8 Algebra CC
Unit 15 Review (Quadratic Functions)

Important Terminology

quadratic function	parabola	vertex	turning point	axis of symmetry
maximum	minimum	roots	zeros	

What should I be able to do?

1. Graph quadratic functions using a table of values.
2. Determine the coordinates of the turning point of a parabola.
3. Determine whether the y-value of the vertex is a *minimum* or *maximum* value.
4. Identify the roots (zeros) of a quadratic function.
5. State the interval for when a quadratic function is *increasing* or *decreasing*.
6. State the domain and range of a quadratic function.
7. Rewrite quadratic functions in *standard form*, *vertex form* and *factored form*.
8. Answer questions about the parabolic path of an object.

Practice Problem Set

1. a) Graph $\mathbf{y = -x^2 - 5x + 3}$ using a table of values.

   b) State and graph the equation of the **axis of symmetry**._____

   c) Determine the coordinates of the **turning point**._____

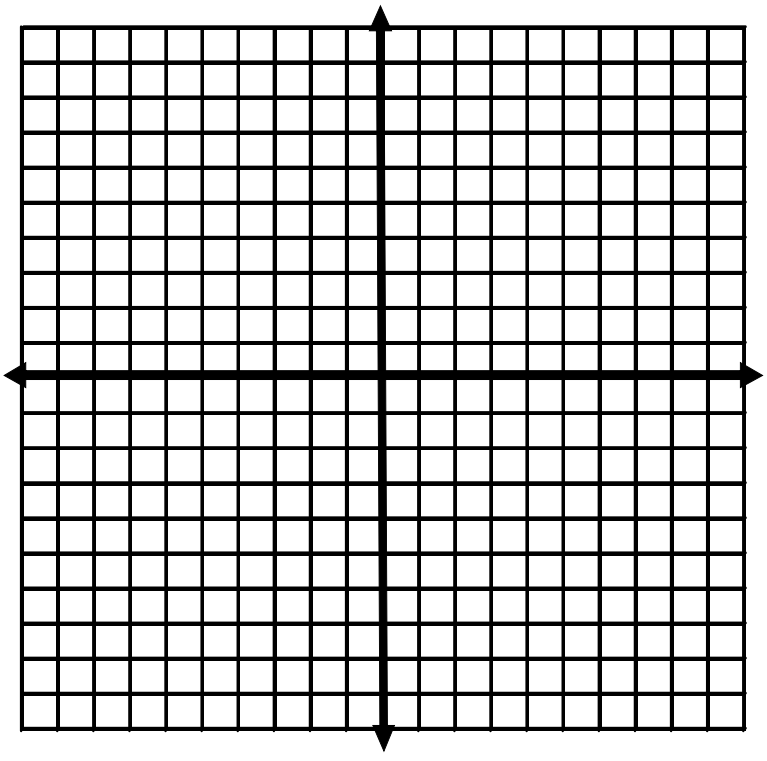
   d) State whether the vertex is a *maximum* or a *minimum* point._____

   e) State the **roots** of the parabola (round to the nearest hundredth)._____

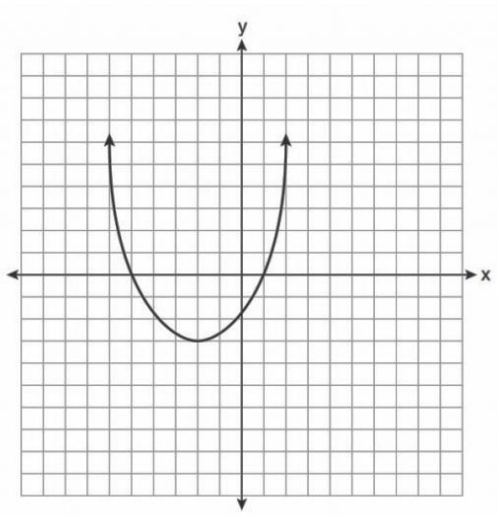
   f) State the **y-intercept** of the graph._____

   g) State the **range** of the function. _____

x	y



2) Let ***f*** be the function represented by the graph.



a) State the **roots** of the function._____

b) State the **vertex**. _____

c) Let ***g*** be a function such that $\boldsymbol{g(x) = \frac{1}{2}x^2 + 4x + 3}$.

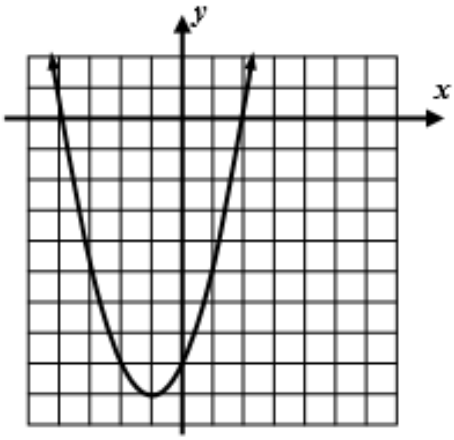
Determine which function has the smaller *minimum* value. Justify your response.

