Utica High School

47255 Shelby Road
Utica, Michigan 48317

Phone: (586) 797-2200
Fax: (586) 797-2201

Summer 2015

Dear Incoming Algebra II Students (& Parents),

In preparation for any Algebra II course it is important for all students to have a solid foundation in the understanding of the Algebra I Curriculum. With the changing content expectations, linear functions as well as a large portion of quadratic functions are no longer covered in the Algebra II curriculum. Therefore, the mathematics department in Utica Community Schools feels it is important for students to review these important concepts prior to the beginning of the school year. By reviewing these concepts, students will be better prepared for the rigorous Algebra II curriculum. Attached is an Algebra II prerequisite packet which contains problems dealing with the review of Algebra I content. The incoming Algebra II students will be tested on these concepts during the first week of school so that teachers can assess their prior knowledge of linear and quadratic functions.

It is important that you, as a future Algebra II student make the effort to complete these problems and also identify any difficulties you have prior to the school year. Please bring the completed packet to your Algebra II class on the first day of school. This packet should also be available on your home schools website. In addition, **please strongly consider purchasing a TI-nspire CX graphing calculator to use throughout the school year**. The use of a graphing calculator in this course will aide in the understanding of the content. The mathematics department looks forward to a smooth transition into the new curriculum.

In advance, we appreciate the effort you will put into this packet.

Utica Mathematics Department

ALGEBRA II SUMMER PACKET
Review of Algebra 1 Skills

Name _____

Evaluate each expression. $a=-9, b=\frac{1}{3}, c=8, d=-6$ **. Leave ALL answers as fractions.**

1.

$$\frac{db+4c}{2a-d}$$

Answer: _____

2.

$$2b\left(4a+a^2\right)$$

Answer: _____

Simplify each expression.

3.

$$7(m-3)-5(m^2+m)$$

Answer: _____

4.

$$9x-\frac{1}{2}(4x-14)+31$$

Answer: _____

Solve each equation. Leave ALL answers as fractions.

5.

$$-\frac{2}{5}b+10=14$$

Answer: _____

6.

$$2x-3(x+11)=-(x+10)$$

Answer: _____

7.

$$\frac{1}{2}(14x+2)=3(2-3x)$$

Answer: _____

8.

$$\frac{3}{4}x-\frac{2}{5}x=\frac{7}{5}$$

Answer: _____

9. When solving a linear equation, your friend works through the problem correctly and her last step says -8 = -8. What should she write down as her "solution"?

Solve each inequality. Leave ALL answers as fractions.

10. $3(2 - m) < 2(2 - m) - m$

Answer: _____

11. $2(x + 4) \geq -2(8 - 2x) + 10$

Answer: _____

12. $-2 < 5(x + 1) + 2 < 12$

Answer: _____

Use the given information to answer the question.

13. Amusement Park Trip Your travel arrangements to an amusement park include a ground trip driving distance of 216 miles. The planned travel time is 4 hours. What must your average speed be to make the trip in the allotted time?

Speed = _____

14. Photography Studio A photography studio advertises a session with a sitting fee of $8.95 per person. The standard package of pictures costs $29.25. Write an expression that gives the total cost of a session with the purchase of one standard package. Evaluate the expression if a family of four purchases this package.

Expression for Total Cost = _____ **Family of Four Cost =** _____

15. **Lighting Configuration** You want to install 3 ceiling lights in a row to improve the visibility in your garage. Each light is 3 feet long and your garage is 27 feet long. The distance between each light, and between the lights and the walls, should the same. Draw a diagram to help solve this problem. What is the distance between successive lights?

Distance = _____

Identify the domain and range of the relation. Then, determine whether the relation is a function by answering Yes or No.

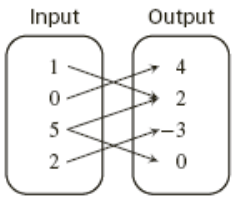
16.

x	-2	-1	4	0	2
y	1	1	1	1	1

Domain = _____ **Range =** _____

Function? **YES** **NO**

17.

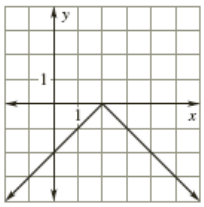


Domain = _____ **Range =** _____

Function? **YES** **NO**

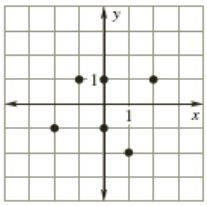
Use the vertical line test to determine whether the relation is a function. Answer Yes or No.

