Graphing Quadratic Functions

- As you will see throughout this section of the course, quadratic functions can be expressed in many different forms including:
  - Transformational Form: $\frac{1}{a}(y-k)=(x-h)^2 \; ; \; a \neq 0$
  - Standard Form: $y=a(x-h)^2+k \; ; \; a \neq 0$
  - General Form: $y=ax^2+bx+c \; ; \; a \neq 0$
- We will look at each of these forms along with the characteristics that each of them show us. We will begin by reviewing Transformational Form from grade 10.

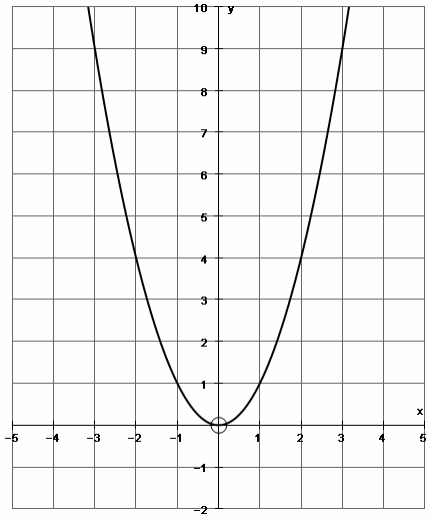
Transformational Form of a Quadratic Equation

- In previous math courses, we have expressed a function in many different forms. One of the forms was mapping notation. Mapping notation tells us how to get the image of a given graph. In the following lessons, we will review using mapping notation to show how we can generate an image graph of a **quadratic** function under various transformations.
- Example:

The standard base table of values for the quadratic $y=x^2$ is given by:

x	y
-3	9
-2	4
-1	1
0	0
1	1
2	4
3	9

When the points in the table of values are graphed, we get the base **parabola**:



The graph of the function is in the shape of a curve or parabola. The domain of the function is $D = \{x \mid x \in \mathbb{R}\}$ and the range is $R = \{y \mid y \geq 0,\ y \in \mathbb{R}\}$.

- All transformations and image graphs generated in this section will be applied to the base quadratic function $y = x^2$. Because of this, we will be looking at the change in ordered pairs which will then be used to graph the image function.