



# Algebra II

## Summer Math Packet

Course 1332

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*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  $41^\circ\text{F}$  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) \_\_\_\_\_

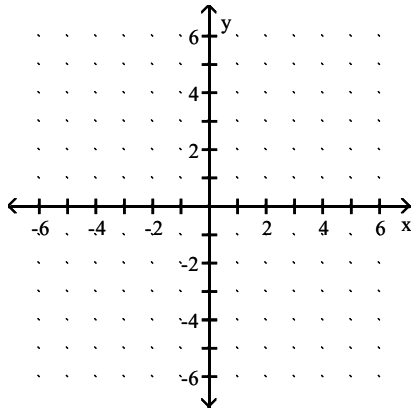
**Solve the problem.**

- 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?

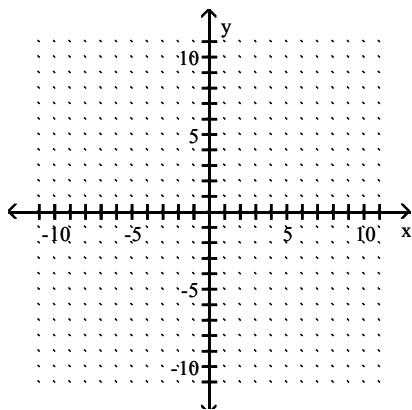
15) \_\_\_\_\_

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

16)  $y = 2x + 5$

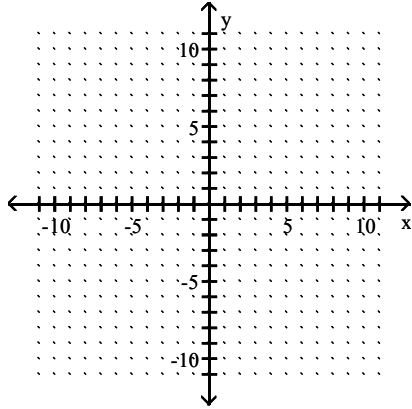
16) \_\_\_\_\_

x	y
0	
1	
-1	



Graph the linear equation by finding and plotting its intercepts.

17)  $-x + 2y = 2$



17) \_\_\_\_\_

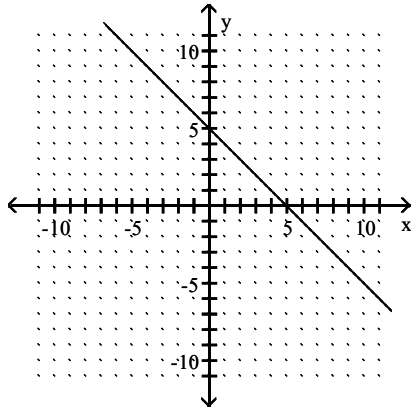
Find the slope of the line that passes through the given points.

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

18) \_\_\_\_\_

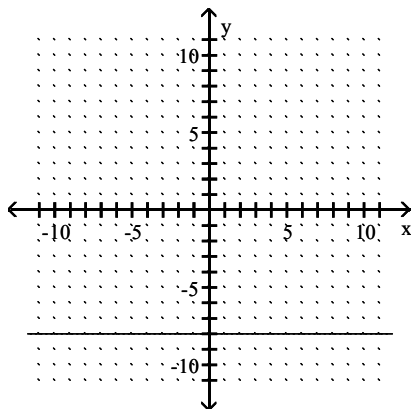
Find the slope of the line if it exists.

19)



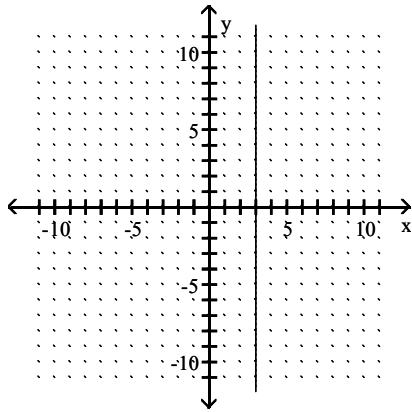
19) \_\_\_\_\_

20)



20) \_\_\_\_\_

21)



