solution but has only 59% and 75% solutions available. Find how many milliliters of each that should be mixed to get the desired solution.

40) _____

41) Two cars leave a city and head in the same direction. After 4 hours, the faster car is 12 miles ahead of the slower car. The slower car has traveled 160 miles. Find the speeds of the two cars.

41) _____

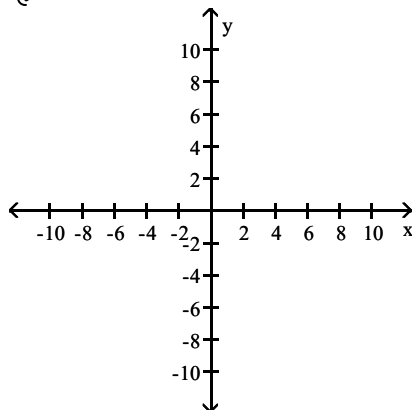
42) One number is 3 less than a second number. Twice the second number is 12 more than 3 times the first. Find the two numbers.

42) _____

Graph the solutions to the system of linear inequalities (Section 4.5).

43)

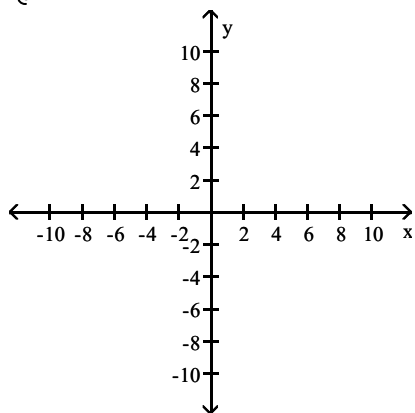
$$\begin{cases} y \geq x + 4 \\ y \leq -2 - x \end{cases}$$



43) _____

44)

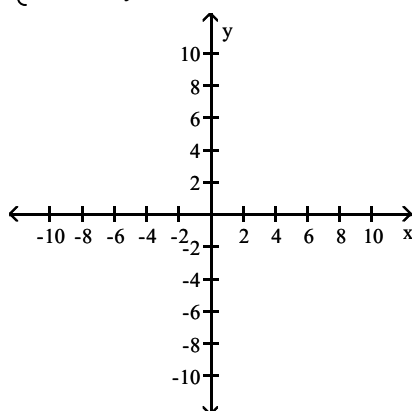
$$\begin{cases} y \leq 3x + 3 \\ y \geq 1 - x \end{cases}$$



44) _____

45)

$$\begin{cases} y + 4x \geq 0 \\ 4x - 3y \leq 12 \\ y \leq 3 \end{cases}$$



45) _____

Factor the polynomial completely (Section 5.5).

46) $3xy + 6x + 8y + 16$

46) _____

47) $3y - 33 + xy - 11x$

47) _____

48) $15a^3 - 25a^2b + 12ab^2 - 20b^3$

48) _____

Factor the polynomial completely (section 5.5).

49) $x(y - 7) - 14(y - 7)$

49) _____

50) $x(x^2 + 14) - 7(x^2 + 14)$

50) _____

51) $8a(a - b) + (a - b)$

51) _____

Factor the polynomial completely (Section 5.6).

52) $63x^3 - 603x^2 + 324x$

52) _____

53) $18x^3y + 57x^2y + 45xy$

53) _____

54) $12x^2y^2 - 17xy^2 + 6y^2$

54) _____

Factor the polynomial completely (Section 5.7).

55) $(x - 3)^2 - y^2$

55) _____

56) $2x^2 - 32$

56) _____

57) $49x^2 - 4y^2$

57) _____

58) $125x^3 + 1$

58) _____

59) $1,000x^3 - 729$

59) _____

60) $512y^3 + 343$

60) _____

Find the domain of the rational function (Section 6.1).

