



Algebra II
Fundamentals
Summer Math Packet

Congratulations and welcome to St. Brendan High School!

This summer math packet is a review of some of the concepts learned in Algebra I that will be needed for Algebra II. It will assure that all students begin the school year on the same page and with equal opportunity to succeed in Algebra II.

Instructions for completing the packet:

- Please print the packet or use loose leaf paper to complete the packet by hand showing all work. Work must be neat and legible.
- Please use your Algebra I notes or the websites provided to help you if you need reminders on how to complete some practice problems.
- Take notes as you complete your work. You will be given a quiz on this material the first week of school.
- Work on the packet with your friends. Help each other. Every student is responsible for knowing the material in this packet when you return in August. We will review as a team and everyone will be expected to participate.
- Bring your packet to our first class together. It will be collected for a grade. Only packets done with paper and pencil will be accepted.

Helpful Websites:

<http://www.mathtv.com/>

<http://www.purplemath.com/modules/index.htm>

<https://www.khanacademy.org>

Helpful for graphing functions:

<https://www.education.ti.com/en/resources/family-of-functions>

Name _____

Solve.

- 1) The formula $C = \frac{5}{9}(F - 32)$ expresses the relationship between Fahrenheit temperature, F , and Celsius temperature, C . Use the formula to convert 41°F to its equivalent temperature on the Celsius scale. 1) _____
- 2) A stone is dropped from a tower that is 730 feet high. The formula $h = 730 - 16t^2$ describes the stone's height above the ground, h , in feet, t seconds after it was dropped. What is the stone's height 1 seconds after it is released? 2) _____
- 3) If a rock falls from a height of 90 meters above the ground, the height H (in meters) after x seconds can be approximated using the formula $H = 90 - 4.9x^2$. What is the height of the rock after 3 seconds? 3) _____

Solve the problem.

- 4) A car rental agency charges \$250 per week plus \$0.25 per mile to rent a car. How many miles can you travel in one week for \$325? 4) _____
- 5) A train ticket in a certain city is \$1.50. People who use the train also have the option of purchasing a frequent rider pass for \$16.50 each month. With the pass, each ticket costs only \$0.75. Determine the number of times in a month the train must be used so that the total monthly cost without the pass is the same as the total monthly cost with the pass. 5) _____

Solve the formula for the specified variable.

- 6) $A = \frac{1}{2}bh$ for b 6) _____
- 7) $V = \frac{1}{3}Bh$ for h 7) _____
- 8) $P = 2L + 2W$ for W 8) _____

Solve the absolute value equation or indicate that the equation has no solution.

- 9) $|8x + 6| = 2$ 9) _____
- 10) $|6x + 9| + 6 = 11$ 10) _____

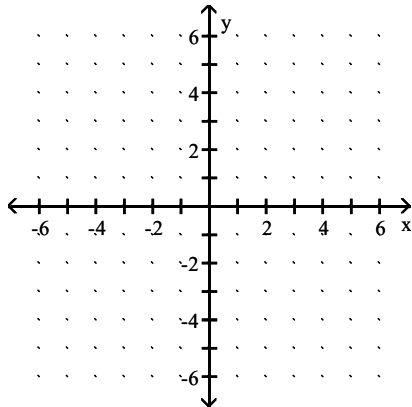
Solve the problem.

- 11) The function $f(x) = 500(0.5)^{x/90}$ models the amount in pounds of a particular radioactive material stored in a concrete vault, where x is the number of years since the material was put into the vault. Find the amount of radioactive material in the vault after 110 years. Round to the nearest whole number. 11) _____

Graph the function by making a table of coordinates.

12) $f(x) = 4^x$

12) _____



Solve.

- 13) Dave can hike on level ground 3 miles an hour faster than he can on uphill terrain. Yesterday, he hiked 37 miles, spending 2 hours on level ground and 5 hours on uphill terrain. Find his average speed on level ground.

13) _____

Solve the problem.

