Plotting the Parabola

How to plot : $y(x) = a x^2 + b x + c$
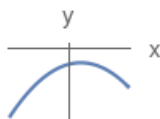
Step 1.

Examine the sign for the leading coefficent

If $a > 0$ then the valley shape:
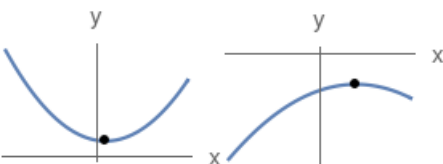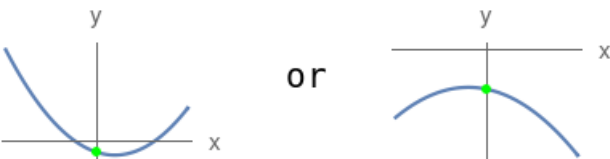
If $a < 0$ then the hill shape:

Step 2.

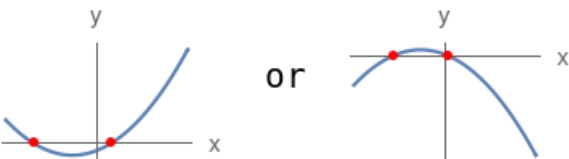Compute the vertex: $(-\frac{b}{2a}, y(-\frac{b}{2a}))$

Step 3.

Compute the y-intercept by setting $x = 0$, $0^2 a + 0 b + c = c$

or

Step 4.

Compute the x-intercepts by solving: $a x^2 + b x + c = 0$

or

Step 5.

Sketch a rough plot, try to connect vertex to intercepts:

or