Intercepts of the Quadratic

Given a quadratic $m(n) = a\,n^2 + b\,n + c$ 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.

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

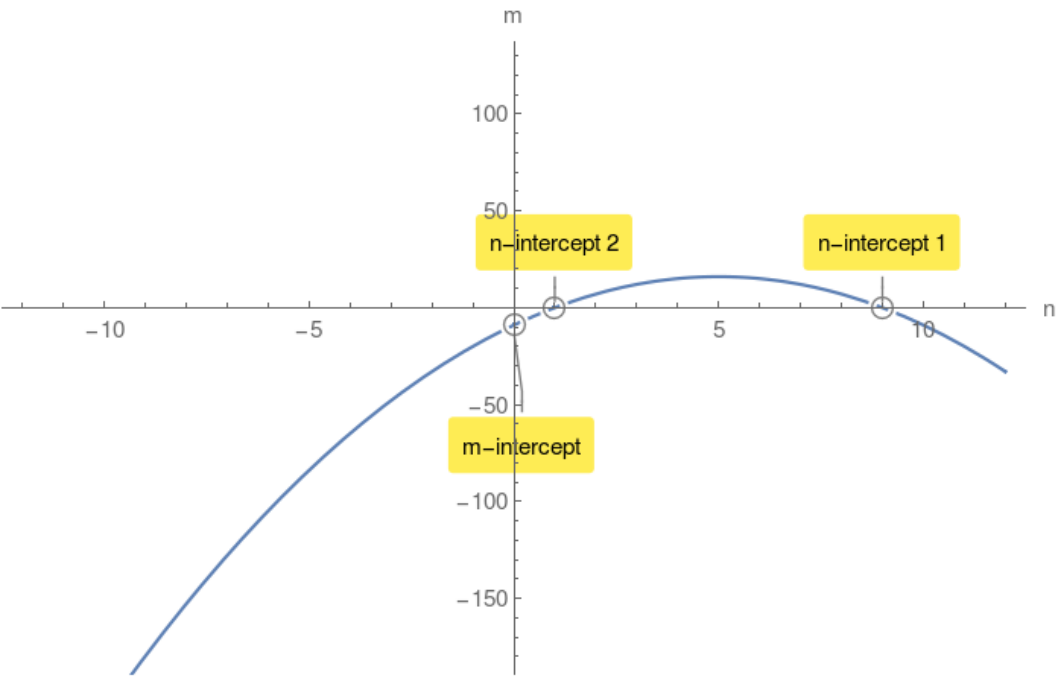
Example 1.

$m(n) = -n^2 + 10\,n - 9$ compute its discriminant $\triangle$:

$\triangle = 64 > 0$

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

$m(0) = -9$ m-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.

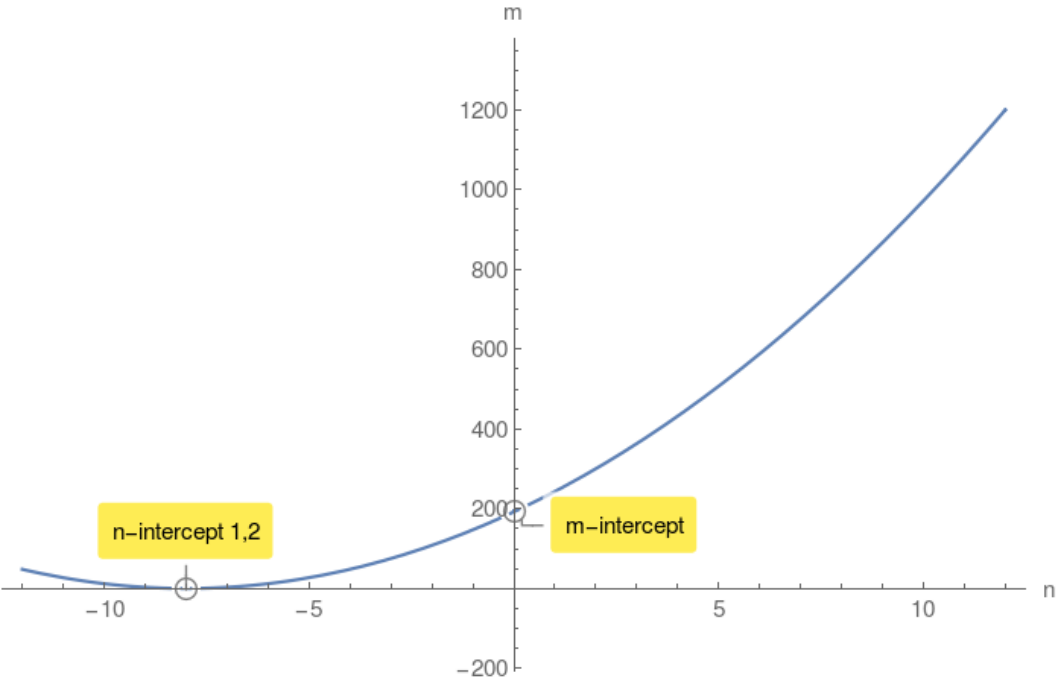
Example 2.

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

$\triangle = 0$

$n_{1,2} = -8, -8$

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

Example 3.

$m(n) = -4\,n^2 + 72\,n - 405$ compute its discriminant $\triangle$:

$\triangle = -1296 < 0$

$m(0) = -405$ m-intercept.