Plotting the Parabola

How to plot : $v(y) = a\,y^2 + b\,y + c$
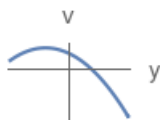
Step 1.
Examine the sign for the leading coefficent

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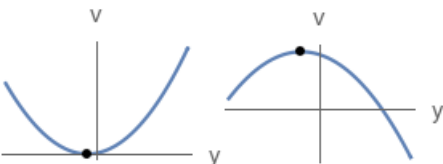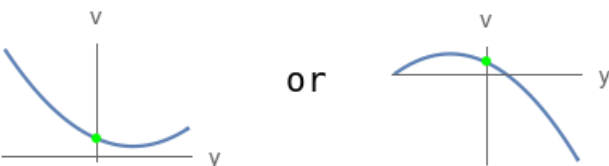
If $a < 0$ then the hill shape:

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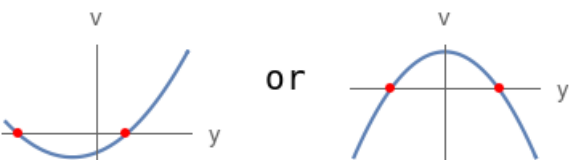Compute the vertex: $\left(-\dfrac{b}{2a}, v\left(-\dfrac{b}{2a}\right)\right)$

Step 3.
Compute the v-intercept by setting $y=0$, $0^2\,a + 0\,b + c = c$

or

Step 4.
Compute the y-intercepts by solving: $a\,y^2 + b\,y + c = 0$

or

Step 5.
Sketch a rough plot, try to connect vertex to intercepts:

or