

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) Find the domain of each of the following functions:

a.  $g(x) = \frac{5x^2 - 3}{x - 1}$

b.  $f(x) = \frac{7x - 2}{x^2 - 2x - 15}$

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

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

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

5) Simplify  $\frac{3x - x^2}{x^2 - 9}$

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

7) Perform the operation and leave in simplest form.  $\frac{x^2 + 3x}{x^3 - 36x} \cdot \frac{x^2 - 8x + 12}{x^2 - 9}$

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

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

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

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

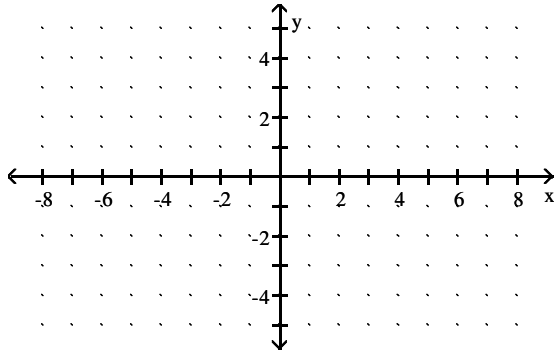
12) Perform the operation and leave answer in simplest form.  $\frac{3x}{x^2 - 36} - \frac{2}{5x + 30}$

- 13) Perform the operation and leave in simplest form.  $\frac{2x}{6x^2 + 11x - 10} + \frac{x}{2x^2 - 3x - 20}$
- 14) Perform the operation and leave in simplest form.  $\frac{32x + 9}{12x^2 + x - 6} - \frac{3}{4x + 3} - \frac{x + 5}{3x - 2}$
- 15) Simplify the complex fraction.  $\frac{\frac{4}{ab} - \frac{3}{b^2}}{\frac{1}{a} + \frac{3}{b}}$
- 16) Solve  $\frac{5}{7x} - \frac{5}{6} = \frac{1}{6x}$
- 17) Solve  $\frac{5}{2x - 1} = \frac{-6}{3x + 2}$
- 18) Solve  $\frac{2x}{x - 2} + \frac{15}{x^2 - 7x + 10} = \frac{3}{x - 5}$
- 19) Solve  $\frac{2}{n - 2} - \frac{n}{n + 5} = \frac{10n + 15}{n^2 + 3n - 10}$
- 20) Solve  $\frac{x}{x + 2} + \frac{3}{x + 4} = \frac{14}{x^2 + 6x + 8}$
- 21) 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)
- 22) 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)
- 23) 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)

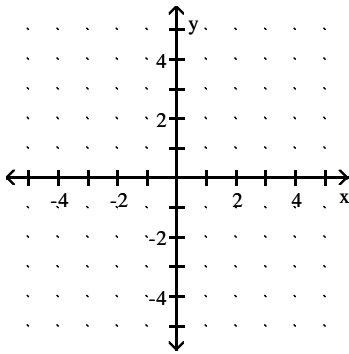
## CHAPTERS 8 & 4

- 24) Is (3, 1) a solution for  $2x - y = 5$ ?
- 25) Find the slope of the line determined by the following pairs of points. (5, -3), (-5, -9)
- 26) a. What is the slope of a vertical line?  
b. What is the slope of a horizontal line?

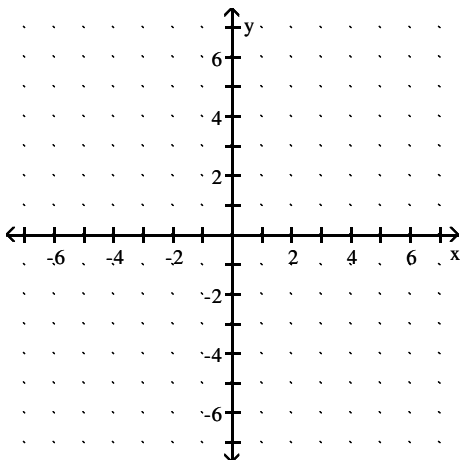
- 27) Given:  $y = -\frac{1}{2}x + 3$  Find the x- and y-intercepts and one other point. Graph.



