Plotting the Parabola

How to plot : $e(w) = a w^2 + b w + c$

Step 1.

Examine the sign for the leading coefficent

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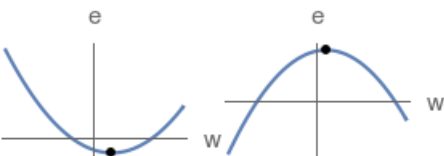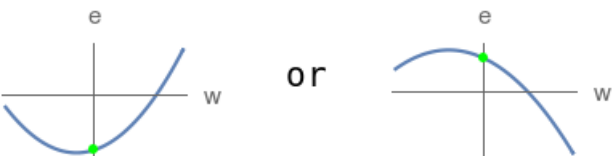
If $a < 0$ then the hill shape:

Step 2.

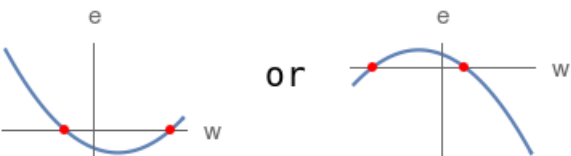Compute the vertex: $(-\frac{b}{2a}, e(-\frac{b}{2a}))$

Step 3.

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

or

Step 4.

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

or

Step 5.

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

or