- 14) Sue took her collection of nickels and dimes to deposit in the bank. She has five fewer nickels than dimes. Her total deposit was \$54.05. How many dimes did she deposit?

14) _____

Solve.

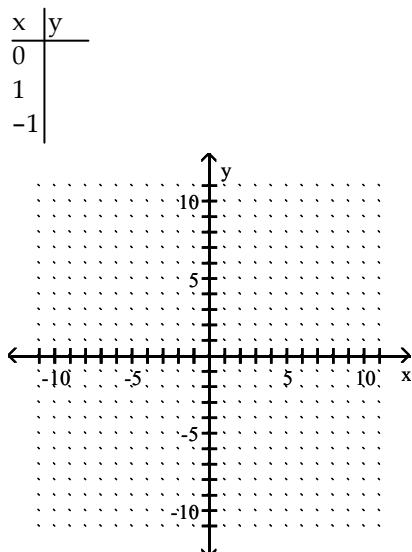
- 15) Kevin invested part of his \$10,000 bonus in a certificate of deposit that paid 6% annual simple interest, and the remainder in a mutual fund that paid 11% annual simple interest. If his total interest for that year was \$900, how much did Kevin invest in the mutual fund?

15) _____

Find three ordered pair solutions by completing the table. Then use the ordered pairs to graph the equation.

16) $y = 2x + 5$

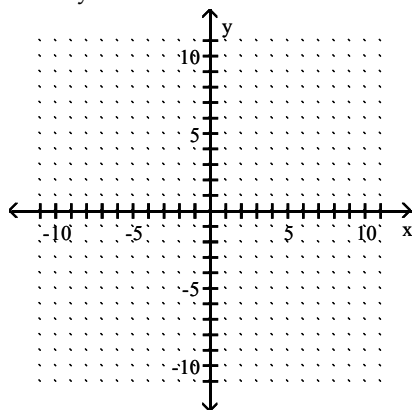
16) _____



Graph the linear equation by finding and plotting its intercepts.

17) $-x + 2y = 2$

17) _____



Find the slope of the line that passes through the given points.

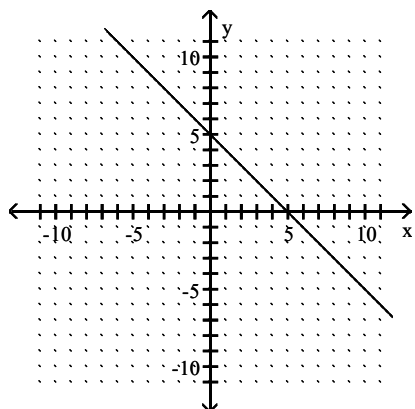
18) (9, 5) and (7, 8)

18) _____

Find the slope of the line if it exists.

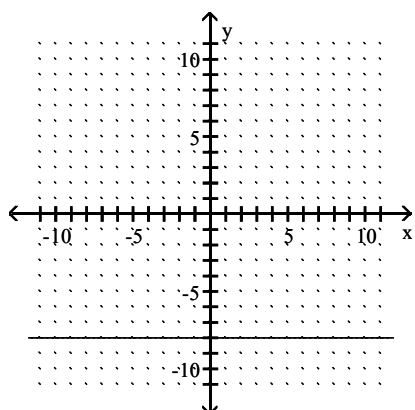
19)

19) _____

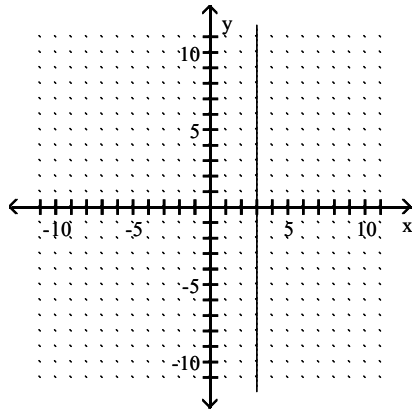


20)

20) _____



21)



