Plotting the Parabola

How to plot : $q(x) = a\,x^2 + b\,x + c$

Step 1.

Examine the sign for the leading coefficent

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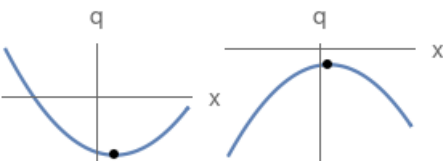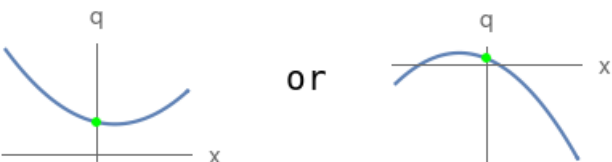
If a $<$ 0 then the hill shape:

Step 2.

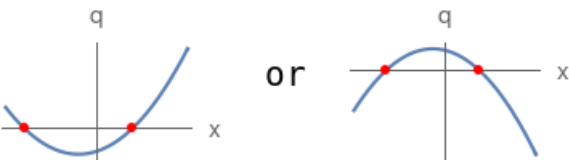Compute the vertex: $\left(-\dfrac{b}{2a}, q\left(-\dfrac{b}{2a}\right)\right)$

Step 3.

Compute the q-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