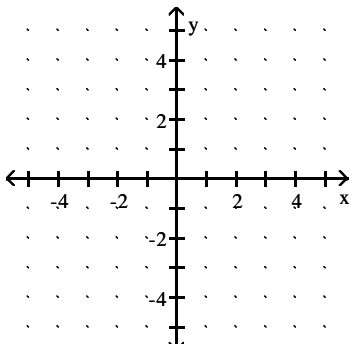
- 28) Given:  $y = -3$  Find the x- and y-intercepts and one other point. Graph.



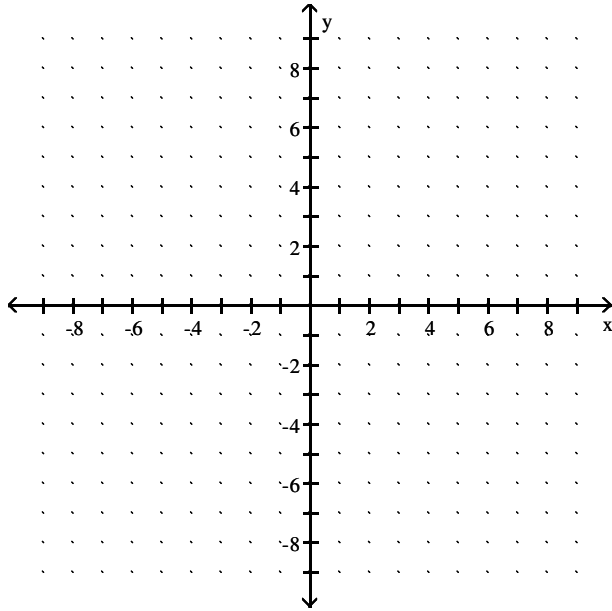
- 29) Given:  $3x - y = 6$  Find the x- and y-intercepts and one other point. Graph.



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



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



- 32) Given  $2x - 3y = 5$  Solve for  $y$  and determine the slope and  $y$ -intercept.
- 33) Find the coordinates of two points on the given line, and then use those coordinates to find the slope of the line.  $2x + y = 4$
- 34) Write the equation of a line that passes through the points  $(0, 3)$  and  $(5, -3)$ .
- 35) Write the equation of a line that passes through the points  $(-3, 2)$  and  $(-3, 5)$ .
- 36) Write the equation of a line that passes through the points  $(-1, -5)$  and  $(-4, 1)$ .
- 37) Write the equation of the line that passes through the points  $(-2, 5)$  and  $(3, -3)$ .
- 38) Write the equation of a line with slope of  $-\frac{3}{4}$  and passes through the point  $(-1, -5)$ .
- 39) Write the equation of the line with  $m = -\frac{3}{5}$  passing through the point  $(-2, -4)$ .
- 40) Write the equation of the line that has an  $x$ -intercept of  $-1$  and a  $y$ -intercept of  $-3$ .
- 41) Write the equation of a line perpendicular to the line  $y = \frac{1}{5}x - 4$  and passes through the point  $(2, 3)$ .
- 42) Write the equation of the line that contains the point  $(1, 3)$  and is parallel to the line  $x + 5y = 9$ .
- 43) Write the equation of the line that contains the point  $(5, 6)$  and is perpendicular to the  $y$ -axis.

- 44) A plumber charges \$80 plus \$40 for each hour of labor. Let  $n$  represent the number of hours of labor and  $c$  is the total cost.
- Write a linear equation modeling the scenario.
  - Find the total bill if labor is 2 hours.
  - If the total bill is \$240, for how many hours of labor was the customer charged?
  - Graph the equation with  $n$  along the horizontal axis and  $c$  along the vertical axis.
  - What does the  $c$ -intercept represent?