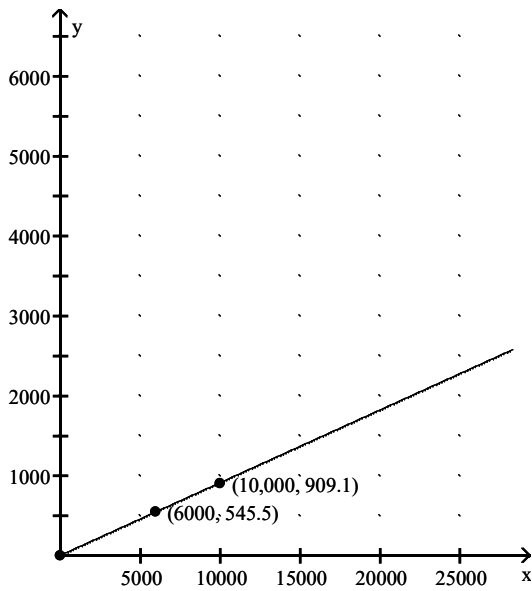
21) _____

Solve.

- 22) The approach ramp used by a daredevil motorcyclist for flying over a collection of flaming tires has a rise of 70 feet for every 100 feet in horizontal distance. Find the grade of the ramp. Round to the nearest whole percent. 22) _____

Find the slope of the line and write the slope as a rate of change. Don't forget to attach the proper units.

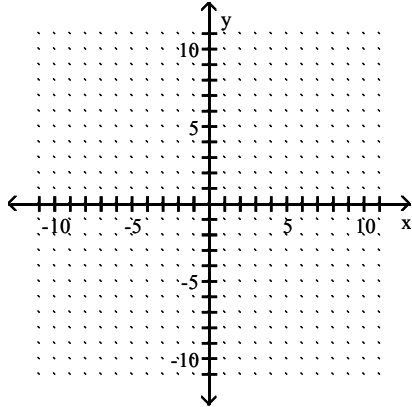
- 23) The graph shows the total cost y (in dollars) of owning and operating a mini-van where x is the number of miles driven. 23) _____



Use the slope-intercept form to graph the equation.

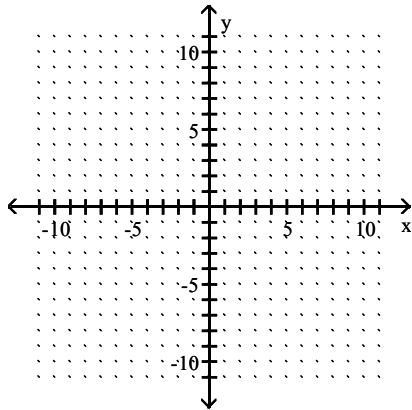
24) $y = -3x - 9$

24) _____



25) $4x + 3y = 12$

25) _____



Find an equation of the line described. Write the equation in slope-intercept form if possible.

26) Through $(1, 8)$ and $(7, 38)$

26) _____

Solve. Assume the exercise describes a linear relationship.

27) The average value of a certain type of automobile was \$19,380 in 2007 and depreciated to \$10,260 in 2011. Let y be the average value of the automobile in the year x , where $x = 0$ represents 2007. Write a linear equation that models the value of the automobile in terms of the year x .

27) _____

Find the domain and the range of the relation.

28) $\{(9, 1), (-10, 0), (-2, -2), (13, -10)\}$

28) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Determine whether the ordered pair is a solution of the system of linear equations.

