Writing Assignment Example

Convert to Vertex form, describe all transformations and Graph the following (if you use Calculator you must write down the sequences of buttons you pushed.)

$$y=x^{2}+6x+8$$

In order to convert this into Vertex form which is:

$$y=a(x-h)^{2}+k$$

You must find a, h, and k. These letters stand for the coefficient in front of x squared (a) this will give the stretch (narrowing), shrink (widening), and reflection of the graph. “h” is x-coordinate of the vertex and also gives the horizontal shift (translation), and “k” is the y-coordinate of the vertex and also gives the vertical shift (translation). We know that a = 1 for the equation in Standard Form. Thus, all that remains is to find the vertex (h,k). We know from class that “h” or x-coordinate of the vertex is actually:

$$\frac{-b}{2a} where a and b are the coefficients in y=ax^{2}+bx+c$$

Thus, the “h” value here is

$$\frac{-b}{2a}=\frac{-6}{2\left(1\right)}=-3$$

Now all that remains is to find the “k” value or y-coordinate of the vertex. We find this by using the -3 as an input value for the equation above to find out the output value which will be “k.”

$$y=\left(-3\right)^{2}+6\left(-3\right)+8=9-18+8=-1$$

Now we have our a = 1, h = -3, and k = -1, we are now ready to convert to Vertex form.

$$y=1(x-\left(-3\right))^{2}-1 = (x+3)^{2}-1$$

Which yields:

$$y=\left(x+3\right)^{2}-1$$

And the conversion is done.

In order to describe all of the transformations in this equation we need a, h, and k again. Having already found them in the last portion we know:

a = 1 tells us that the graph does not reflect, it does not widen, nor does it narrow.

h = -3 tells us that the graph translates or shift horizontally to the left 3 units.

k = -1 tells us that the graph translates or shifts vertically down 1 unit.

This means that the graph will look as follows.



And so we have completed the assignment.