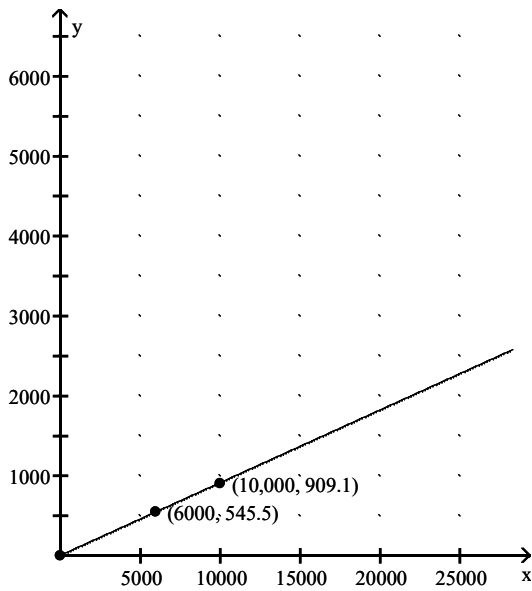
21) \_\_\_\_\_

**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.**

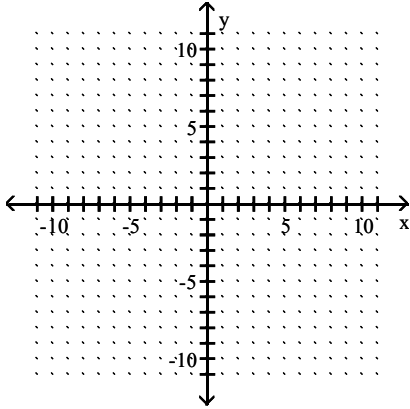
- 23) The graph shows the total cost  $y$  (in dollars) of owning and operating a mini-van where  $x$  is the number of miles driven. 23) \_\_\_\_\_



Use the slope-intercept form to graph the equation.

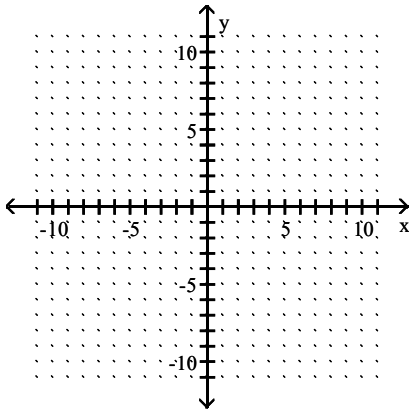
24)  $y = -3x - 9$

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) \_\_\_\_\_

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

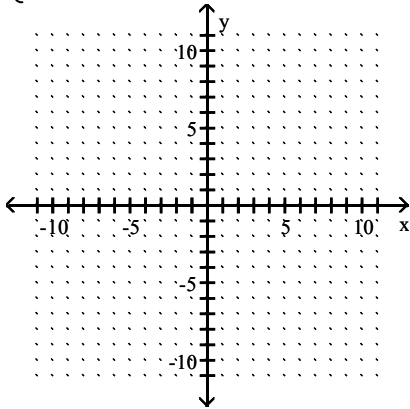
A) Yes

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.

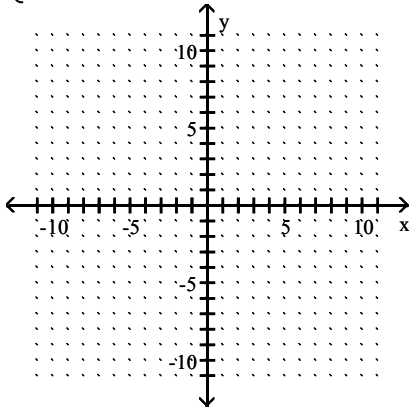
37) Devon purchased tickets to an air show for 8 adults and 2 children. The total cost was \$146. The cost of a child's ticket was \$7 less than the cost of an adult's ticket. Find the price of an adult's ticket and a child's ticket.

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  $25\pi$  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) \_\_\_\_\_

