Graphing Parabolas – General Form

$$y = ax^2 + bx + c$$

Remembering the Quadratic Formula; the –b/2a is the midpoint of the x-intercepts - the line of symmetry. So rather than going through the process of Completing the Square to find the vertex, all we need to do is use –b/2a as find the x-coordinate of the vertex and substitute that value in the equation to find the y-coordinate of the vertex. From there, pick a convenient point, like zero, to find a second point. Then use symmetry to find a third point.

Strategy – In the equation $y = ax^2 + bx + c$: find the vertex, pick a convenient point and then use symmetry to graph.

Procedure

1. **Find the vertex letting x = –b/2a to find x-coordinate**
2. **Use b/2a to find the y coordinate of the vertex**
3. **Pick a convenient point, 0 if possible, to find a second point**
4. **Use symmetry to find 3rd point**

Sketch the graph

Example Graph $y = 3x^2 - 12x + 13$

1. **Using –b/2a for x: –(–12)/6 = 2 and substitute to find y,**
   $3(2)^2 - 12(2) + 13 = 1$
   So the vertex, V is at (2, 1)
2. **Let x = 0, then y = 13; (0, 13)**
3. **Use symmetry, 3rd point is (4, 13)**
4. **Sketch the graph**