61) $f(x) = \frac{1 - 2x}{x^2 - 18x + 77}$

61) _____

62) $f(x) = \frac{1 - 6x}{x^3 - 2x^2 - 35x}$

62) _____

$$63) f(x) = \frac{4x - 6}{x^2 - 64}$$

63) _____

Perform the indicated operation. Simplify if possible (Section 6.2).

$$64) \frac{m - 6}{m^2 - 2m - 3} + \frac{5m - 2}{m^2 - 7m + 12}$$

64) _____

$$65) \frac{4x}{x + 1} + \frac{5}{x - 1} - \frac{8}{x^2 - 1}$$

65) _____

$$66) \frac{b}{b^2 - 25} + \frac{5}{b + 5} - \frac{6}{b}$$

66) _____

Find the LCD of the rational expressions in the list (Section 6.2).

$$67) \frac{m - 3}{m^2 + 3m}, \frac{-18}{m^2 + 9m + 18}$$

67) _____

$$68) \frac{x - 3}{x^2 + 3x + 2}, \frac{x - 7}{x^2 + 7x + 6}$$

68) _____

$$69) \frac{r - 1}{r^2 + 3r + 2}, \frac{-7}{r^2 + r}$$

69) _____

Simplify (Section 6.3).

$$70) \frac{\frac{25y^2 - 9x^2}{xy}}{\frac{5}{x} - \frac{3}{y}}$$

70) _____

$$71) \frac{\frac{5}{x} + \frac{4}{x^2}}{\frac{25}{x^2} - \frac{16}{x}}$$

71) _____

$$72) \frac{\frac{10}{11 - x} + \frac{11}{x - 11}}{\frac{3}{x} + \frac{8}{x - 11}}$$

72) _____

Solve the equation (Section 6.5).

$$73) \frac{1}{x+7} + \frac{2}{x+3} = \frac{-4}{x^2 + 10x + 21} \quad 73) \underline{\hspace{2cm}}$$

$$74) \frac{x+7}{x^2 + 2x - 15} - \frac{7}{x^2 - 6x + 9} = \frac{x-7}{x^2 + 2x - 15} \quad 74) \underline{\hspace{2cm}}$$

$$75) \frac{2}{x+3} - \frac{8}{x-3} = \frac{6}{x^2 - 9} \quad 75) \underline{\hspace{2cm}}$$

Solve (Section 6.6).

76) One pump can drain a pool in 11 minutes. When a second pump is also used, the pool only takes 8 minutes to drain. How long would it take the second pump to drain the pool if it were the only pump in use? 76)

77) One conveyor belt can move 1000 boxes in 11 minutes. Another can move 1000 boxes in 10 minutes. If another conveyor belt is added and all three are used, the boxes are moved in 3 minutes. How long would it take the third conveyor belt alone to do the same job? 77)

78) A baker can decorate the day's cookie supply four times as fast as his new assistant. If they decorate all the cookies working together in 16 minutes, how long would it take for each of them to decorate the cookies working individually? 78)

Simplify the radical expression. Assume that all variables represent positive real numbers Section 7.3).

$$79) \sqrt[3]{-64a^{14}b^7} \quad 79) \underline{\hspace{2cm}}$$

$$80) \sqrt[5]{243x^3y^{28}} \quad 80) \underline{\hspace{2cm}}$$

$$81) \sqrt[3]{512x^4y^5} \quad 81) \underline{\hspace{2cm}}$$

$$82) \frac{\sqrt[3]{625a^4b^9}}{\sqrt[3]{5a}} \quad 82) \underline{\hspace{2cm}}$$

$$83) \frac{\sqrt{189x^5y^6}}{\sqrt{3y^4}} \quad 83) \underline{\hspace{2cm}}$$

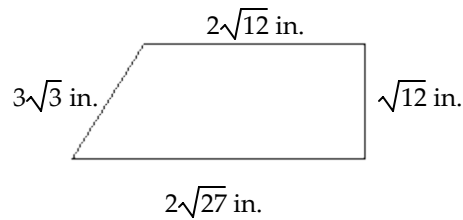
$$84) \frac{\sqrt{108x^{11}}}{\sqrt{3x}} \quad 84) \underline{\hspace{2cm}}$$

$$85) \sqrt{98k^7q^8} \quad 85) \underline{\hspace{2cm}}$$

Solve (Section 7.4).