29) $(-5, 5);$

29) _____

$$\begin{cases} 2x = -5 - y \\ 4x = -10 - 2y \end{cases}$$

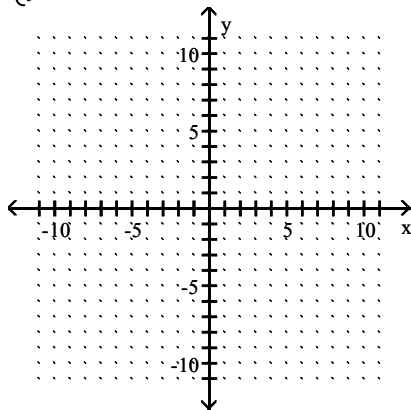
A) Yes

B) No

Solve the system of equations by graphing.

$$30) \begin{cases} y = x - 6 \\ y = 3x - 8 \end{cases}$$

30) _____



Solve the system of equations by the substitution method.

$$31) \begin{cases} 9x + y = 64 \\ 8x - 3y = 53 \end{cases}$$

31) _____

$$32) \begin{cases} -4x - 16y = 2 \\ 5x + 20y = 0 \end{cases}$$

32) _____

Solve the system of equations by the addition method.

$$33) \begin{cases} 2x - 3y = 4 \\ 3x - 2y = 4 \end{cases}$$

33) _____

$$34) \begin{cases} \frac{x}{3} + \frac{y}{9} = 1 \\ \frac{x}{2} - \frac{y}{6} = 0 \end{cases}$$

34) _____

Write a system of equations in x and y describing the situation. Do not solve the system.

35) One number is 6 more than another number. If you add 10 to 5 times the first number, the result is 6 times the second number.

35) _____

36) An order of 4 orders of fries, 3 hamburgers, and 3 drinks costs \$13. An order of 2 orders of fries, 5 hamburgers, and 5 drinks costs \$17. All drinks are \$1.

36) _____

Solve.

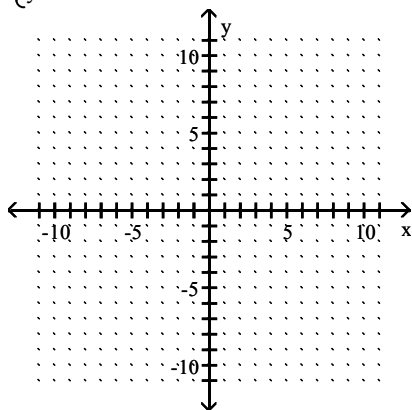
37) Devon purchased tickets to an air show for 8 adults and 2 children. The total cost was \$146. The cost of a child's ticket was \$7 less than the cost of an adult's ticket. Find the price of an adult's ticket and a child's ticket.

37) _____

Graph the solution of the system of linear inequalities.

$$38) \begin{cases} y < 2x + 8 \\ y \geq x - 6 \end{cases}$$

38) _____



Perform the indicated operation.

$$39) (8y^4 + 2y^3 - 8) + (2y^4 - 8y^3 + 8)$$

39) _____

$$40) (8y^5 - 4y^2 - 8) + (4y^5 - 2y^2 + 8)$$

40) _____

$$41) (9n^7 + 15n^6 - 2) - (5n^7 + 11n^6 + 10)$$

41) _____

$$42) (3x^2 - 8x + 4) - (x^2 - 4x + 2) + (7x^2 + 5)$$

42) _____

Multiply.

$$43) (3y + 8)(5y + 3)$$

43) _____

$$44) (4z - 3)(3z + 7)$$

44) _____

$$45) (8x - 1)(x^2 - 4x + 1)$$

45) _____

$$46) (9x - 1)(x^2 - 3x + 1)$$

46) _____

Simplify the expression. Write the result using positive exponents only.

$$47) \frac{x^9(x^{-8})^{-6}}{(x^{-3})^{-8}}$$

47) _____

$$48) \left(\frac{xy^4}{x^5y} \right)^{-2}$$

48) _____

Perform the division.

$$49) \frac{16x^8 + 24x^6 + 64x^4}{8x^6}$$

49) _____

Factor out the GCF from the polynomial.

50) $18x^3 - 6x^2 + 10x$

50) _____

51) $21m^9 + 12m^7 + 21m^5$

51) _____

Factor the trinomial completely. If the polynomial cannot be factored, write "prime."

52) $x^2 - x - 12$

52) _____

53) $x^2 + 4x - 45$

53) _____

54) $x^2 + 7x - 8$

54) _____

Factor completely.

