M117 Review for Final Exam

Revised **FALL 2007**

PLEASE BE ADVISED THAT THIS REVIEW IS ONLY A SAMPLING OF QUESTIONS FROM THE COURSE. ALL NOTES, HOMEWORK, EXAMS, QUIZZES, ETC. SHOULD ALSO BE REVIEWED. THERE MAY BE PROBLEM TYPES ON THE FINAL EXAM THAT DO NOT APPEAR ON THIS REVIEW.

CHAPTER 7

1) Simplify $\dfrac{-30x^2y^2z^2}{-35xz^3}$

2) Simplify $\dfrac{x^2 - 4}{x^2 + 2x}$

3) Simplify $\dfrac{4x^2 - 15x - 4}{7x^2 - 30x + 8}$

4) Simplify $\dfrac{3x - x^2}{x^2 - 9}$

5) Perform the operation and leave in simplest form. $\dfrac{4x^2}{5y^2} \cdot \dfrac{15xy}{24x^2y^2}$

6) Perform the operation and leave in simplest form. $\dfrac{x^4 - 81}{x^2 - 6x + 9} \div \dfrac{5x^2 + 8x - 21}{6x^2 - 11x - 21}$

7) Perform the operation and leave in simplest form. $\dfrac{6x}{x - 3} - \dfrac{18}{x - 3}$

8) Perform the operation and leave in simplest form. $\dfrac{x + 1}{4} + \dfrac{x - 3}{6} - \dfrac{x - 2}{8}$

9) Perform the operation and leave in simplest form. $\dfrac{7}{3x^2} - \dfrac{9}{4x} - \dfrac{5}{2x}$

10) Perform the operation and leave answer in simplest form. $2 + \dfrac{4x}{3x - 1}$

11) Perform the operation and leave answer in simplest form. $\dfrac{3x}{x^2 - 36} - \dfrac{2}{5x + 30}$

12) Perform the operation and leave in simplest form. $\dfrac{2x}{6x^2 + 11x - 10} + \dfrac{x}{2x^2 - 3x - 20}$

13) Perform the operation and leave in simplest form. $\dfrac{32x + 9}{12x^2 + x - 6} - \dfrac{3}{4x + 3} - \dfrac{x + 5}{3x - 2}$

14) Simplify the complex fraction. $\dfrac{\frac{4}{ab} - \frac{3}{b^2}}{\frac{1}{a} + \frac{3}{b}}$

15) Solve $\frac{5}{7x} - \frac{5}{6} = \frac{1}{6x}$

16) Solve $\frac{5}{2x - 1} = \frac{-6}{3x + 2}$

17) Solve $\frac{2x}{x - 2} + \frac{15}{x^2 - 7x + 10} = \frac{3}{x - 5}$

18) Solve $\frac{2}{n - 2} - \frac{n}{n + 5} = \frac{10n + 15}{n^2 + 3n - 10}$

19) Solve $\frac{x}{x + 2} + \frac{3}{x + 4} = \frac{14}{x^2 + 6x + 8}$

20) Suppose that Wendy rides her bicycle 30 miles in the same time that it takes Kim to ride her bicycle 20 miles. If Wendy rides 5 miles per hour faster than Kim, find the rate of each.
(NO EQUATION = NO CREDIT)

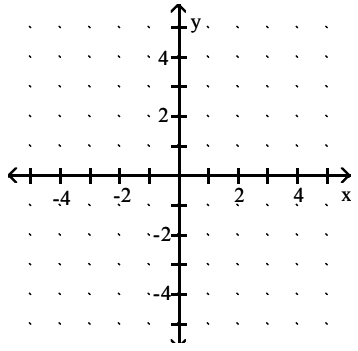
21) If an airplane travels 1050 miles in the same amount of time that a car travels 150 miles, and the speed of the
plane is 50 mph more than six times the speed of the car, how fast is each moving?
(NO EQUATION = NO CREDIT)

22) The speed of a stream is 5 mph. If a boat travels 52 miles downstream in the same time that it takes to travel
26 miles upstream, what is the speed of the boat in still water? (NO EQUATION = NO CREDIT)

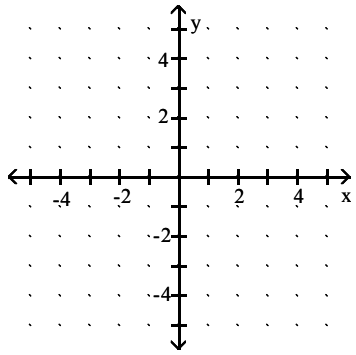
CHAPTERS 4 & 9

23) Is (3, 1) a solution for $2x - y = 5$?