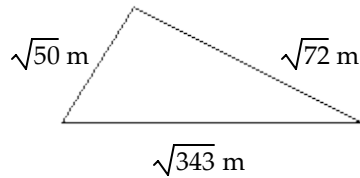
86) Find the perimeter of the trapezoid. Simplify.

86) _____



87) Find the perimeter of the triangle. Simplify.

87) _____



Add or subtract. Assume all variables represent positive real numbers (Section 7.4).

88) $9\sqrt[3]{x^3y^{10}} + 2xy\sqrt[3]{8y^7}$

88) _____

89) $\sqrt{3x^2} + 6\sqrt{27x^2} - 3\sqrt{27x^2}$

89) _____

90) $\sqrt{6a} + 5\sqrt{216a} + 3\sqrt{96a}$

90) _____

91) $\sqrt{3} + 5\sqrt{75} + 4\sqrt{108}$

91) _____

92) $-6\sqrt{48} + 9\sqrt{75} - 2\sqrt{192}$

92) _____

Solve (Section 7.6).

93) $\sqrt{3-x} = x-1$

93) _____

94) $\sqrt{7x-27} = 5-x$

94) _____

95) $x - \sqrt{24x-48} = -4$

95) _____

Perform the indicated operation. Write the result in the form $a + bi$ (Section 7.7).

96) $(4 - 9i)^2$

96) _____

97) $(8 + 5i)(8 - 5i)$

97) _____

98) $(\sqrt{11} + 5i)(\sqrt{11} - 5i)$

98) _____

$$99) \frac{9 + 9i}{9 - 4i}$$

99) _____

$$100) \frac{9 - 4i}{9 + 5i}$$

100) _____

$$101) \frac{5 - 8i}{9 + i}$$

101) _____

Use the quadratic formula to solve the equation.

$$102) 3x^2 + 10x = -6$$

102) _____

$$103) 2x^2 = -12x - 3$$

103) _____

$$104) -7x^2 - 5x - 5 = 0$$

104) _____

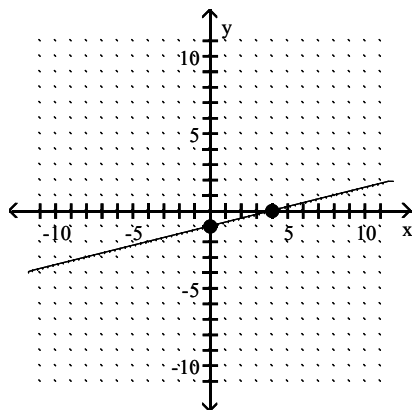
$$105) 8x^2 + 1 = 5x$$

105) _____

Answer Key

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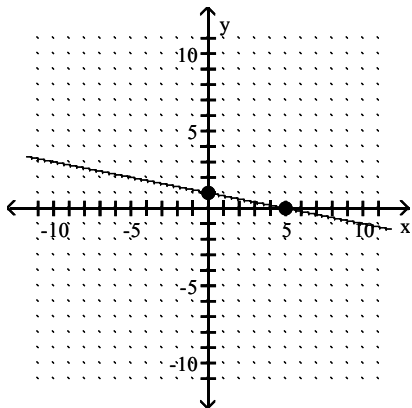
- 1) $\emptyset$
- 2) $\frac{28}{25}$
- 3) 1
- 4) Washington Center: 720 feet
Lincoln Galleria: 270 feet
Jefferson Square Tower: 810 feet
- 5) 72 million pages
- 6) 108, 110, 112
- 7) $B = \frac{2A - bh}{h}$
- 8) $W = \frac{P - 2L}{2}$
- 9) $C = \frac{5}{9}(F - 32)$
- 10) domain: {29, 5, 4, 13}
range: {-2, -1, 0, 1, 3}
not a function
- 11) domain: {-3, 1, 5, 7}
range: {-6, 5, -3, -2}
function
- 12) domain: {-3, -2, 0, 2, 4}
range: {7, 2, -2, 14}
function
- 13) not a function
- 14) not a function
- 15) not a function
- 16) -3
- 17) 6
- 18) 112
- 19)