18.



_____

19.



_____

Evaluate the function for the given value of *x*. Leave ALL answers as fractions.

20.

$g(x) = -2x^3 - 18x$

$g(-5)$

$g(-5)$ = _____

21.

$h(x) = \dfrac{35}{-2x + 23}$

$h(9)$

$h(9)$ = _____

Find the slope of the line passing through the given points. Then tell whether the line *rises, falls, is horizontal*, or *is vertical*.

22. $(8, 7), (8, -3)$

m = _____ _____

23. $\left(.5, \dfrac{5}{2}\right), \left(\dfrac{7}{2}, \dfrac{9}{2}\right)$

m = _____ _____

Determine whether the lines are *parallel, perpendicular,* or *neither.*

24.

Line 1: through $(7, 3), (8, 7)$

Line 2: through $(-5, -4), (-1, -5)$

Answer: _____

25.

Line 1: through $(5, 2), (1, -7)$

Line 2: through $(-1, 3), (9, -1)$

Answer: _____

Use the information to write an equation of the line in slope-intercept form.

Slope-Intercept Form $y = mx + b$ **Point-Slope Form** $y - y_1 = m(x - x_1)$ **Standard Form** Ax + By = C

26.

$m = -\dfrac{1}{2},\ b = -14$

EQ: _____

27.

$m = -3$ through the point $(-5, 11)$

EQ: _____

28.

$m = \frac{4}{3}$ through the point $(-12, -7)$

EQ: _____

29.

through the point $(2, -4)(7, 6)$

EQ: _____

30.

through the points $(-4, 9), (-7, 9)$

EQ: _____

31.

through the points $(11, 1), (11, 12)$

EQ: _____

32.

Parallel to $y = 5x - 8$, passes through $(2, -3)$

EQ: _____

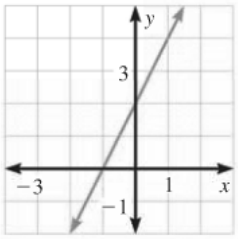
33.

Perpendicular to $y = \frac{1}{3}x$, passes through $(5, 3)$

EQ: _____

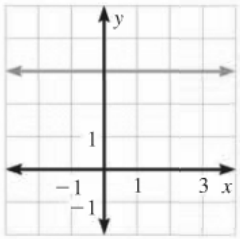
Use the graph to write an equation of the line.

34.



EQ: _____

35.



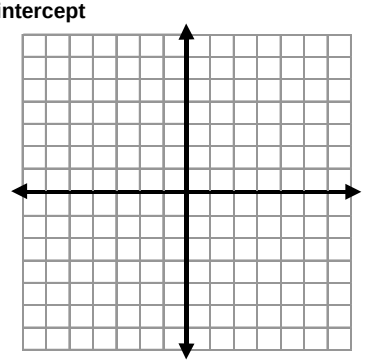
EQ: _____

Use the information to graph the equation.

36. Graph using the slope and y-intercept

$-2x + 5y = -10$

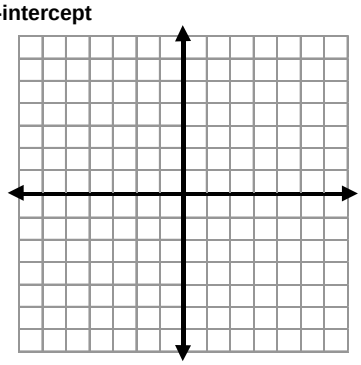
m = _____ **b =** _____



37. Graph using the slope and y-intercept

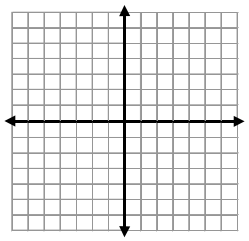
$y = -\frac{2}{3}x + 4$

m = _____ **b =** _____



38. Graph a line using the x- and y-intercept

x-intercept: –3
y-intercept: 4



39. Write the equation that is the translation of $y = |x|$ right 3 units and up 4 units.

Answer: _____

40. An absolute value equation _____ has an extraneous solution.

a. always
b. sometimes
c. never

Solve the equation. Check for extraneous solutions. Leave ALL answers as fractions.