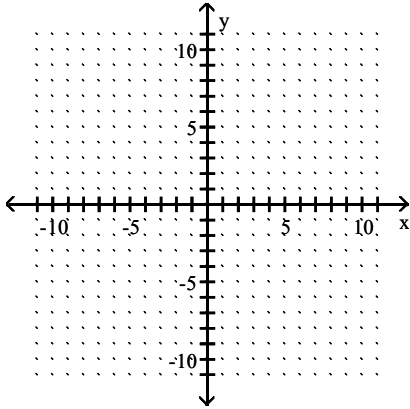
82)  $x^2 + 5x = 84$

82) \_\_\_\_\_

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

83)  $y = 5x^2$

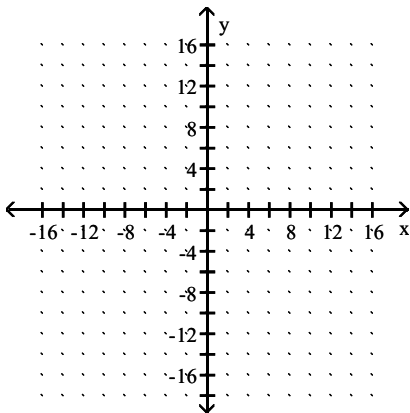
83) \_\_\_\_\_



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)  $5^{\circ}\text{C}$

2) 714 ft

3) 45.9 m

4) 300 miles

5) 22 times

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

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

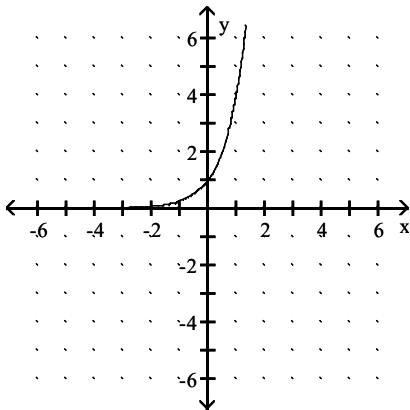
8)  $W = \frac{P - 2L}{2}$

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

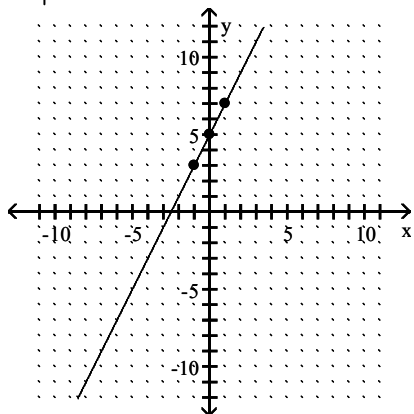
15) \$6000

Answer Key

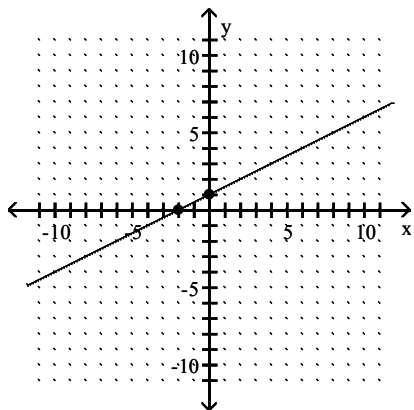
Testname: ALGEBRA 2 SUMMER PACKET

16)

x	y
0	5
1	7
-1	3



17)



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

19) -1

20) 0

21) undefined slope

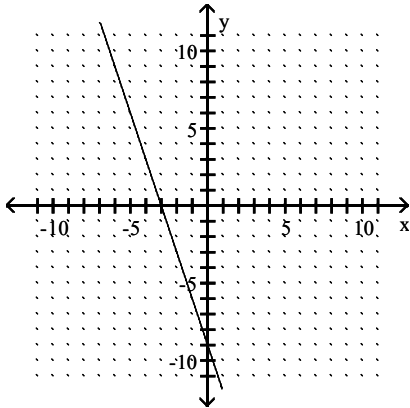
22) 70%

23) \$0.09 per mile

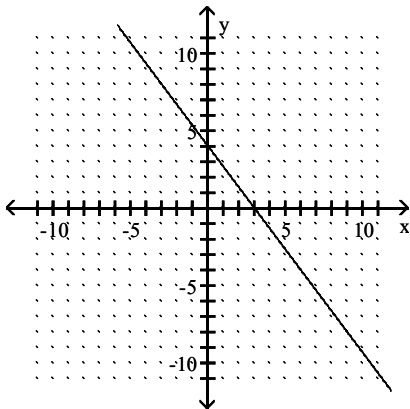
Answer Key

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

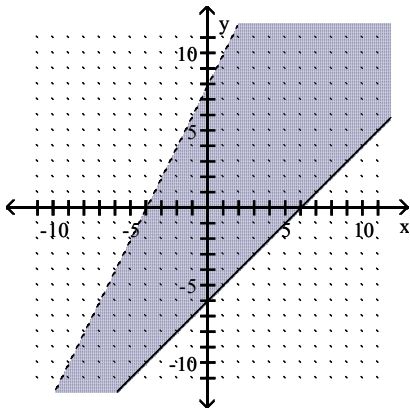
36)  $\begin{cases} 4x + 3y + 3 = 13 \\ 2x + 5y + 5 = 17 \end{cases}$

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

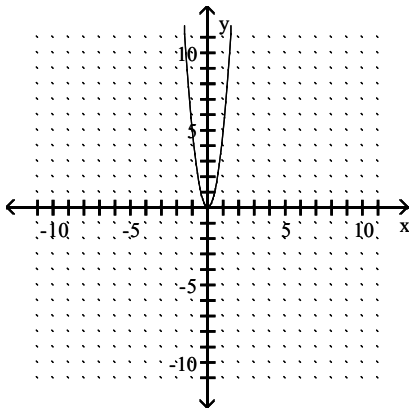
79)  $\frac{-3 \pm 3\sqrt{5}}{2}$

80) -9, 7

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

82) -12, 7

83)



84) vertex: (1, 4);

x-intercepts: none;

y-intercept: (0, 5)