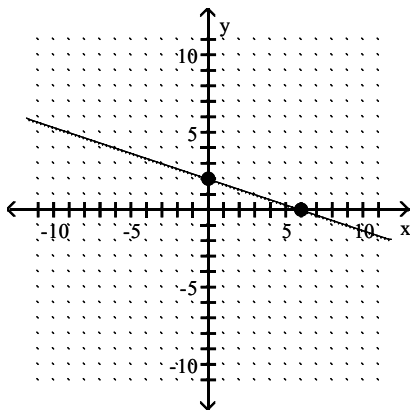
Answer Key

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20)



21)



22) parallel

23) perpendicular

24) neither

25) $f(x) = -8x + 10$

26) $f(x) = -5x - 9$

27) $f(x) = \frac{1}{3}x + \frac{1}{4}$

28) $4x + 3y = 32$

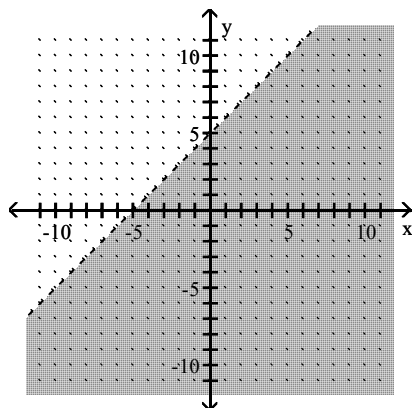
29) $7x + 5y = 41$

30) $f(x) = \frac{9}{5}x - \frac{18}{5}$

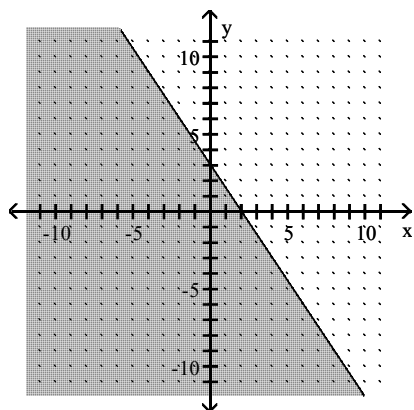
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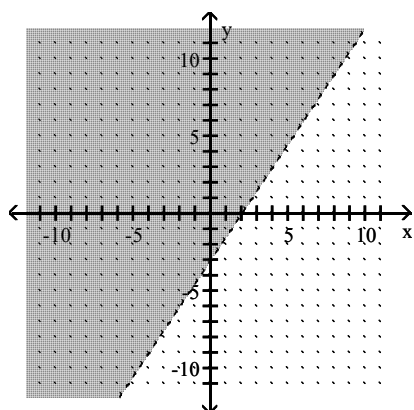
31)



32)



33)