55) $5x^2 + 19x - 4$

55) _____

56) $6x^2 - x - 155$

56) _____

57) $6z^2 - 5z - 6$

57) _____

58) $4x^2 - 14x - 8$

58) _____

Factor the perfect square trinomial completely.

59) $x^2 + 30x + 225$

59) _____

60) $x^2 + 6xy + 9y^2$

60) _____

Factor the binomial completely.

61) $s^{14} - a^2$

61) _____

Factor the sum or difference of two cubes.

62) $x^3 - 8$

62) _____

Solve the equation.

63) $(8x + 1)(5x - 4) = 0$

63) _____

64) $x(6x + 3) = 0$

64) _____

65) $5x^2 + 35x + 60 = 0$

65) _____

66) $20x^3 + 100x^2 + 120x = 0$

66) _____

Solve.

67) The area of a square is 25 square miles. Find the length of a side of the square. 67) _____

68) The area of a circle is 25π square meters. Find its radius. 68) _____

69) An object is thrown upward from the top of a 160-foot building with an initial velocity of 48 feet per second. The height h of the object after t seconds is given by the quadratic equation $h = -16t^2 + 48t + 160$. When will the object hit the ground? 69) _____

Add or subtract by first simplifying each radical and then combining any like radical terms. Assume that all variables represent positive real numbers.

70) $-2\sqrt{12} + 6\sqrt{27}$ 70) _____

71) $\sqrt{98} - 5\sqrt{32} - 6\sqrt{128}$ 71) _____

Multiply and simplify. Assume that all variables represent positive real numbers.

72) $\sqrt{18} \cdot \sqrt{98}$ 72) _____

73) $12\sqrt{5} \cdot 10\sqrt{10}$ 73) _____

Divide and simplify. Assume that all variables represent positive real numbers.

74) $\frac{\sqrt{150}}{\sqrt{6}}$ 74) _____

Solve.

75) A formula used to determine the velocity v in feet per second of an object (neglecting air resistance) after it has fallen a certain height is $v = \sqrt{2gh}$, where g is the acceleration due to gravity and h is the height the object has fallen. If the acceleration g due to gravity on Earth is approximately 32 feet per second per second, find the velocity of a bowling ball after it has fallen 40 feet. (Round to the nearest tenth.) 75) _____

Simplify the expression.

76) $(-243)^{1/5}$ 76) _____

Use the square root property to solve the quadratic equation.

77) $x^2 = \frac{1}{64}$ 77) _____

78) $(x - 7)^2 = 49$ 78) _____

Solve the quadratic equation by completing the square.

79) $y^2 + 3y - 9 = 0$ 79) _____

80) $x(x + 2) = 63$ 80) _____

Use the quadratic formula to solve the quadratic equation.

81) $4m^2 + 11m = 0$

81) _____

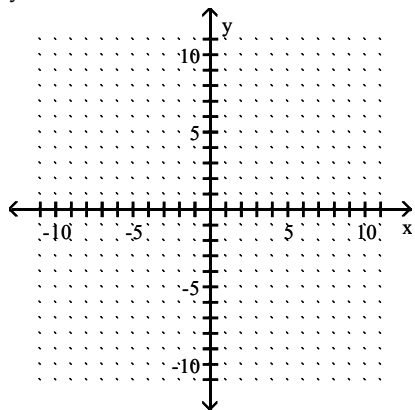
82) $x^2 + 5x = 84$

82) _____

Graph the quadratic equation by finding and plotting ordered pair solutions.

83) $y = 5x^2$

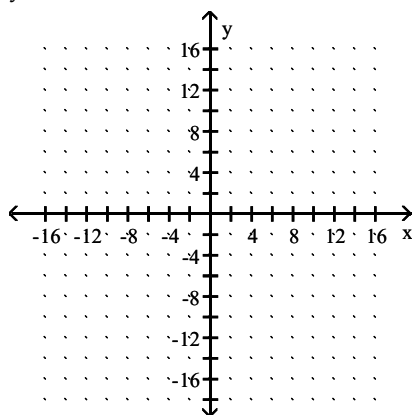
83) _____



Sketch the graph of the equation. Identify the vertex and the intercepts.