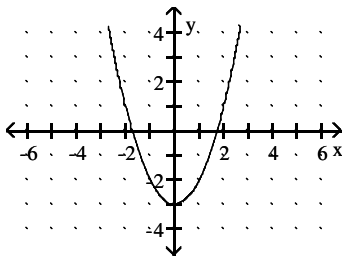
- 45) In a certain city, the cost of a taxi ride is computed as follows: There is a fixed charge of \$2.95 as soon as you get in the taxi, to which a charge of \$1.65 per mile is added. Find a linear equation that can be used to determine the cost,  $C(x)$ , of an  $x$ -mile taxi ride, and use this equation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

- 46) 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,  $x$ .

- 47) Given  $f(x) = 4x^2 - 5x + 6$ , find:
- $f(4)$
  - $f(-1)$
  - $f(a)$

- 48) Given  $f(x) = \frac{3}{x-2}$ , find:
- $f(-5)$
  - $f(2)$

- 49) Use the graph to determine the value of the function.
- $f(-2)$
  - $f(0)$



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

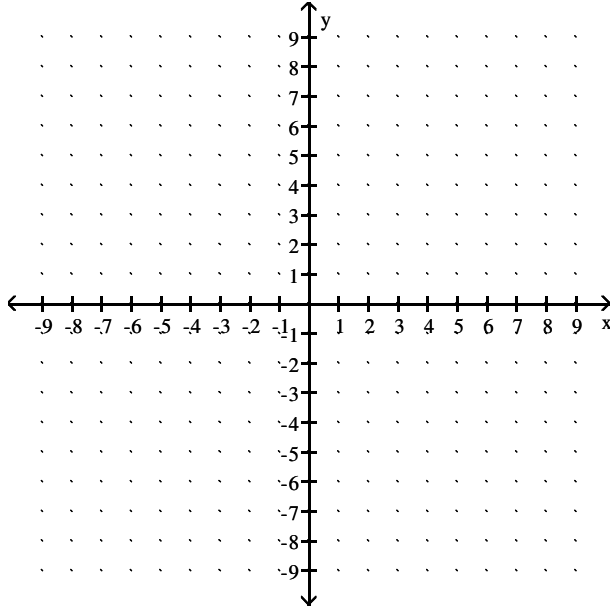
- 51) Solve using the substitution method:
- $$2y - x = 7$$
- $$2x + 3y = 14$$

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

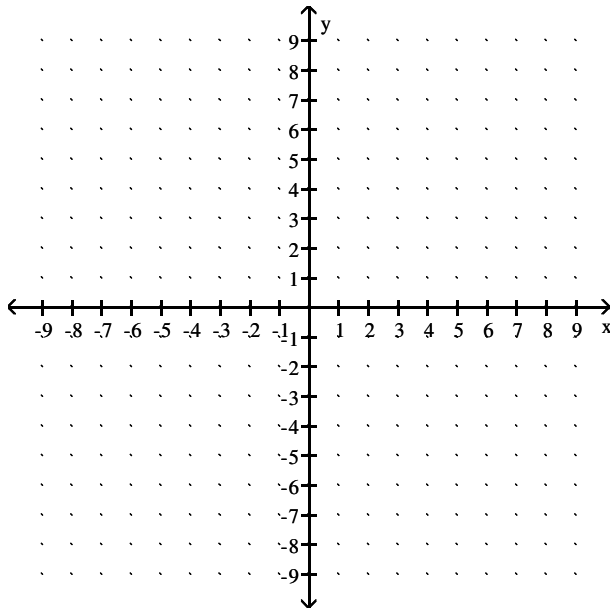
- 53) Solve using the elimination by addition method:
- $$\frac{2}{3}x + \frac{1}{2}y = \frac{5}{2}$$
- $$\frac{2}{5}x - y = \frac{1}{5}$$

- 54) Solve using the elimination by addition method:
- $$2x - 6y = 8$$
- $$x - 3y = 4$$

