Intercepts of the Quadratic

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

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

Case1: $\triangle>0$

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

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

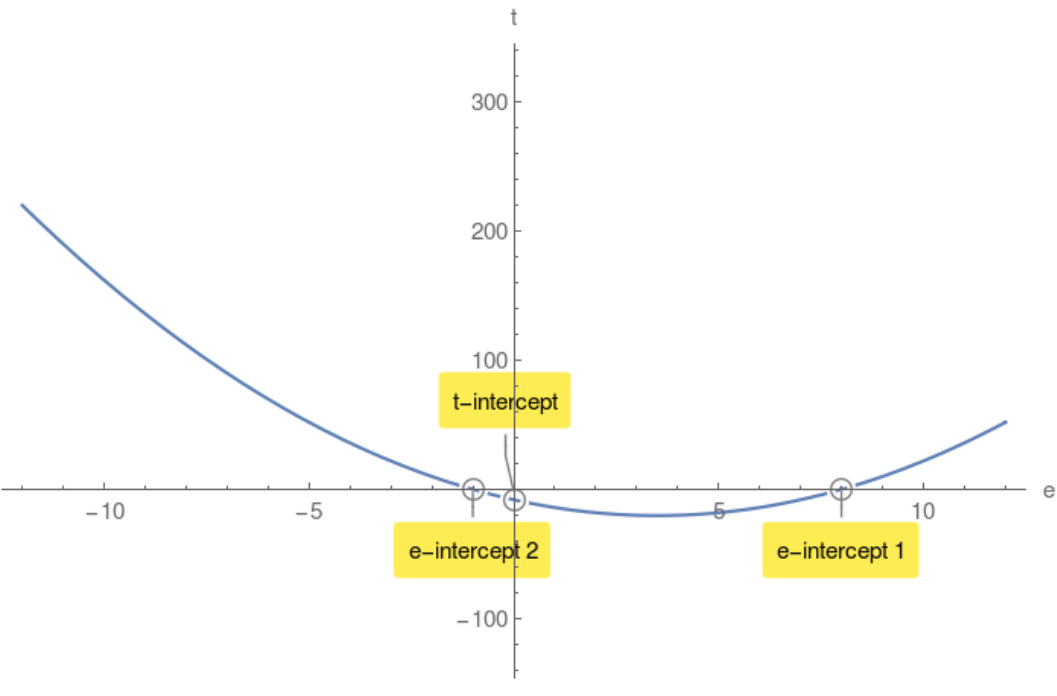
Example 1.

$t(e)=e^2-7\,e-8$ compute its discriminant $\triangle$:

$\triangle=81>0$

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

$t(0)=-8$ t-intercept.



Case2: $\triangle=0$

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

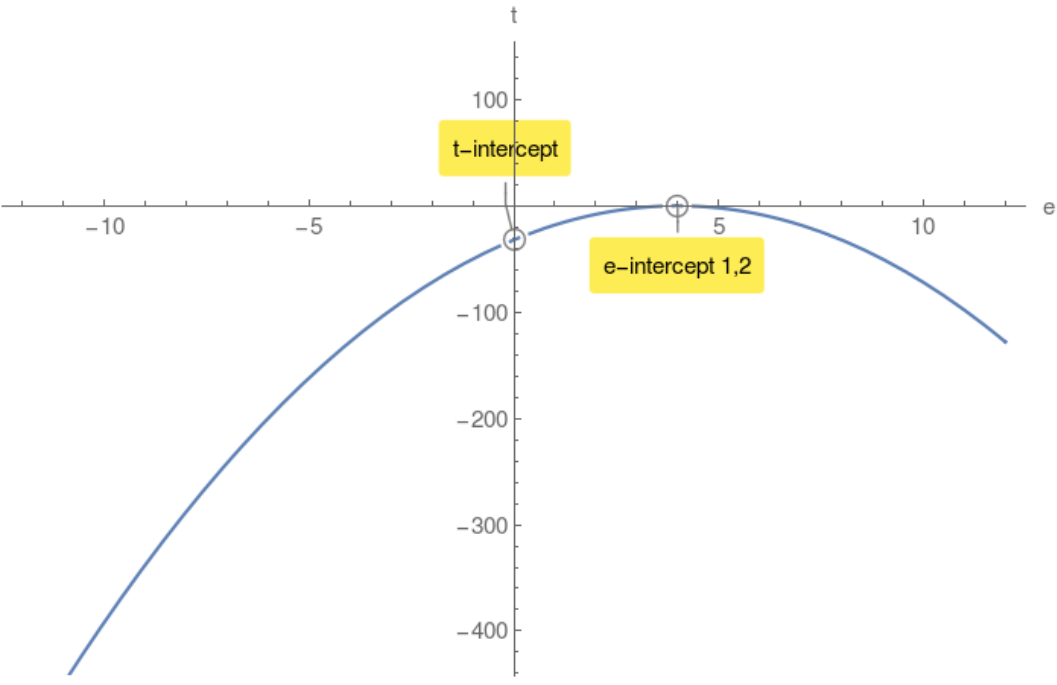
Example 2.

$t(e)=-2\,e^2+16\,e-32$ compute its discriminant $\triangle$:

$\triangle=0$

$e_{1,2}=4,4$

$t(0)=-32$ t-intercept.



Case3: $\triangle<0$

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

However there is a t-intercept.

Example 3.

$t(e)=4\,e^2+72\,e+405$ compute its discriminant $\triangle$:

$\triangle=-1296<0$

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