

Intercepts of the Quadratic

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

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

Case1: $\Delta > 0$

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

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

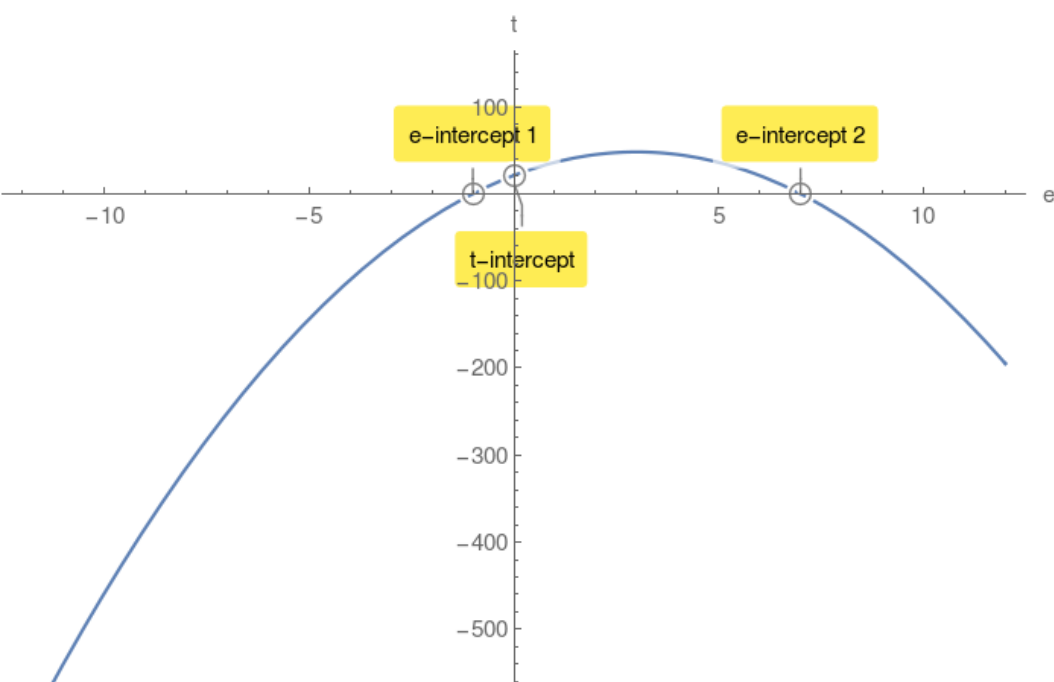
Example 1.

$t(e) = -3e^2 + 18e + 21$ compute its discriminant Δ :

$$\Delta = 576 > 0$$

$$e_{1,2} = -1, 7$$

$t(0) = 21$ t-intercept.



Case2: $\Delta = 0$

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

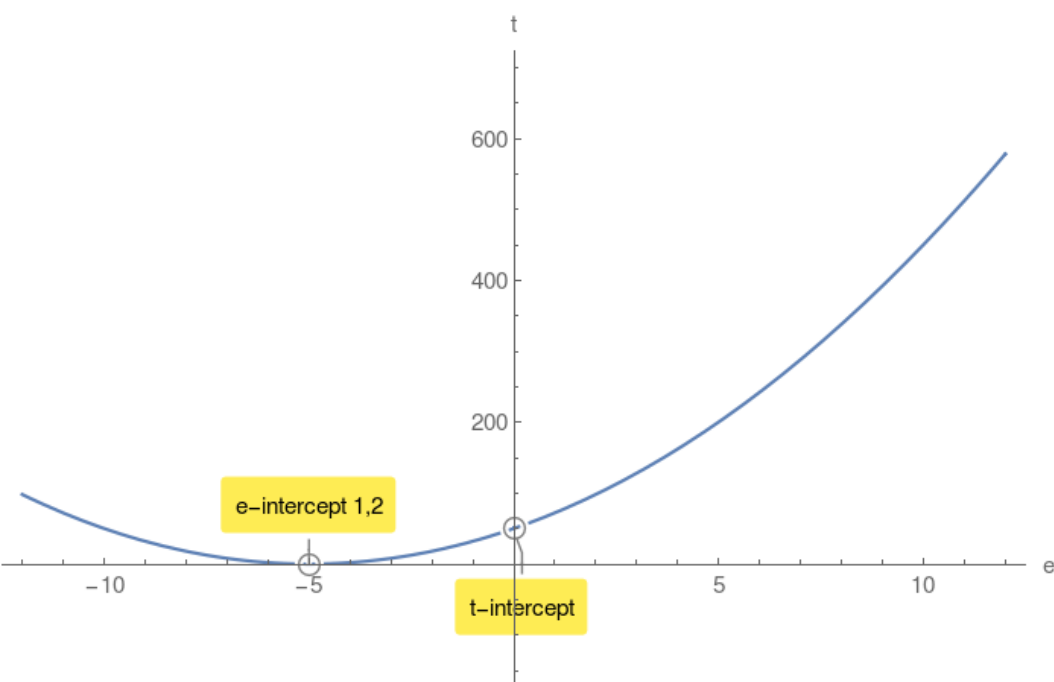
Example 2.

$t(e) = 2e^2 + 20e + 50$ compute its discriminant Δ :

$$\Delta = 0$$

$$e_{1,2} = -5, -5$$

$t(0) = 50$ t-intercept.



Case3: $\Delta < 0$

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

However there is a t-intercept.

Example 3.

$t(e) = 9e^2 - 144e + 640$ compute its discriminant Δ :

$$\Delta = -2304 < 0$$

$t(0) = 640$ t-intercept.

