Intercepts of the Quadratic

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

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

Case1: $\triangle>0$

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

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

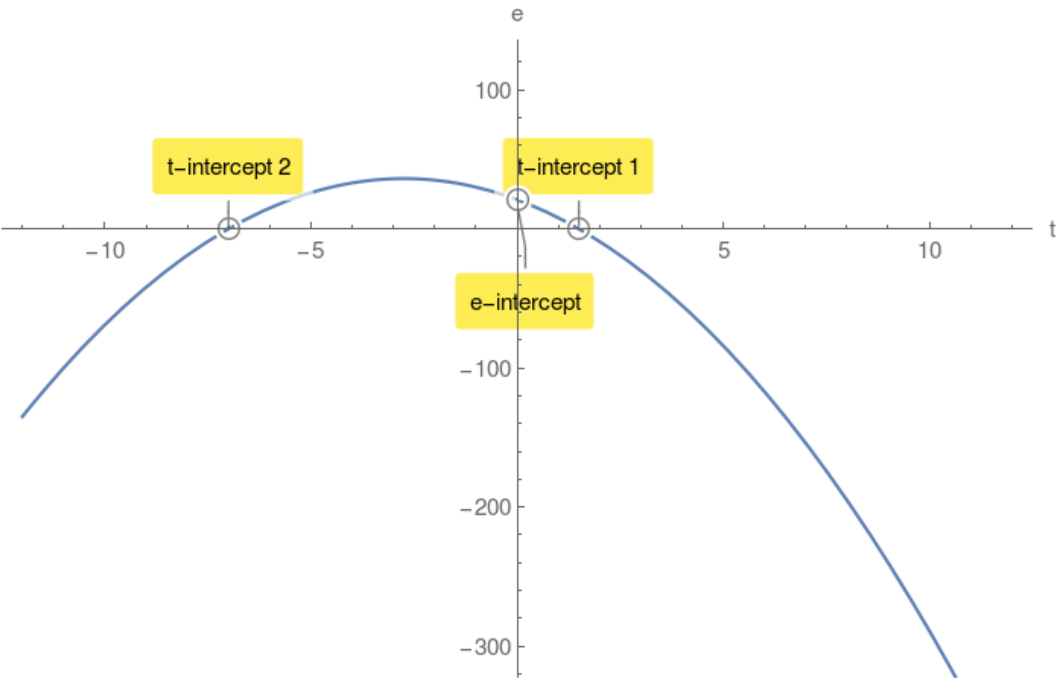
Example 1.

$e(t)=-2\,t^2-11\,t+21$ compute its discriminant $\triangle$:

$\triangle=289>0$

$t_{1,2}=\frac{3}{2},-7$

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



Case2: $\triangle=0$

$t_{1,2}=\frac{-b\pm\sqrt{b^2-4\,ac}}{2a}=\frac{-b\pm0}{2a}=\frac{-b}{2a}$ single t-intercept of multiplicity 2.

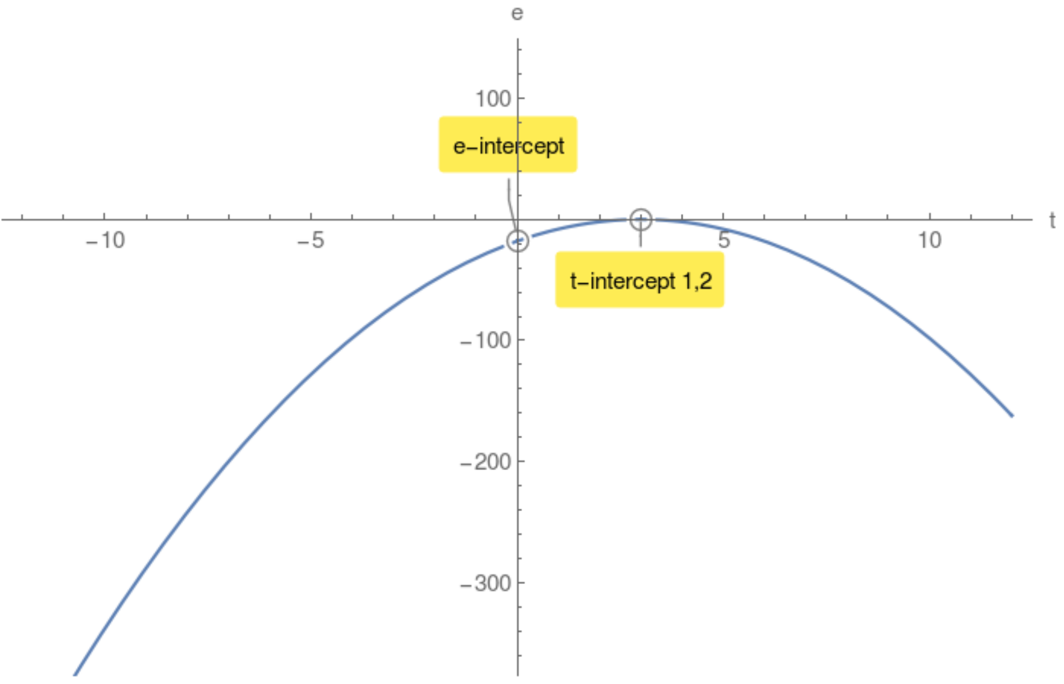
Example 2.

$e(t)=-2\,t^2+12\,t-18$ compute its discriminant $\triangle$:

$\triangle=0$

$t_{1,2}=3,3$

$e(0)=-18$ e-intercept.



Case3: $\triangle<0$

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

However there is a e-intercept.

Example 3.

$e(t)=-4\,t^2+80\,t-500$ compute its discriminant $\triangle$:

$\triangle=-1600<0$

$e(0)=-500$ e-intercept.