41. $|x - 5| = 7$

Answer: _____

42. $3|x + 1| - 3 = 15$

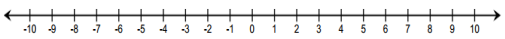
Answer: _____

43. $4|4 - 3x| = 4x + 8$

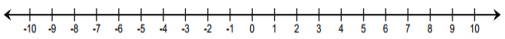
Answer: _____

Solve the inequality. Graph the solution. Show the interval notation.

44. $|4x + 10| \geq 30$



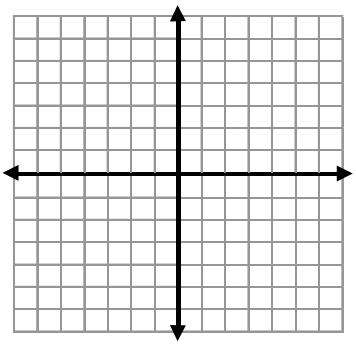
45. $|2x + 5| < 19$



Graph the Absolute Value equation. Be sure to include ALL of the following for each graph.

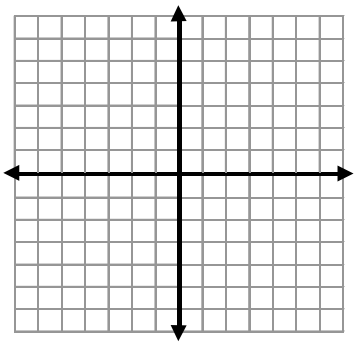
A. Find the Vertex
B. Graph the Function
C. Find the Axis of Symmetry
D. Does it stretch, if so by how much?
E. State the domain and range.
F. Describe end behavior.

46. $y = |x + 2| + 1$



A	
B	*See graph above*
C	
D	
E	**Domain:** **Range:**
F	

47. $y = -|2x + 3|$



A	
B	*See graph above*
C	
D	
E	**Domain:** **Range:**
F	

Solve the System of Equations using any method.

48. $\begin{cases} -3x - 5y = 3 \\ 3x - y = -3 \end{cases}$

Answer: _____

49. $\begin{cases} 3x + 3y = -6 \\ 2x - 3y = -14 \end{cases}$

Answer: _____

50. $\begin{cases} -x - y = 7 \\ 2x + 2y = -14 \end{cases}$

Answer: _____

51. A rental car agency charges a flat fee of $24.00 plus $2.00 per day to rent a certain car. Another agency charges a fee of $18.75 plus $3.75 per day to rent the same car. Write a system of equations to represent the cost *c* for renting a car at each agency for *d* days. Using a graphing calculator, find the number of days for which the costs are the same. Round your answer to the nearest whole day.

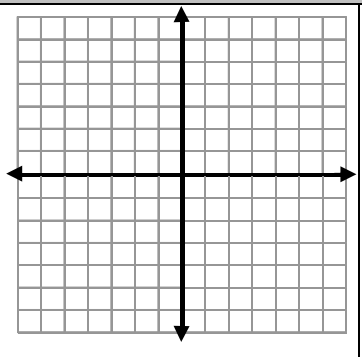
Answer: _____ **Days** _____ **Cost**

52. A group of 75 people attended a ball game. There were four times as many children as adults in the group. Set up a system of equations that represents the numbers of adults and children who attended the game and solve the system to find the number of children who were in the group.

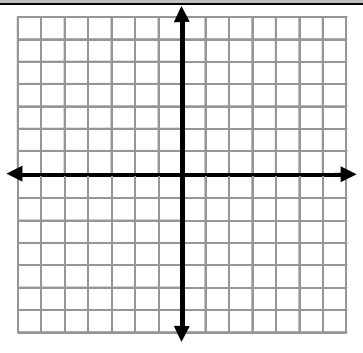
Answer: _____ **# of Adults** _____ **Cost**

Solve the system of inequalities by graphing.

53. $\begin{cases} y \le -x - 1 \\ y > 4x - 3 \end{cases}$

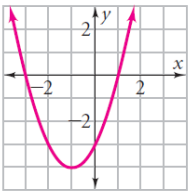


54. $\begin{cases} x \ge -1 \\ y > -2 \end{cases}$



Identify the vertex, axis of symmetry, domain, and range of each parabola. Use Interval Notation.