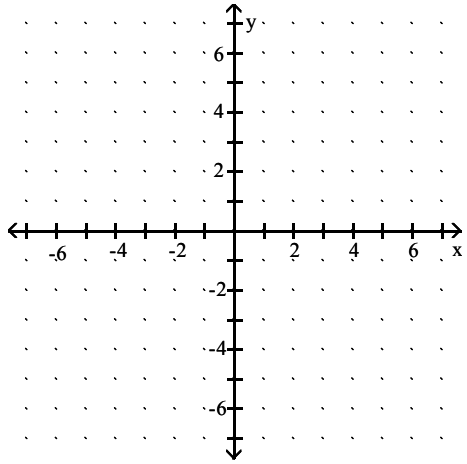
24) Given: $y = -\frac{1}{2}x + 3$ Find the x- and y-intercepts and one other point. Graph.



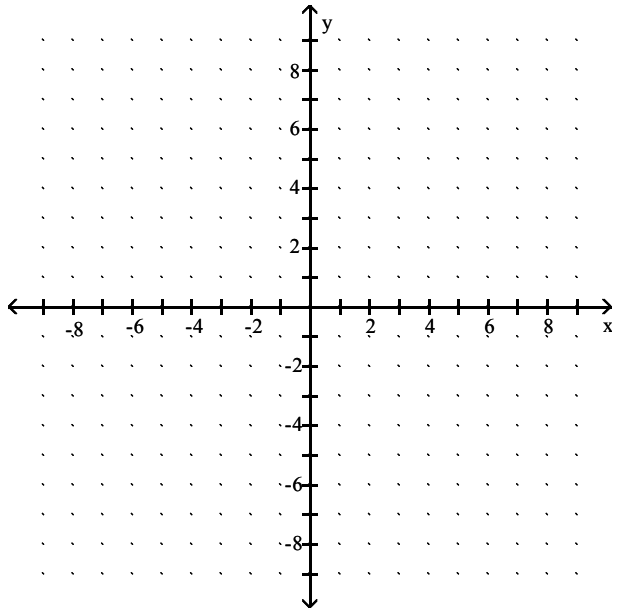
25) Given: $y = -3$ Find the x- and y-intercepts and one other point. Graph.



26) Given: $3x - y = 6$ Find the x- and y-intercepts and one other point. Graph.



27) Given the following point and slope, find the coordinates of three other points on the line. $(-4, 1)$ $m = \frac{2}{3}$.



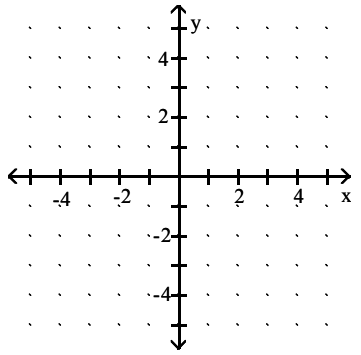
28) Find the slope of the line determined by the following pairs of points. $(5, -3), (-5, -9)$

29) a. What is the slope of a vertical line?
b. What is the slope of a horizontal line?

30) Given $2x - 3y = 5$ Solve for y and determine the slope and y-intercept.

31) Find the coordinates of two points on the given line, and then use those coordinates to find the slope of the line. $2x + y = 4$

32) Given $y = \frac{2}{5}x - 5$ Determine the slope and y-intercept. Graph.



33) Write the equation of a line that passes through the points (0, 3) and (5, -3).

34) Write the equation of a line that passes through the points (-3, 2) and (-3, 5).

35) Write the equation of a line that passes through the points (-1, -5) and (-4, 1).

36) Write the equation of the line that passes through the points (-2, 5) and (3, -3).

37) Write the equation of a line with slope of $-\frac{3}{4}$ and passes through the point (-1, -5).

38) Write the equation of the line with $m = -\frac{3}{5}$ passing through the point (-2, -4).

39) Write the equation of the line that has an x-intercept of -1 and a y-intercept of -3.

40) Write the equation of a line perpendicular to the line $y = \frac{1}{5}x - 4$ and passes through the point (2, 3).

41) Write the equation of the line that contains the point (1, 3) and is parallel to the line $x + 5y = 9$.

42) Write the equation of the line that contains the point (5, 6) and is perpendicular to the y-axis.

43) A plumber charges \$80 plus \$40 for each hour of labor. Let n represents the number of hours of labor and c is the total cost.

a. Write a linear equation modeling the scenario.
b. Find the total bill if labor is 2 hours.
b. If the total bill is \$240, for how many hours of labor was the customer charged?
c. Graph the equation with n along the horizontal axis and c along the vertical axis.
d. What does the c-intercept represent?