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



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



- 57) A manufacturing company purchased \$3000 worth of new equipments to offer new stationary to its customers. The cost of producing a package of stationary is \$3 and it is sold for \$5.50. Find the number of packages that must be sold for the company to break-even.
- 58) A 10% acid solution is to be mixed with a 50% acid solutions in order to get 120 ounces of a 20% solution. How many ounces of the 10% and 50% should be mixed?
- 59) 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

- 60) If  $f(x) = \sqrt{2x + 4}$ , find  $f(0)$ .
- 61) Find the domain of each of the following functions:  
a. If  $f(x) = \sqrt{3x + 9}$   
b.  $g(x) = \sqrt{8 - 4x}$
- 62) 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.
- 63) Simplify  $\sqrt[4]{36}$  Express your answer in radical form.
- 64) Simplify  $\sqrt[3]{-\frac{8}{27}}$
- 65) Simplify  $\sqrt{160}$
- 66) Simplify  $-4\sqrt{54}$
- 67) Simplify  $\frac{6\sqrt{5}}{5\sqrt{12}}$
- 68) Simplify  $\frac{3}{\sqrt[3]{3}}$
- 69) Simplify  $13\sqrt{28} - 2\sqrt{63} - 7\sqrt{7}$
- 70) Simplify  $\frac{3}{8}\sqrt{96} - \frac{2}{3}\sqrt{54}$
- 71) Simplify  $-3\sqrt[3]{2} - 2\sqrt[3]{16} + \sqrt[3]{54}$
- 72) Simplify  $\sqrt{96a^7b^8}$
- 73) Simplify  $\frac{\sqrt{5y}}{\sqrt{18x^3}}$
- 74) Simplify  $\frac{\sqrt[3]{2y}}{\sqrt[3]{3x}}$

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

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

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

78) Simplify  $\sqrt{2x}(\sqrt{12xy} - \sqrt{8y})$

79) Simplify  $(7\sqrt{3} - \sqrt{7})(2\sqrt{3} + 4\sqrt{7})$

80) Simplify  $(2\sqrt{3} + \sqrt{11})(2\sqrt{3} - \sqrt{11})$

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

82) Simplify  $\frac{\sqrt{7}}{3\sqrt{2} - 5}$

83) Simplify  $\frac{4}{\sqrt{2} - \sqrt{3}}$

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

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

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

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

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

89) Solve  $y - 1 = \sqrt{2y - 2}$

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

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

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

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

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

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

96) Simplify  $(9x^2y^4)^{\frac{3}{2}}$

97) Simplify  $(a^2b^{-3})^{-\frac{1}{3}}$

## CHAPTER 11

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

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

100) Solve  $3t^2 = 8$

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

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

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

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

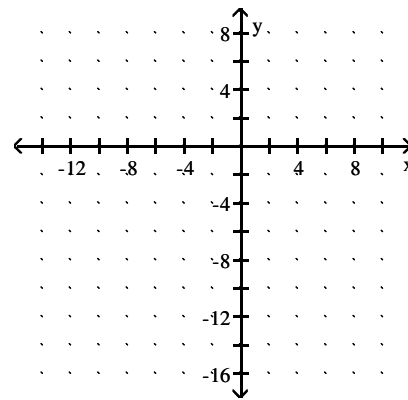
105) Solve  $\frac{5}{n-3} - \frac{3}{n+3} = 1$

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

- 107) 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)
- 108) 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)
- 109) A square sheet of metal has an area of 676 square inches. What is the length of each side? (NO EQUATION = NO CREDIT)
- 110) 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)
- 111) 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 dimensions of the sign. (NO EQUATION = NO CREDIT)

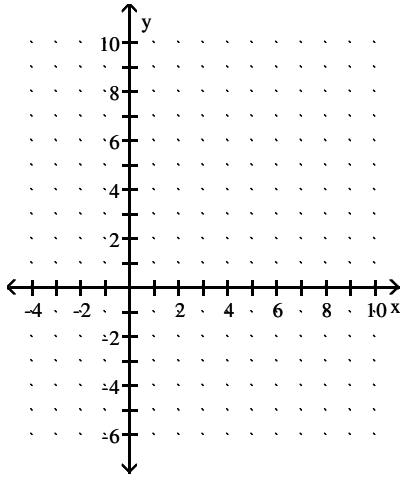
112) Given the following quadratic equation:  $y = -(x + 4)^2 + 1$

- What is the vertex?
- Which way does the parabola open?
- What is the y-intercept?
- What is the Axis of Symmetry?
- Graph.