3) Each quadratic function below has a *domain* of all real numbers. State the ***range*** of each function.

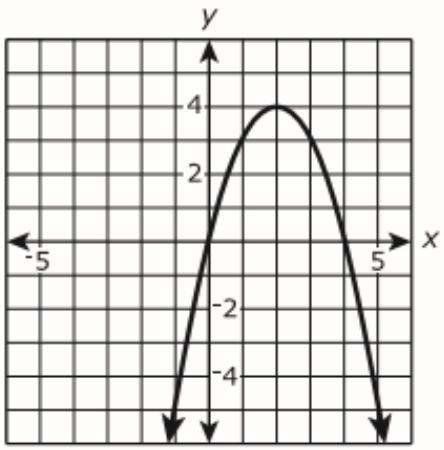
$h(x) = -(x + 2)^2 + 5$

x	y
-3	1
-2	-5
-1	-7
0	-5
1	1

$f(x) = 4x^2 + 8x - 6$



4) The graph of the function $\boldsymbol{f(x) = 4x - x^2}$ is shown here.



a) State the ***range*** of the function.

b) State the interval on which $f(x)$ is ***increasing***.

c) State the interval on which $f(x)$ is ***decreasing***.

5) State the **zeros** of the function $\boldsymbol{f(x) = -10(x + 3)(x - 7)}$.

6) In the xy-coordinate plane, the graph of the equation $\mathbf{y = 3x^2 - 12x - c}$ has zeros at x = a and x = b, where a < b. The graph has a minimum at (2, -48). What are the values of a, b and c?

7) Given the function $f(x) = x^2 + 6x + 8$

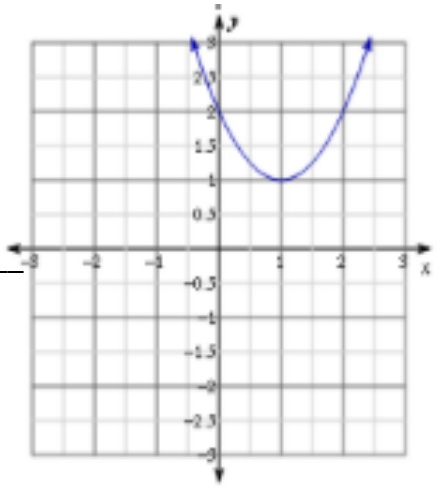
a) Rewrite the function in **factored form**. State the **zeros** of the function.

b) Rewrite the function in **vertex form** by completing the square. State the **vertex** of the function.

c) Rewrite the function $y = 2x^2 - 8x + 6$ in **vertex form** by completing the square. State the vertex of the function.

d) Which function has the smaller *minimum* value?

8) Answer **a** and **b** based on the graph shown here.

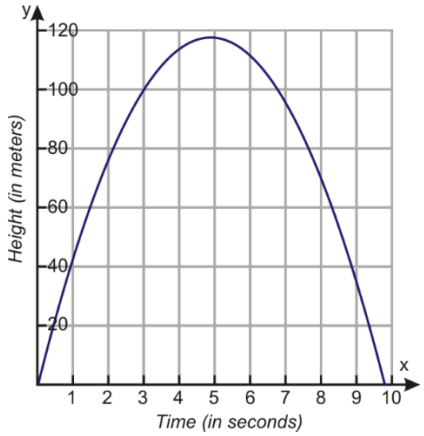


a) Are the roots *real* or *non-real* numbers? _____

b) Is the discriminant ($b^2 - 4ac$) *positive* or *negative*? _____

9) The height of an object after it has been launched is modeled by the graph of the quadratic function shown here where **y** represents the height of the object from the ground after **x** seconds.

Calculate the *average rate of change* of the height of the object for the first 3 seconds after being launched.



10) A student throws a bag of chips to her friend. Unfortunately, her friend does not catch the chips, and the bag hits the ground. The distance from the ground (height) for the bag of chips is modeled by the function $\boldsymbol{h(t) = -16t^2 + 32t + 4}$, where ***h*** is the height (distance from the ground in feet) of the chips, and ***t*** is the number of seconds the chips are in the air.

a) From what height are the chips being thrown?

b) What is the maximum height the bag of chips reaches while airborne?

c) How long does it take the bag of chips to reach its maximum height?

11) A rocket is launched from a cliff. The relationship between the height of the rocket, *in feet*, and the time since its launch, ***t***, *in seconds* can be represented by the function $\boldsymbol{h(t) = -16t^2 + 80t + 384}$. How long did it take for the rocket to hit the ground?