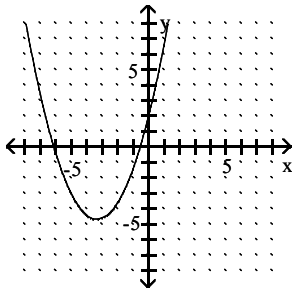
44) In a certain city, the cost of a taxi ride is computed as follows: There is a fixed charge of \$2.95 as soon as you get in the taxi, to which a charge of \$1.65 per mile is added. Find a linear equation that can be used to determine the cost, C(x), of an x-mile taxi ride, and use this equation to find the cost of a 5-mile taxi ride.

45) The cost of manufacturing a molded part is related to the quantity produced during a production run. When 100 parts are produced, the cost is \$300. When 600 parts are produced, the cost is \$2800. Find a linear equation that models cost, C(x), in terms of the number of parts produced, x.

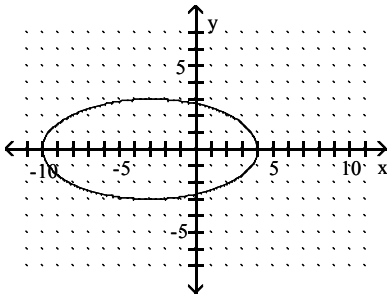
46) Determine if the relation is a function: {(-9, 9), (-9, -9), (2, 1), (5, 2)}

47) Determine if the relation is a function: {(-1, -4), (2, 7), (4, -4), (8, 1)}

48) Determine if the relation is a function:



49) Determine if the relation is a function:



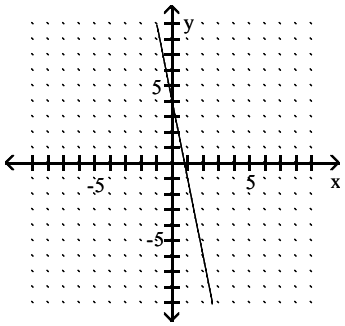
50) Determine if the relation is a function. Assume that the domain is in the left column and the range is in the right column. The number of tests in various classes:

Math	11
English	6
History	11
Biology	7
Psychology	2

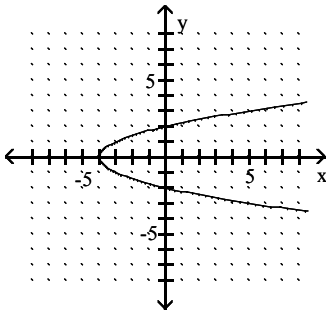
51) Determine the domain and range of the relation: {(9, -6), (6, -9), (5, -2), (2, -6)}

52) Determine the domain and range.

a.



b.



53) Given $f(x) = 4x^2 - 5x + 6$, find:

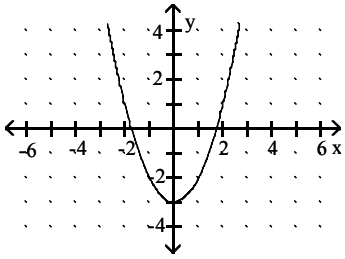
a. f(4) b. f(-1)

54) Given $f(x) = \frac{3}{x - 2}$, find:

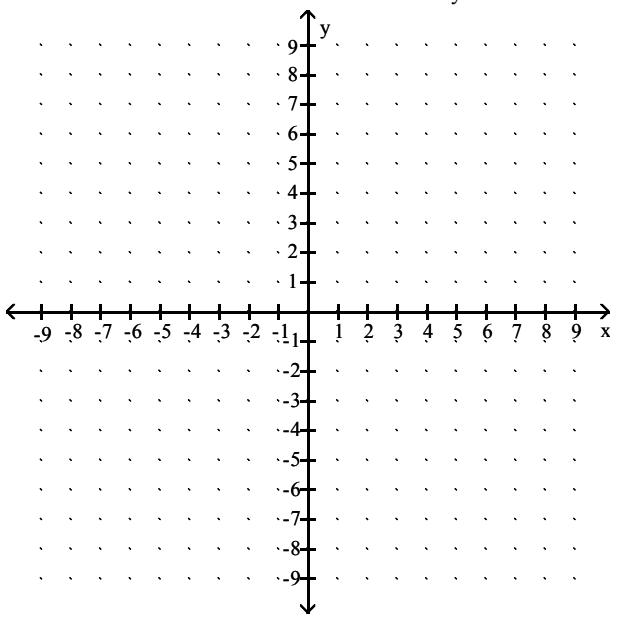
a. f(-5) b. f(2)

55) Use the graph to determine the value of the function.

