Intercepts of the Quadratic

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

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

Case1: $\triangle > 0$

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

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

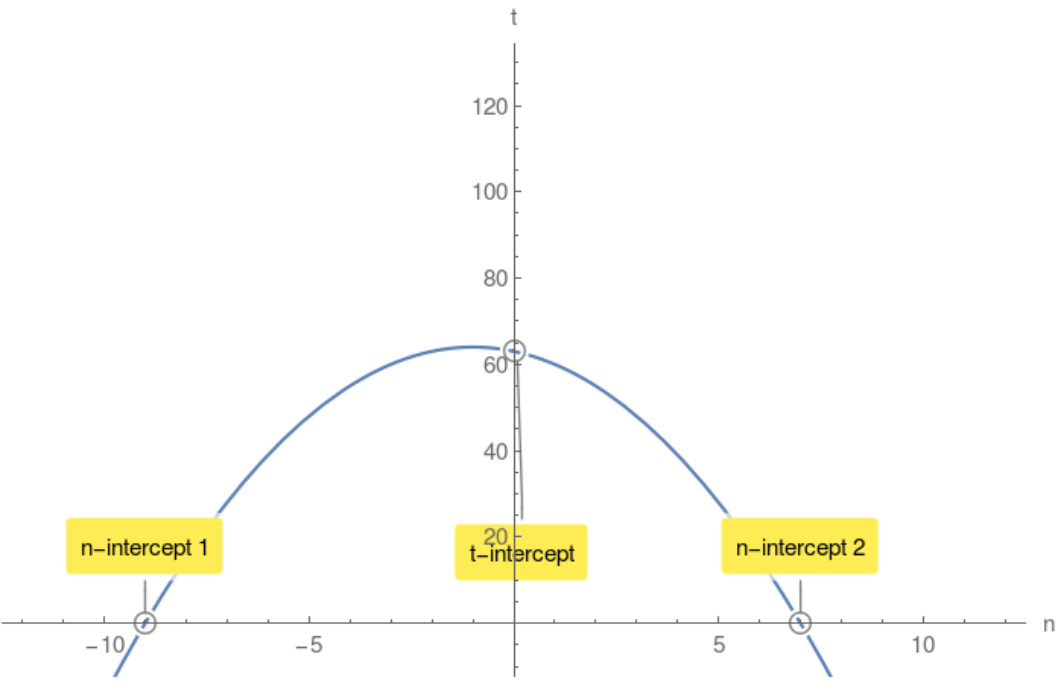
Example 1.

$t(n) = -n^2 - 2\,n + 63$ compute its discriminant $\triangle$:

$\triangle = 256 > 0$

$n_{1,2} = -9, 7$

$t(0) = 63$ t-intercept.



Case2: $\triangle = 0$

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

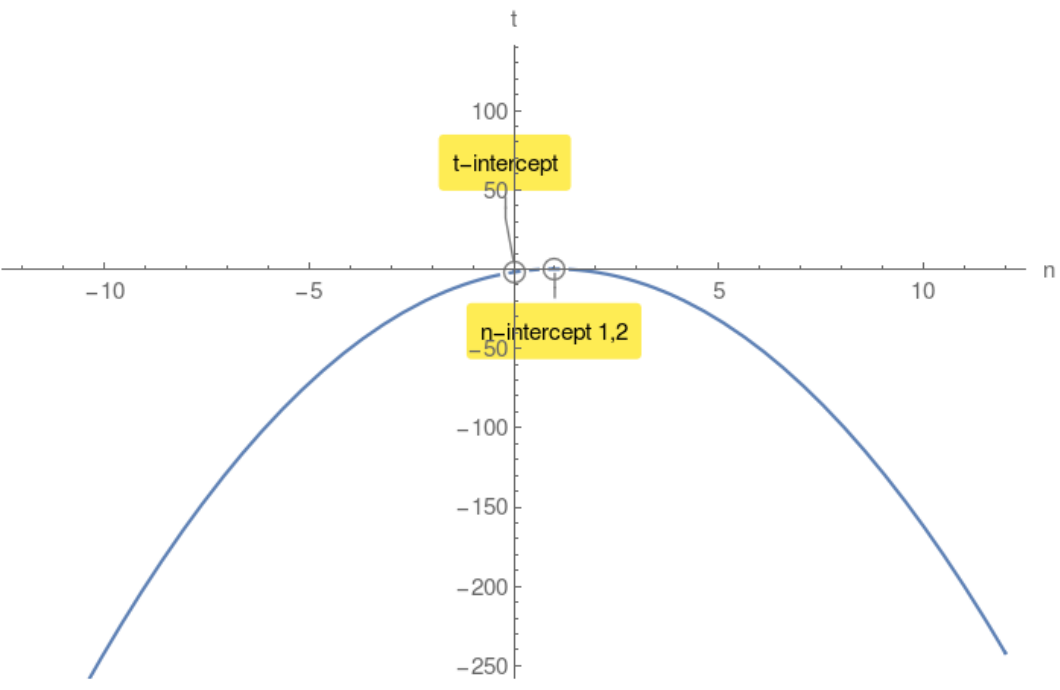
Example 2.

$t(n) = -2\,n^2 + 4\,n - 2$ compute its discriminant $\triangle$:

$\triangle = 0$

$n_{1,2} = 1, 1$

$t(0) = -2$ t-intercept.



Case3: $\triangle < 0$

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

However there is a t-intercept.

Example 3.

$t(n) = -9\,n^2 + 126\,n - 490$ compute its discriminant $\triangle$:

$\triangle = -1764 < 0$

$t(0) = -490$ t-intercept.