

Intercepts of the Quadratic

Given a quadratic $e(t) = at^2 + bt + c$ compute its discriminant Δ :

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

Case1: $\Delta > 0$

$t_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ computes the t-intercepts of multiplicity 1.
 $e(0) = c$ computes the single e-intercept.

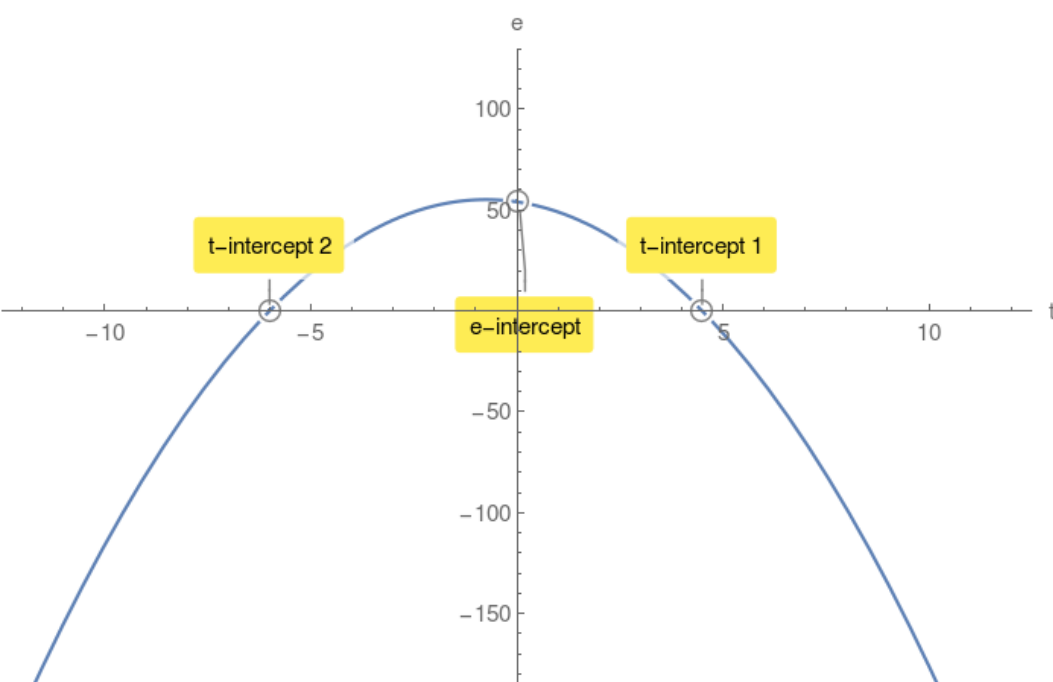
Example 1.

$e(t) = -2t^2 - 3t + 54$ compute its discriminant Δ :

$$\Delta = 441 > 0$$

$$t_{1,2} = \frac{9}{2}, -6$$

$e(0) = 54$ e-intercept.



Case2: $\Delta = 0$

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

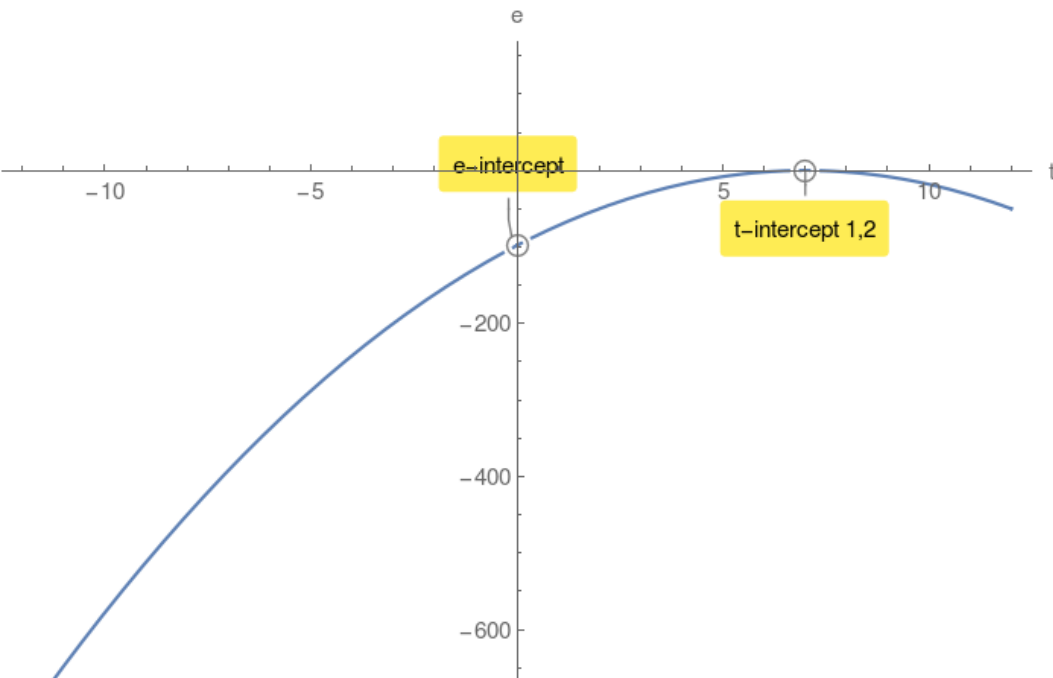
Example 2.

$e(t) = -2t^2 + 28t - 98$ compute its discriminant Δ :

$$\Delta = 0$$

$$t_{1,2} = 7, 7$$

$e(0) = -98$ e-intercept.



Case3: $\Delta < 0$

$\sqrt{b^2 - 4ac}$ has no value in Real Numbers. Therefore there are no t-intercepts.
However there is a e-intercept.

Example 3.

$e(t) = -9t^2 + 180t - 1000$ compute its discriminant Δ :

$$\Delta = -3600 < 0$$

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