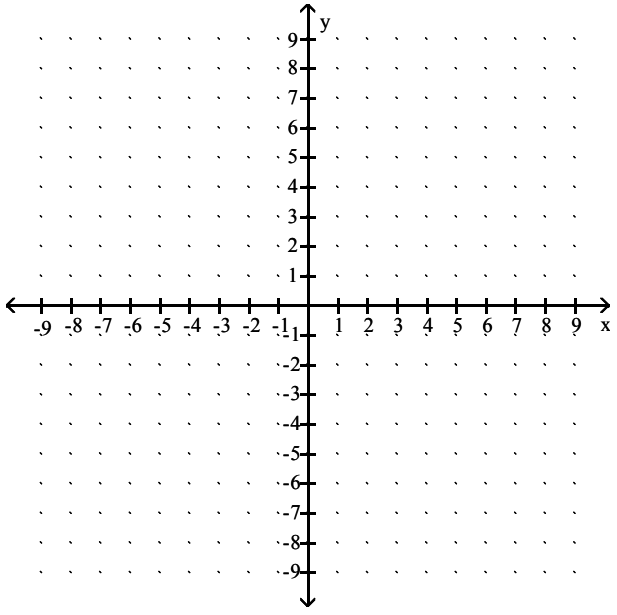
a. f(-2) b. f(0)



56) Solve by graphing: $2x - y = 6$
$5y - 2x = 10$



57) Solve by graphing: $y - 2x = 6$
$y = 2x + 8$



58) Solve using the substitution method: $y = -2x - 7$
$3x + 2y = -10$

59) Solve using the substitution method: $2y - x = 7$
$2x + 3y = 14$

60) Solve using the elimination by addition method: $15x - 8y = 8$
$30x + 7y = -7$

61) Solve using the elimination by addition method: $\frac{2}{3}x + \frac{1}{2}y = \frac{5}{2}$

$\frac{2}{5}x - y = \frac{1}{5}$

62) Solve using the elimination by addition method: $2x - 6y = 8$

$x - 3y = 4$

63) Suppose that the cost of 5 tennis balls and 4 golf balls is $17. Furthermore, suppose that at the same prices, the cost of 3 tennis balls and 7 golf balls is $20.55. Find the cost of one tennis ball and the cost of one golf ball.

CHAPTER 10

64) If $f(x) = \sqrt{2x + 4}$, find f(0).

65) If $f(x) = \sqrt{2x - 8}$, find the domain.

66) Neglecting air resistance, the velocity of an object, v, in meters per second can be found after falling h meters using the formula $v = \sqrt{18.1h}$. Find the velocity of a ball that has been dropped from a roof after falling 7 meters. Round your answer to 3 decimal places.

67) Simplify $\sqrt[4]{36}$ Express your answer in radical form.

68) Simplify $\sqrt[3]{-\frac{8}{27}}$

69) Simplify $\sqrt{160}$

70) Simplify $-4\sqrt{54}$

71) Simplify $\frac{6\sqrt{5}}{5\sqrt{12}}$

72) Simplify $\frac{3}{\sqrt[3]{3}}$

73) Simplify $13\sqrt{28} - 2\sqrt{63} - 7\sqrt{7}$

74) Simplify $\frac{3}{8}\sqrt{96} - \frac{2}{3}\sqrt{54}$

75) Simplify $-3\sqrt[3]{2} - 2\sqrt[3]{16} + \sqrt[3]{54}$

76) Simplify $\sqrt{96a^7b^8}$

77) Simplify $\dfrac{\sqrt{5y}}{\sqrt{18x^3}}$

78) Simplify $\dfrac{\sqrt[3]{2y}}{\sqrt[3]{3x}}$

79) Simplify $-3\sqrt{2x^3} + 4\sqrt{8x^3} - 3\sqrt{32x^3}$

80) Simplify $(-3\sqrt{3})(-4\sqrt{8})$

81) Simplify $\left(4\sqrt[3]{3}\right)\left(5\sqrt[3]{9}\right)$

82) Simplify $\sqrt{2x}\left(\sqrt{12xy} - \sqrt{8y}\right)$

83) Simplify $\left(7\sqrt{3} - \sqrt{7}\right)\left(2\sqrt{3} + 4\sqrt{7}\right)$

84) Simplify $\left(2\sqrt{3} + \sqrt{11}\right)\left(2\sqrt{3} - \sqrt{11}\right)$

85) Simplify $2\sqrt[3]{2}\left(3\sqrt[3]{6} - 4\sqrt[3]{5}\right)$

86) Simplify $\dfrac{\sqrt{7}}{3\sqrt{2} - 5}$

87) <u>Rationalize the denominator, then use it to solve the problem.</u> The time T in seconds required for a pendulum of length L feet to make one swing is given by $T = 2\pi\sqrt{\dfrac{L}{32}}$. How long is a pendulum (to nearest hundredth of a foot) if it makes one swing in 3 seconds? Use 3.14 for π.

