Intercepts of the Quadratic

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

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

Case1: $\triangle > 0$

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

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

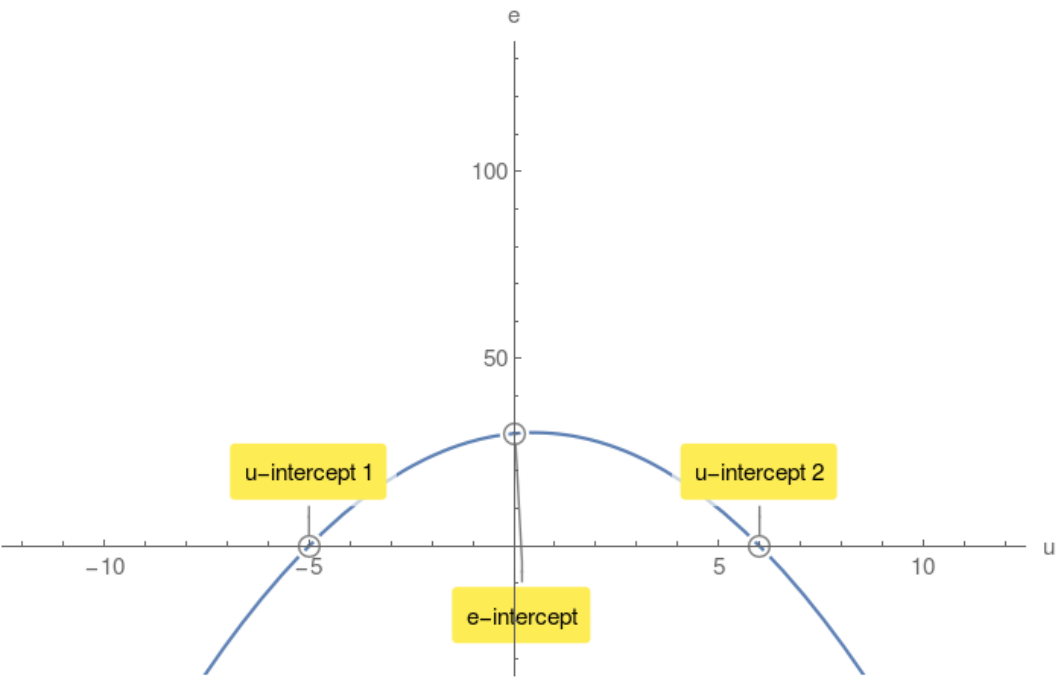
Example 1.

$e(u) = -u^2 + u + 30$ compute its discriminant $\triangle$:

$\triangle = 121 > 0$

$u_{1,2} = -5, 6$

$e(0) = 30$ e-intercept.



Case2: $\triangle = 0$

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

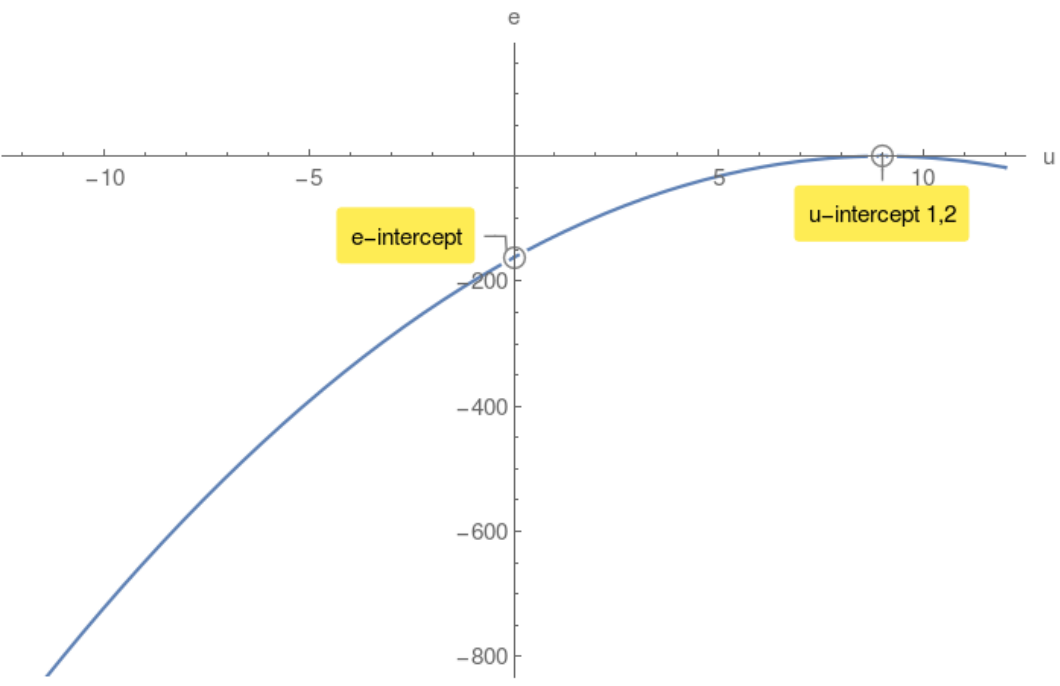
Example 2.

$e(u) = -2\,u^2 + 36\,u - 162$ compute its discriminant $\triangle$:

$\triangle = 0$

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

$e(0) = -162$ e-intercept.



Case3: $\triangle < 0$

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

However there is a e-intercept.

Example 3.

$e(u) = -9\,u^2 - 162\,u - 810$ compute its discriminant $\triangle$:

$\triangle = -2916 < 0$

$e(0) = -810$ e-intercept.