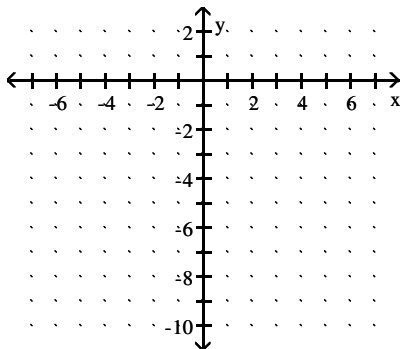


- 113) A record company discovers that the number of CDs sold each week after release of a new album follows a parabolic pattern. The function  $n(t) = -200t^2 + 4000t$  describes the number,  $n$ , of CDs an artist sold each of  $t$  weeks after the release of the album.
- Which week had the greatest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

- 114) Given the following quadratic equation:  $y = 4x^2 - 24x + 32$
- What is the vertex?
  - What are the x-intercepts (if any)?
  - What is the y-intercept?
  - Which way does the parabola open?
  - What is the Axis of Symmetry?
  - Graph.



- 115) Given the following quadratic equation:  $y = -2x^2 - 4x - 5$
- What is the vertex?
  - What are the x-intercepts (if any)?
  - What is the y-intercept?
  - Which way does the parabola open?
  - What is the Axis of Symmetry?
  - Graph.



# Answer Key

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- 1) a.  $\{x \mid x \neq 1\}$   
 b.  $\{x \mid x \neq 5, x \neq 3\}$

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

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

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

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

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

7)  $\frac{x-2}{(x+6)(x-3)}$

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

9) 6

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

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

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

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

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

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

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

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

18)  $3, \frac{7}{2}$

19) -1

20) -8, 1

21) 10 mph for Kim and 15 mph for Wendy

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

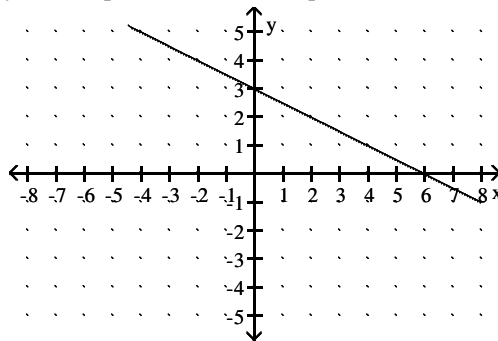
23) 15 mph

24) yes

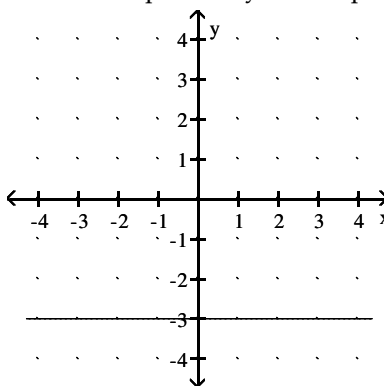
25)  $\frac{3}{5}$

26) a. no slope or undefined      b.  $m = 0$

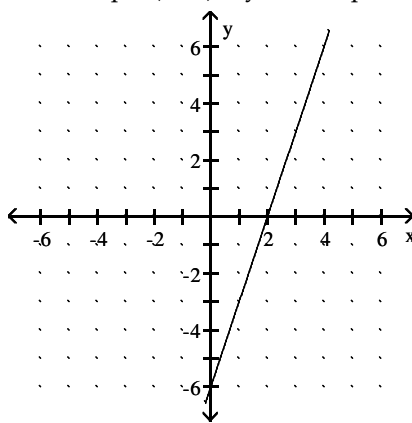
27) y intercept (0, 3), x intercept (6, 0)