88) Solve $2\sqrt{n} - 7 = 0$

89) Solve $\sqrt{x^2 + 3} - 2 = 0$

90) Solve $\sqrt{n^2 - 2n - 4} = n$

91) Solve $\sqrt[3]{2x + 5} = \sqrt[3]{4 - x}$

92) Solve $\sqrt{x + 4} = \sqrt{x - 1} + 1$

93) Simplify $16^{\frac{3}{2}}$

94) Simplify $\left(\frac{1}{8}\right)^{-\frac{2}{3}}$

95) Simplify $(-32)^{\frac{1}{5}}$

96) Express in radical form $5x^{\frac{1}{4}}$

97) Simplify $\left(y^{\frac{3}{4}}\right)\left(y^{-\frac{2}{3}}\right)$

98) Simplify $\left(9x^2y^4\right)^{\frac{1}{2}}$

99) Simplify $\left(a^2b^{-3}\right)^{-\frac{1}{3}}$

CHAPTER 11

100) Solve $6x^2 - 5x - 21 = 0$

101) Solve $\sqrt{3x} + 6 = x$

102) Solve $3t^2 = 8$

103) Solve $(t + 5)^2 = 12$

104) Solve $(9s + 7)^2 = 9$

105) Use the discriminant to determine the number and nature of the roots, then solve using the quadratic formula. $9x^2 - 6x + 1 = 0$

106) Use the discriminant to determine the number and nature of the roots, then solve using the quadratic formula. $4x^2 - 2x = 3$

107) Solve $\frac{5}{n - 3} - \frac{3}{n + 3} = 1$

108) Solve $5x^4 - 32x^2 + 48 = 0$

109) A 24-foot ladder resting against a house reaches a windowsill 16 feet above the ground. How far is the foot of the ladder from the house? (to the nearest tenth of a foot) (NO EQUATION = NO CREDIT)

110) Two pipes together can fill a large tank in 10 hr. One of the pipes, used alone, takes 15 hr longer than the other to fill the tank. How long would each pipe take to fill the tank alone?
(NO EQUATION = NO CREDIT)

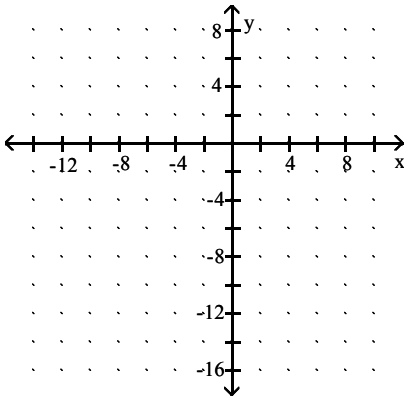
111) A square sheet of metal has an area of 676 square inches. What is the length of each side?
(NO EQUATION = NO CREDIT)

112) The length of a table is 15 inches more than its width. If the area of the table is 2106 square inches, what is its length? (NO EQUATION = NO CREDIT)

113) A rectangular sign must have an area of 42 square feet. The length of the sign is 2 feet more than the width. Find the <u>dimensions</u> of the sign. (NO EQUATION = NO CREDIT)

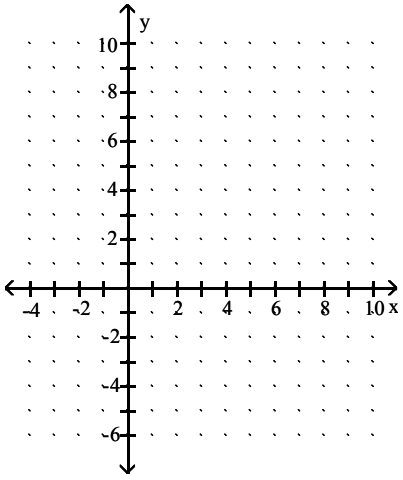
114) Given the following quadratic equation: $y = -(x + 4)^2 + 1$

a. What is the vertex?
b. Which way does the parabola open?
c. What is the y-intercept?
d. Graph.