34) $(-5, 16)$

35) $(5, 6)$

36) $(-3, -2)$

37) 385 senior citizen tickets

38) 10 pounds of trail mix

30 pounds of cashews

39) \$2.00 for a hot dog; \$1.25 for a bag of potato chips

40) 110 ml of 59%; 50 ml of 75%

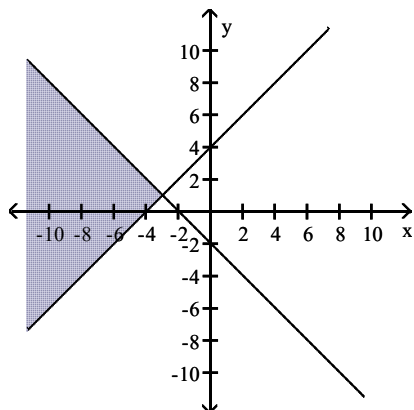
41) 40 mph and 43 mph

42) -6 and -3

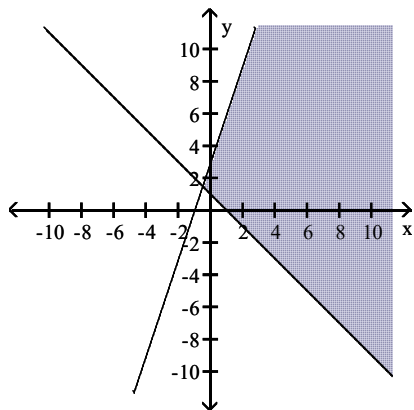
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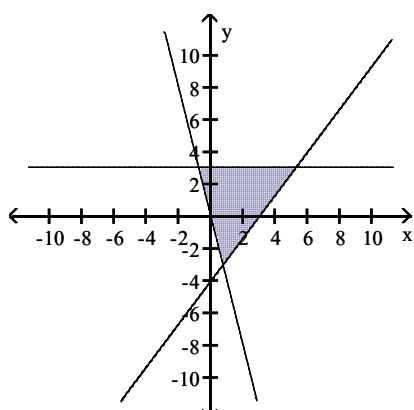
43)



44)



45)



46) $(3x + 8)(y + 2)$

47) $(y - 11)(3 + x)$

48) $(5a^2 + 4b^2)(3a - 5b)$

49) $(y - 7)(x - 14)$

50) $(x^2 + 14)(x - 7)$

51) $(a - b)(8a + 1)$

52) $9x(x - 9)(7x - 4)$

53) $3xy(3x + 5)(2x + 3)$

54) $y^2(4x - 3)(3x - 2)$

55) $(x - 3 + y)(x - 3 - y)$

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56) $2(x + 4)(x - 4)$

57) $(7x + 2y)(7x - 2y)$

58) $(5x + 1)(25x^2 - 5x + 1)$

59) $(10x - 9)(100x^2 + 90x + 81)$

60) $(8y + 7)(64y^2 - 56y + 49)$

61) $\{x \mid x \text{ is a real number and } x \neq 11, x \neq 7\}$

62) $\{x \mid x \text{ is a real number and } x \neq 7, x \neq -5, x \neq 0\}$

63) $\{x \mid x \text{ is a real number and } x \neq 8, x \neq -8\}$

64) $\frac{6m^2 - 7m + 22}{(m - 3)(m + 1)(m - 4)}$

65) $\frac{4x - 3}{x - 1}$

66) $\frac{-25(b - 6)}{b(b + 5)(b - 5)}$

67) $m(m + 3)(m + 6)$

68) $(x + 2)(x + 1)(x + 6)$

69) $r(r + 2)(r + 1)$

70) $3x + 5y$

71) $\frac{5x + 4}{25 - 16x}$

72) $\frac{x}{11x - 33}$

73) $\emptyset$

74) 11

75) -6

76) $29\frac{1}{3}$ min

77) $7\frac{1}{47}$ min

78) Baker: 20 min; assistant: 80 min

79) $-4a^4b^2\sqrt[3]{a^2b}$

80) $3y^5\sqrt[5]{x^3y^3}$

81) $8xy\sqrt[3]{xy^2}$

82) $5ab^3$

83) $3x^2y\sqrt{7x}$

84) $6x^5$

85) $7k^3q^4\sqrt{2k}$

86) $15\sqrt{3}$ in.

87) $(11\sqrt{2} + 7\sqrt{7})$ meters

88) $13xy^3\sqrt[3]{y}$

89) $10x\sqrt{3}$

90) $43\sqrt{6a}$

91) $50\sqrt{3}$

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92) $5\sqrt{3}$

93) 2

94) 4

95) 8

96) $-65 - 72i$

97) $89 + 0i$

98) $36 + 0i$

99) $\frac{45}{97} + \frac{117}{97}i$

100) $\frac{61}{106} - \frac{81}{106}i$

101) $\frac{37}{82} - \frac{77}{82}i$

102) $\frac{-5 - \sqrt{7}}{3}, \frac{-5 + \sqrt{7}}{3}$

103) $\frac{-6 - \sqrt{30}}{2}, \frac{-6 + \sqrt{30}}{2}$

104) $\frac{5 - i\sqrt{115}}{-14}, \frac{5 + i\sqrt{115}}{-14}$

105) $\frac{5 - i\sqrt{7}}{16}, \frac{5 + i\sqrt{7}}{16}$