Plotting the Parabola

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

Step 1.

Examine the sign for the leading coefficent

If a > 0 then the valley shape:
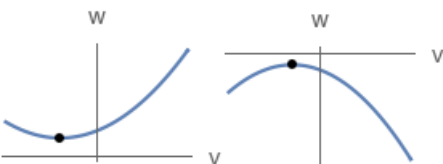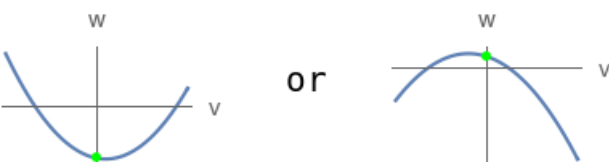

If a < 0 then the hill shape:

Step 2.

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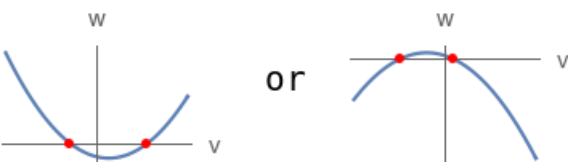

Step 3.

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

   or

Step 4.

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

   or

Step 5.

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

   or