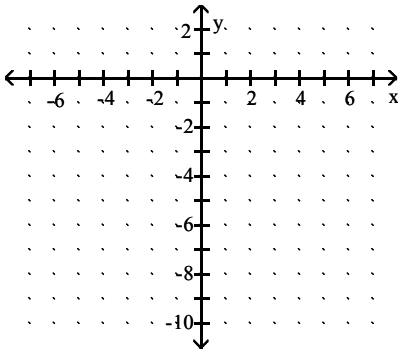
115) Given the following quadratic equation: $y = 4x^2 - 24x + 32$

a. What is the vertex?
b. What are the x-intercepts (if any)?
c. What is the y-intercept?
d. Which way does the parabola open?
e. Graph.



116) Given the following quadratic equation: $y = -2x^2 - 4x - 5$

a. What is the vertex?
b. What are the x-intercepts (if any)?
c. What is the y-intercept?
d. Which way does the parabola open?
e. Graph



117) A record company discovers that the number of CDs sold each week after release of an new album follows a parabolic pattern. The function $n(t) = -200t^2 + 4000t$ describes the number, n, of CDs an artist sold each of t weeks after the release of the album.

a. Which week had the greatest number of CDs sold?
b. How many CDs sold that week?

1) $\frac{6xy^2}{7z}$

2) $\frac{x - 2}{x}$

3) $\frac{4x + 1}{7x - 2}$

4) $\frac{-x}{x + 3}$

5) $\frac{x}{2y^3}$

6) $\frac{(x^2 + 9)(6x + 7)}{5x - 7}$

7) 6

8) $\frac{7x}{24}$

9) $\frac{28 - 57x}{12x^2}$

10) $\frac{10x - 2}{3x - 1}$

11) $\frac{13x + 12}{5(x + 6)(x - 6)}$

12) $\frac{5x^2 - 10x}{(2x + 5)(3x - 2)(x - 4)}$

13) $\frac{-4x^2}{(4x + 3)(3x - 2)}$

14) $\frac{4b - 3a}{b^2 + 3ab}$

15) $\frac{23}{35}$

16) $-\frac{4}{27}$

17) $3, \frac{7}{2}$

18) -1

19) -8, 1

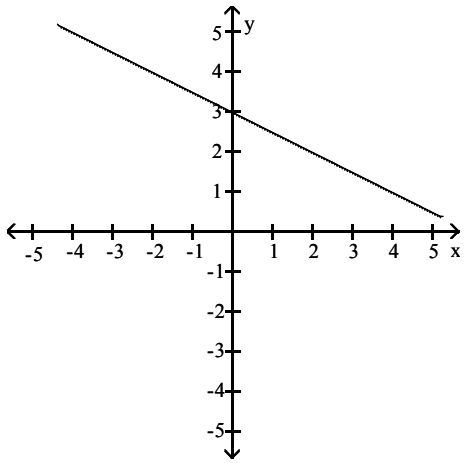
20) 10 mph for Kim and 15 mph for Wendy

21) Car is traveling 50mph and the plane is traveling 350mph

22) 15 mph

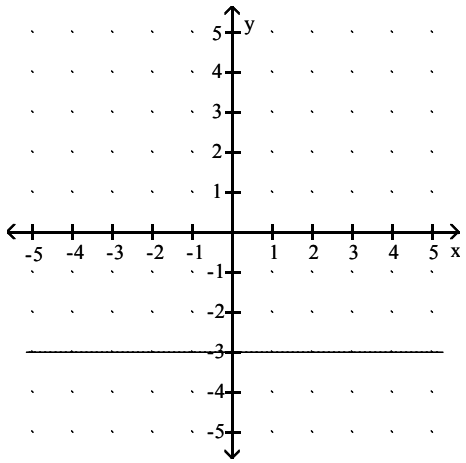
23) yes

24)

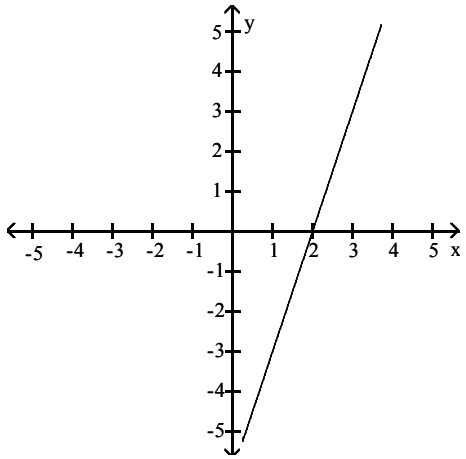


y intercept (0, 6) x intercept (-2, 0)

25) no x-intercepts y-intercept is (0,-3)



26)



27) answers may vary. examples (-1,3), (2,5), (5,7)

