Introduction:

In this investigation, we are going to model and investigate different parabolas using quadratic functions. We are mainly going to be using the turning point formula since we are dealing with parabolas. The formula is as followed:

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

The ***y*** and ***x*** are two points on the graph that we can input, the ***a*** is a constant which we calculate, the ***h*** is the x-coordinate of the vertex and the ***k*** is the y-coordinate of the vertex.

Investigation:

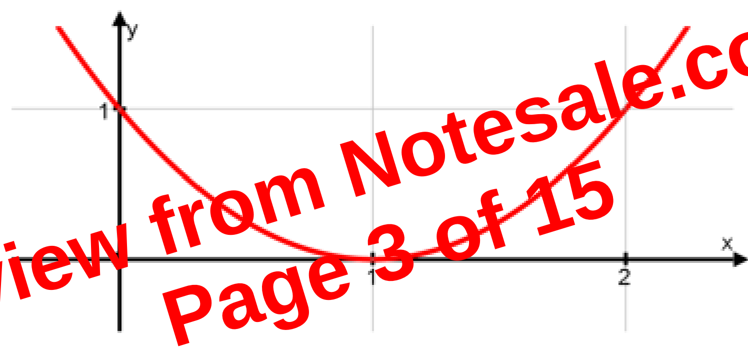

Fig. 1

Fig. 1 is a graph we have been given and we need to find the quadratic function of the parabola, and since it is a parabola, we will be using the turning point formula:

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

The y-intercept is the point where the parabola cuts the y-axis, and reading from *Fig. 1*, we can see that the y-intercept is **(0,1)**. We also know the coordinate of the vertex, since the vertex is the point at which the parabola "turns around", which is the minimum or maximum point of the parabola. Reading from the graph, we can see that the vertex is **v(0,1).**

$$y = a(x - h)^2 + k \Rightarrow y = a(x - 1)^2 + 0$$

Now that we know these values, we can calculate ***a*** by inputting the values into the equation. Since we need a point on the graph, and we already have two, we will simply be using the y-intercept point, which is **(0,1)**:

$$y = a(x-h)^2 + k => 1 = a(0-1)^2 + 0 = 1 = 1a => \frac{1}{1} = a$$

By this, we know that **a = 1**, and therefore the final equation is:

$$\boldsymbol{y = 1(x-1)^2 + 0}$$

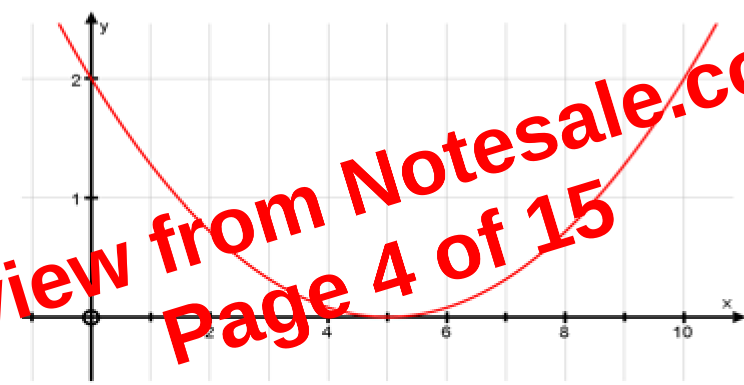

Fig. 2

Fig. 2 is another graph we have been given and we need to find the quadratic function of the parabola and since it is a parabola, we will be using the turning point formula:

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

As before, reading from *Fig. 2*, we can see that the y-intercept is **(0,2)**. Also as before, we can read the coordinate of the vertex from the graph, and we see that the vertex is **v(0,5).** Now we plug in the values.

$$y = a(x-h)^2 + k => y = a(x-5)^2 + 0$$