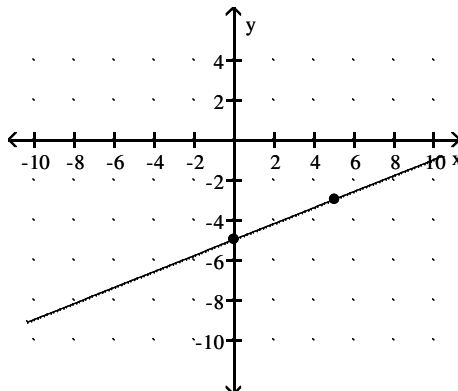
28) no x-intercepts      y-intercept is (0, -3)



29) x-intercepts (2, 0)      y-intercept is (0, -6)



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



# Answer Key

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

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

33)  $m = -2$

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

35)  $x = -3$

36)  $y = -2x - 7$

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

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

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

40)  $y = -3x - 3$

41)  $y = -5x + 13$

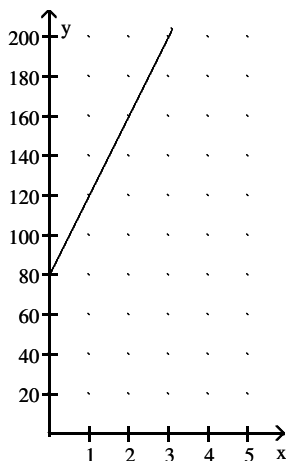
42)  $y = -\frac{1}{5}x + \frac{16}{5}$  OR  $x + 5y = 16$

43)  $0x + y = 6$  OR  $y = 6$

44) a.  $c = 40n + 80$

d.

which is \$80



45)  $C(x) = 2.95 + 1.65x$   
\$11.20

46)  $C(x) = 5x - 200$

47) a.  $f(4) = 50$

b.  $f(-1) = 15$

c.  $f(a) = 4a^2 - 5a + 6$

48) a.  $f(-5) = \frac{3}{-7}$

b.  $f(2) = \text{undefined}$

49) a.  $f(-2) = 1$

b.  $f(0) = -3$

50)  $(-4,1)$

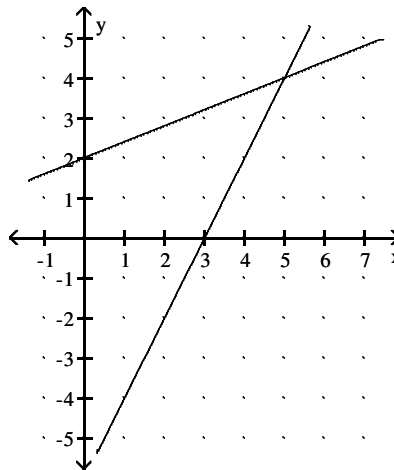
51)  $(1, 4)$

52)  $(0, -1)$

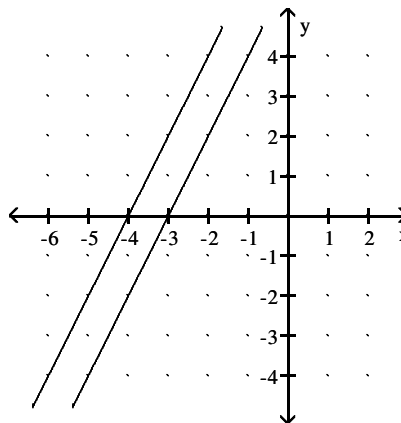
53)  $(3, 1)$

54) Infinitely many solutions

55)  $(5, 4)$



56)  $\emptyset$  (lines are parallel)