84) $y = x^2 - 2x + 5$

84) _____



Answer Key

Testname: ALGEBRA 2 SUMMER PACKET

1) 5°C

2) 714 ft

3) 45.9 m

4) 300 miles

5) 22 times

6) $b = \frac{2A}{h}$

7) $h = \frac{3V}{B}$

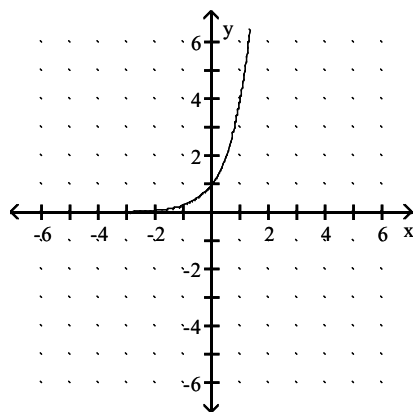
8) $W = \frac{P - 2L}{2}$

9) $\left\{-\frac{1}{2}, -1\right\}$

10) $\left\{-\frac{7}{3}, -\frac{2}{3}\right\}$

11) 214 pounds

12)



13) $7\frac{3}{7}$ mph

14) 362 dimes

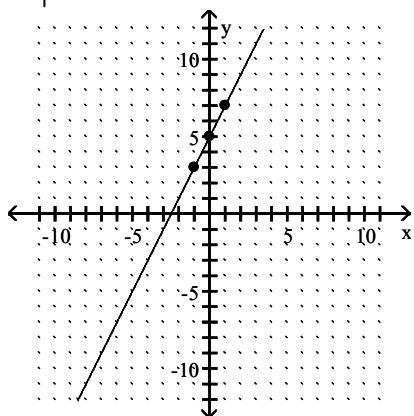
15) \$6000

Answer Key

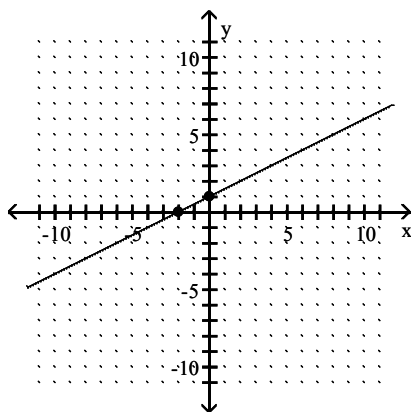
Testname: ALGEBRA 2 SUMMER PACKET

16)

x	y
0	5
1	7
-1	3



17)



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

19) -1

20) 0

21) undefined slope

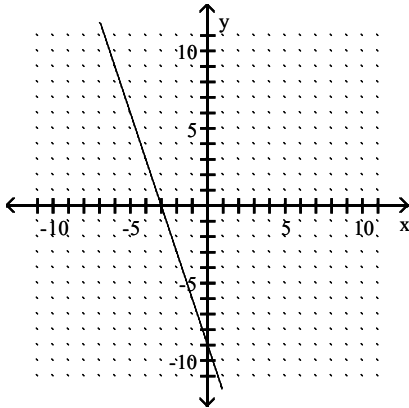
22) 70%

23) \$0.09 per mile

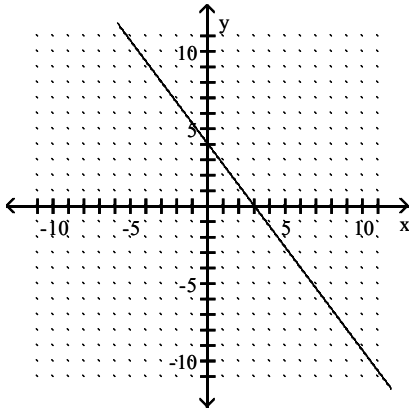
Answer Key

Testname: ALGEBRA 2 SUMMER PACKET

24)