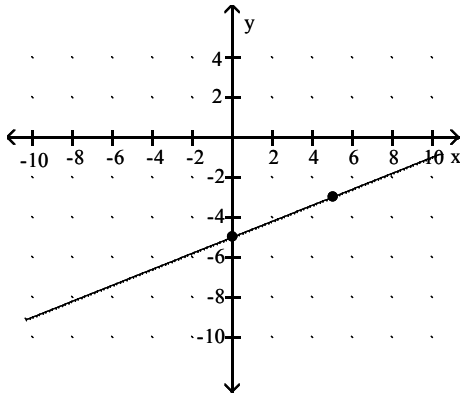
28) $\frac{3}{5}$

29) a. no slope or undefined b. m = 0

30) $y = \frac{2}{3}x - \frac{5}{3}$ $m = \frac{2}{3}$ $b = \left(0, -\frac{5}{3}\right)$

31) $m = -2$

32) $m = \frac{2}{5}$ $b = (0, -5)$



33) $y = -\frac{6}{5}x + 3$

34) $x = -3$

35) $y = -2x - 7$

36) $y = -\frac{8}{5}x + \frac{9}{5}$

37) $y = -\frac{3}{4}x - \frac{23}{4}$

38) $y = -\frac{3}{5}x - \frac{26}{5}$

39) $y = -3x - 3$

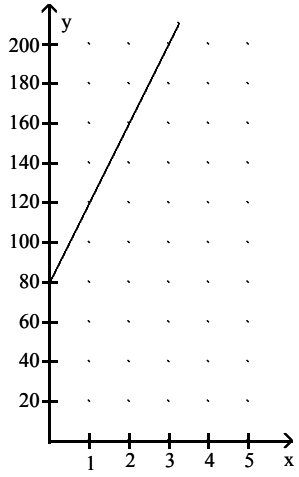
40) $y = -5x + 13$

41) $y = -\frac{1}{5}x + \frac{16}{5}$ OR $x + 5y = 16$

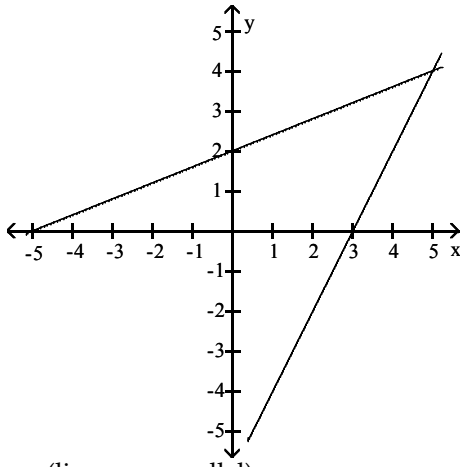
42) $0x + y = 6$ OR $y = 6$

43) a. $c = 40n + 80$ b. \$160 c. 4 hours

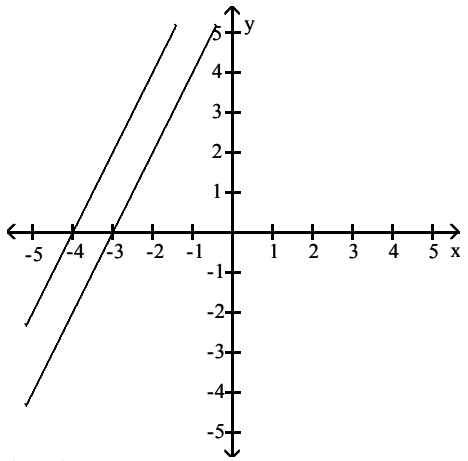
d. e. The initial charge, which is \$80



44) C(x) = 2.95 + 1.65x
$11.20
45) C(x) = 5x - 200
46) No
47) Yes
48) This relation is a function.
49) This relation is not a function.
50) Yes
51) Domain: {9, 6, 5, 2}; range: {-6, -9, -2}
52) a. Domain: all real numbers; range: all real numbers
b. Domain: {x|x ≥ -4}; range: all real numbers
53) a. f(4) = 50
b. f(-1) = 15
54) a. $f(-5) = \frac{3}{-7}$
b. f(2) = undefined
55) a. f(-2) = 1
b. f(0) = -3
56) (5, 4)



57) □ (lines are parallel)



58) (-4,1)
59) (1, 4)
60) (0, -1)
61) (3, 1)