57) 1200 packages

58) 90 ounces of the 10%

30 ounces of the 50%

59) \$1.60 for a tennis ball and \$2.25 for a golf ball

60) 2

61) a.  $x \geq -3$  or  $[-3, \infty)$

b.  $x \leq 2$  or  $(-\infty, 2]$

62) 11.256 m/s

63)  $\sqrt{6}$

64)  $-\frac{2}{3}$

65)  $4\sqrt{10}$

66)  $-12\sqrt{6}$

67)  $\frac{\sqrt{15}}{5}$

68)  $\sqrt[3]{9}$

# Answer Key

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69)  $13\sqrt{7}$

70)  $\frac{-\sqrt{6}}{2}$

71)  $-4\sqrt[3]{2}$

72)  $4a^3b^4\sqrt{6a}$

73)  $\frac{\sqrt{10xy}}{6x^2}$

74)  $\frac{\sqrt[3]{18x^2y}}{3x}$

75)  $-7x\sqrt{2x}$

76)  $24\sqrt{6}$

77) 60

78)  $2x\sqrt{6y} - 4\sqrt{xy}$

79)  $14 + 26\sqrt{21}$

80) 1

81)  $6\sqrt[3]{12} - 8\sqrt[3]{10}$

82)  $\frac{3\sqrt{14} + 5\sqrt{7}}{-7}$

83)  $-4(\sqrt{2} + \sqrt{3})$  or  $-4\sqrt{2} - 4\sqrt{3}$

84)  $T = \frac{\pi\sqrt{2L}}{4}; 7.30 \text{ ft}$

85)  $\frac{49}{4}$

86) 1, -1

87)  $\emptyset$

88)  $-\frac{1}{3}$

89) 1, 3

90) 5

91) 64

92) 4

93) -2

94)  $5\sqrt[4]{x}$

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

96)  $27x^3y^6$

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

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

99) 12

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

101)  $-5 \pm 2\sqrt{3}$

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

103) discriminant is 0, so 1 real root

$\frac{1}{3}$

104) discriminant is 52, so 2 real roots

$\frac{1 \pm \sqrt{13}}{4}$

105)  $1 \pm \sqrt{34}$

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

107) 17.9 feet

108) 15 hour & 30 hours

109) 26 inches

110) 54 inches

111)  $(1 + \sqrt{43})$  yards by  $(-1 + \sqrt{43})$  yards

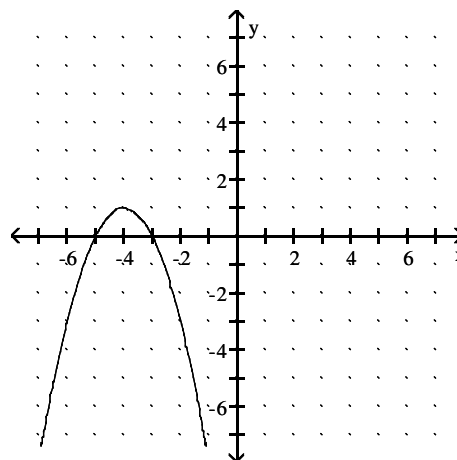
112) a. (-4, 1)

b. down

c. (0,-15)

d.  $x = -4$

e.



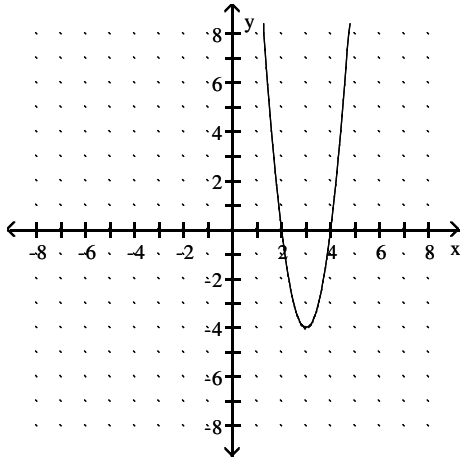
113) a. the 10th week

b. 20,000 CDs

# Answer Key

Testname: M117 FINAL REVIEW FALL 2010

- 114) a.  $(3, -4)$   
b.  $(4, 0)$  and  $(2, 0)$   
c.  $(0, 32)$   
d. up  
e.  $x = 3$   
f.



- 115) a.  $(-1, -3)$   
b. No x-intercepts  
c.  $(0, -5)$   
d. down  
e.  $x = -1$   
f.

