Intercepts of the Quadratic

Given a quadratic $n(v) = a\,v^2 + b\,v + c$ compute its discriminant $\triangle$:

$\triangle = \sqrt{b^2 - 4\,ac}$

Case1: $\triangle > 0$

$v_{1,2} = \frac{-b \pm \sqrt{b^2 - 4\,ac}}{2a}$ computes the v-intercepts of multiplicity 1.

$n(0) = c$ computes the single n-intercept.

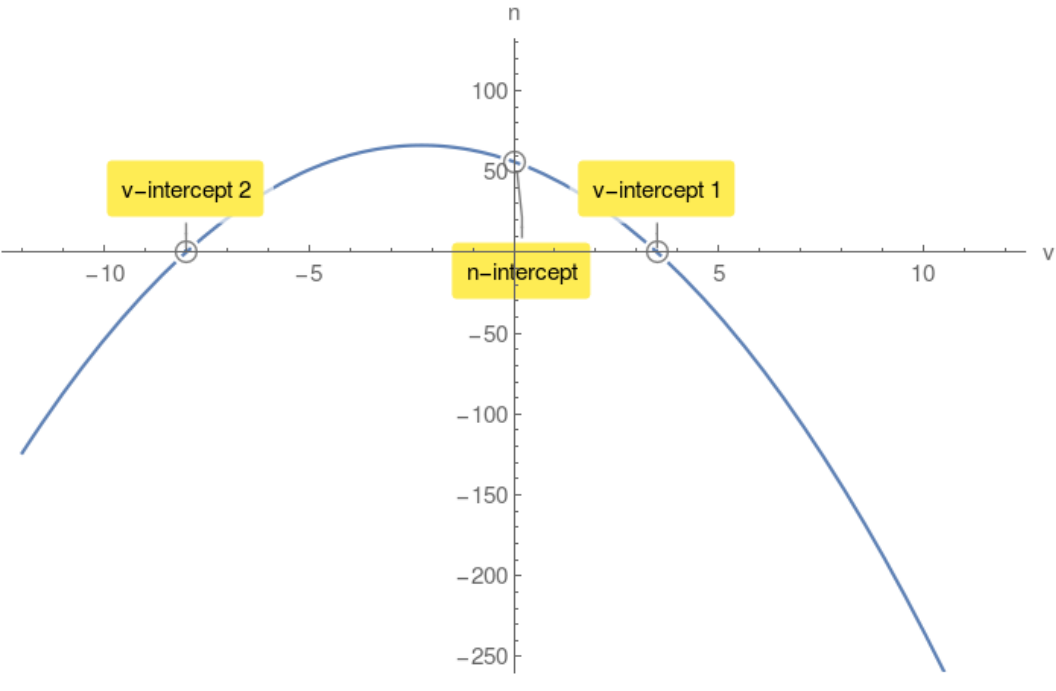
Example 1.

$n(v) = -2\,v^2 - 9\,v + 56$ compute its discriminant $\triangle$:

$\triangle = 529 > 0$

$v_{1,2} = \frac{7}{2}, -8$

$n(0) = 56$ n-intercept.



Case2: $\triangle = 0$

$v_{1,2} = \frac{-b \pm \sqrt{b^2 - 4\,ac}}{2a} = \frac{-b \pm 0}{2a} = \frac{-b}{2a}$ single v-intercept of multiplicity 2.

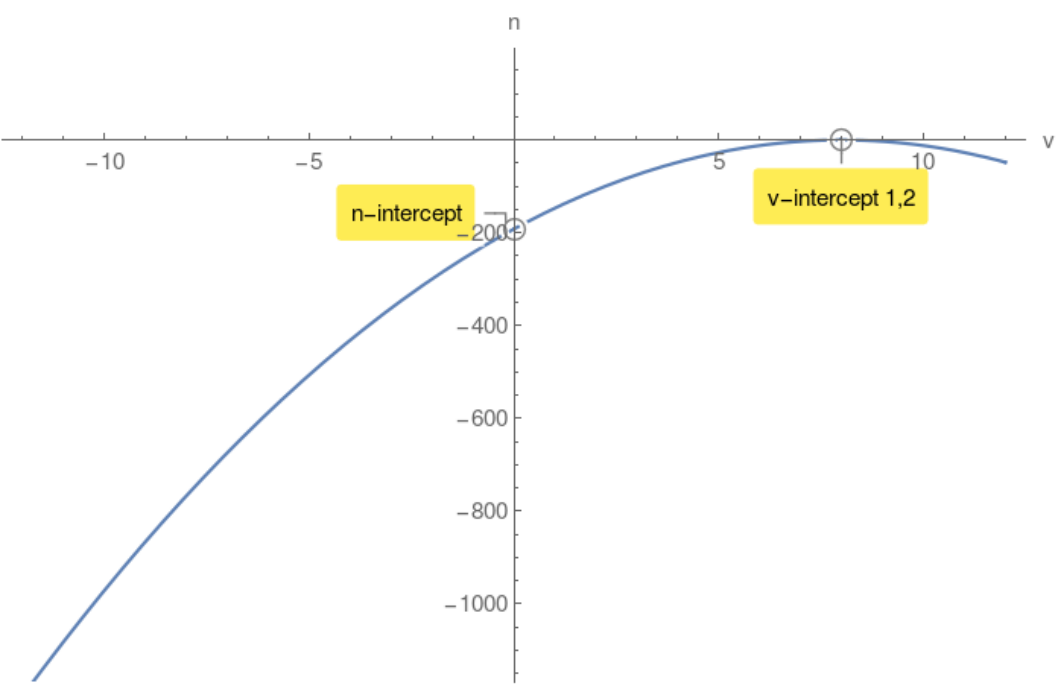
Example 2.

$n(v) = -3\,v^2 + 48\,v - 192$ compute its discriminant $\triangle$:

$\triangle = 0$

$v_{1,2} = 8, 8$

$n(0) = -192$ n-intercept.



Case3: $\triangle < 0$

$\sqrt{b^2 - 4\,ac}$ has no value in Real Numbers. Therefore there are no v-intercepts.

However there is a n-intercept.

Example 3.

$n(v) = 9\,v^2 - 180\,v + 1000$ compute its discriminant $\triangle$:

$\triangle = -3600 < 0$

$n(0) = 1000$ n-intercept.