62) Infinitely many solutions
63) $1.60 for a tennis ball and $2.25 for a golf ball
64) 2
65) $x \geq 4$ or $[4, \infty)$
66) 11.256 m/s
67) $\sqrt{6}$
68) $-\frac{2}{3}$
69) $4\sqrt{10}$
70) $-12\sqrt{6}$
71) $\frac{\sqrt{15}}{5}$
72) $\sqrt[3]{9}$
73) $13\sqrt{7}$
74) $\frac{-\sqrt{6}}{2}$
75) $-4\sqrt[3]{2}$
76) $4a^3b^4\sqrt{6a}$
77) $\frac{\sqrt{10xy}}{6x^2}$
78) $\frac{\sqrt[3]{18x^2y}}{3x}$
79) $-7x\sqrt{2x}$
80) $24\sqrt{6}$
81) 60
82) $2x\sqrt{6y} - 4\sqrt{xy}$
83) $14 + 26\sqrt{21}$
84) 1
85) $6\sqrt[3]{12} - 8\sqrt[3]{10}$
86) $\frac{3\sqrt{14} + 5\sqrt{7}}{-7}$
87) $T = \frac{\pi\sqrt{2L}}{4}$; 7.30 ft
88) $\frac{49}{4}$
89) 1, -1
90) ▫
91) $-\frac{1}{3}$
92) 5
93) 64
94) 4
95) -2
96) $5\sqrt[4]{x}$

97) $y^{\frac{1}{12}}$

98) $3xy^2$

99) $\frac{b}{a^{\frac{2}{3}}}$

100) $-\frac{3}{2}, \frac{7}{3}$

101) 12

102) $\pm\frac{2\sqrt{6}}{3}$

103) $-5 \pm 2\sqrt{3}$

104) $\left\{-\frac{4}{9}, -\frac{10}{9}\right\}$

105) discriminant is 0, so 1 real root
$\frac{1}{3}$

106) discriminant is 52, so 2 real root s
$\frac{1 \pm \sqrt{13}}{4}$

107) $1 \pm \sqrt{34}$

108) $\pm 2, \pm\frac{2\sqrt{15}}{5}$

109) 17.9 feet

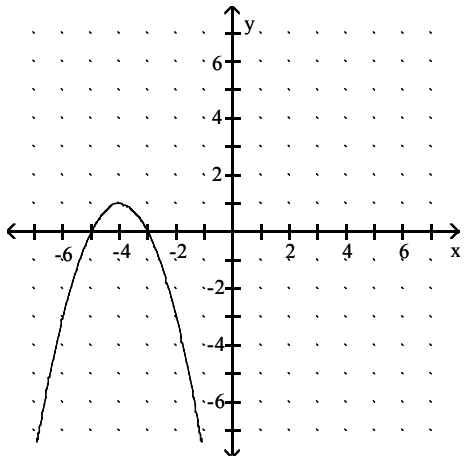
110) 15 hour & 30 hours

111) 26 inches

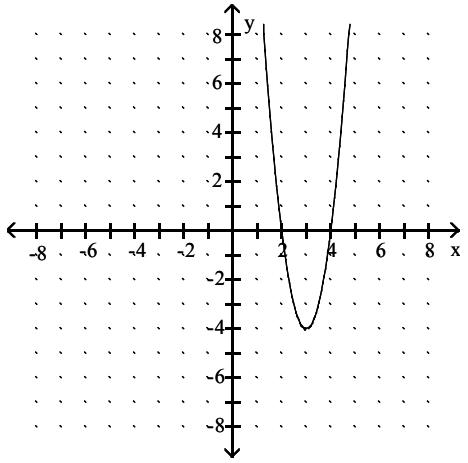
112) 54 inches

113) $(1 + \sqrt{43})$ yards by $(-1 + \sqrt{43})$ yards

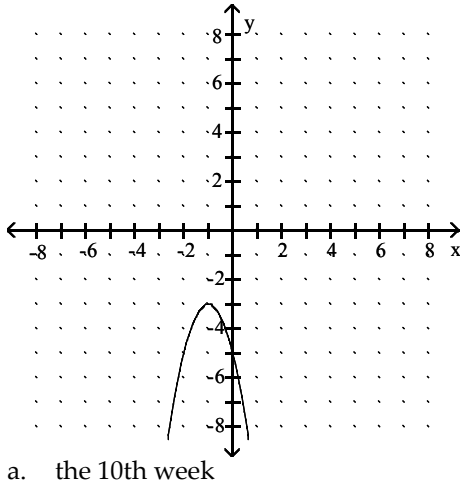
114) a. (-4, 1)
b. down
c. (0, -15)
d.



115) a. (3, -4)
b. (4, 0) and (2, 0)
c. (0, 32)
d. up



116) a. (-1, -3)
b. No x-intercepts
c. (0, -5)
d. down



117) a. the 10th week
b. 20,000 CDs