55.



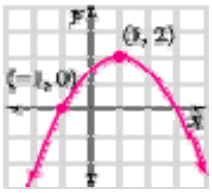
Vertex:_____

Axis of Symmetry:_____

Domain:_____

Range:_____

56.



Vertex:_____

Axis of Symmetry:_____

Domain:_____

Range:_____

Rewrite each function in standard form. Determine whether the function is linear or quadratic.

57. $Y = 2x(x+1)-4+x$

Standard Form:

_____

Circle: Linear or Quadratic

58. $Y = 4x^2 + 12x + 9 - 4x^2 + 3$

Standard Form:

_____

Circle: Linear or Quadratic

59. $Y = (2x+3)(x-4)$

Standard Form:

_____

Circle: Linear or Quadratic

60. $Y = 3(x^2 - 2x) - 3(x^2 - 2)$

Standard Form:

_____

Circle: Linear or Quadratic

Factor the Following Polynomials.

61. $x^2 - 10x + 16$

Answer: _____

62. $x^2 - 7x - 18$

Answer: _____

63. $x^2 - 81$

Answer: _____

64. $x^2 - 7x + 12$

Answer: _____

65. $2x^2 + 7x - 15$

Answer: _____

66. $x^2 - 14x + 49$

Answer: _____

67. $2x^2 + 15x + 7$

Answer: _____

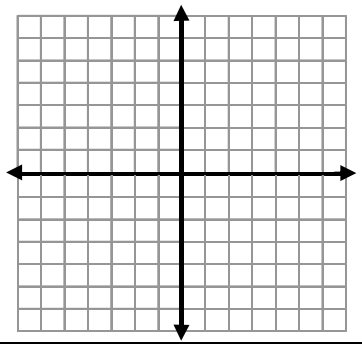
68. $9x^2 + 30x + 25$

Answer: _____

Graph the Quadratic equation. Be sure to include ALL of the following for each graph.

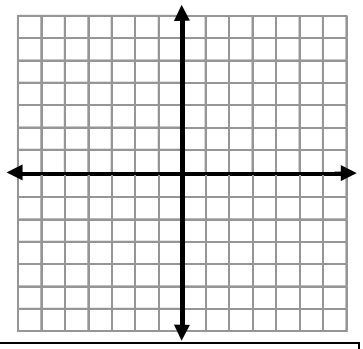
A. Find the Vertex
B. Graph the Function
C. Find the Axis of Symmetry
D. Does it stretch, if so by how much?
E. State the domain and range.
F. Describe end behavior.

69. $y = 2(x + 1)^2 - 4$



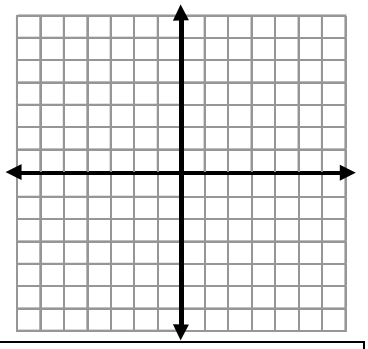
A	
B	*See graph above*
C	
D	
E	Domain: Range:
F	

70. $y = -(x - 2)^2 + 1$



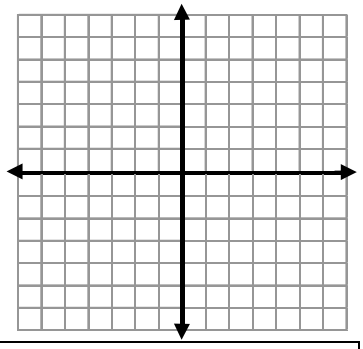
A	
B	*See graph above*
C	
D	
E	Domain: Range:
F	

71. $y = -x^2+5x-3$



A	
B	*See graph above*
C	
D	
E	Domain: Range:
F	

72. $y = 2x^2+8x-3$



A	
B	*See graph above*
C	
D	
E	Domain: Range:
F	

Solve the story problem.

73. The function $y = -16x^2 + 486$ models the heights *y* in feet of a stone *x* seconds after it is dropped from the edge of a vertical cliff. How long will it take the stone to hit the ground? Round to the nearest hundredth.

Answer: _____