25)



26) $y = 5x + 3$

27) $y = -2280x + 19,380$

28) domain: $\{-10, -2, 9, 13\}$; range: $\{-10, -2, 0, 1\}$

29) A

30) $(1, -5)$

31) $(7, 1)$

32) no solution

33) $(\frac{4}{5}, -\frac{4}{5})$

34) $(\frac{3}{2}, \frac{9}{2})$

35) $\begin{cases} x - y = 6 \\ 5x - 6y = -10 \end{cases}$

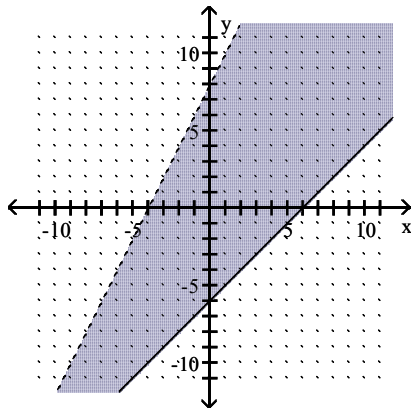
36) $\begin{cases} 4x + 3y + 3 = 13 \\ 2x + 5y + 5 = 17 \end{cases}$

37) adult's ticket: \$16; child's ticket: \$9

Answer Key

Testname: ALGEBRA 2 SUMMER PACKET

38)



39) $10y^4 - 6y^3$

40) $12y^5 - 6y^2$

41) $4n^7 + 4n^6 - 12$

42) $9x^2 - 4x + 7$

43) $15y^2 + 49y + 24$

44) $12z^2 + 19z - 21$

45) $8x^3 - 33x^2 + 12x - 1$

46) $9x^3 - 28x^2 + 12x - 1$

47) x^{33}

48) $\frac{x^8}{y^6}$

49) $2x^2 + 3 + \frac{8}{x^2}$

50) $2x(9x^2 - 3x + 5)$

51) $3m^5(7m^4 + 4m^2 + 7)$

52) $(x + 3)(x - 4)$

53) $(x + 9)(x - 5)$

54) $(x - 1)(x + 8)$

55) $(5x - 1)(x + 4)$

56) $(6x - 31)(x + 5)$

57) $(3z + 2)(2z - 3)$

58) $2(2x + 1)(x - 4)$

59) $(x + 15)^2$

60) $(x + 3y)^2$

61) $(s^7 + a)(s^7 - a)$

62) $(x - 2)(x^2 + 2x + 4)$

63) $-\frac{1}{8}, \frac{4}{5}$

64) $0, -\frac{1}{2}$

65) $-4, -3$

66) $0, -3, -2$

67) 5 mi

Answer Key

Testname: ALGEBRA 2 SUMMER PACKET

68) 5 m

69) 5 sec

70) $14\sqrt{3}$

71) $-61\sqrt{2}$

72) 42

73) $600\sqrt{2}$

74) 5

75) 50.6 ft/sec

76) -3

77) $\pm \frac{1}{8}$

78) 0, 14

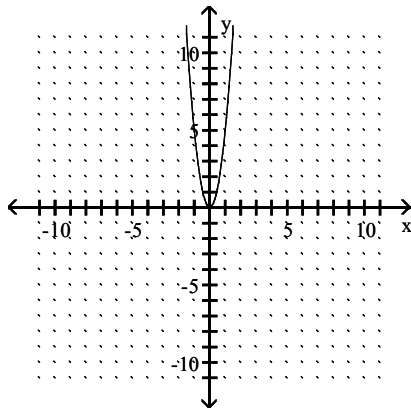
79) $\frac{-3 \pm 3\sqrt{5}}{2}$

80) -9, 7

81) $-\frac{11}{4}, 0$

82) -12, 7

83)



84) vertex: (1, 4);

x-intercepts: none;

y-intercept: (0, 5)

