Intercepts of the Quadratic

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

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

Case1: $\triangle>0$

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

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

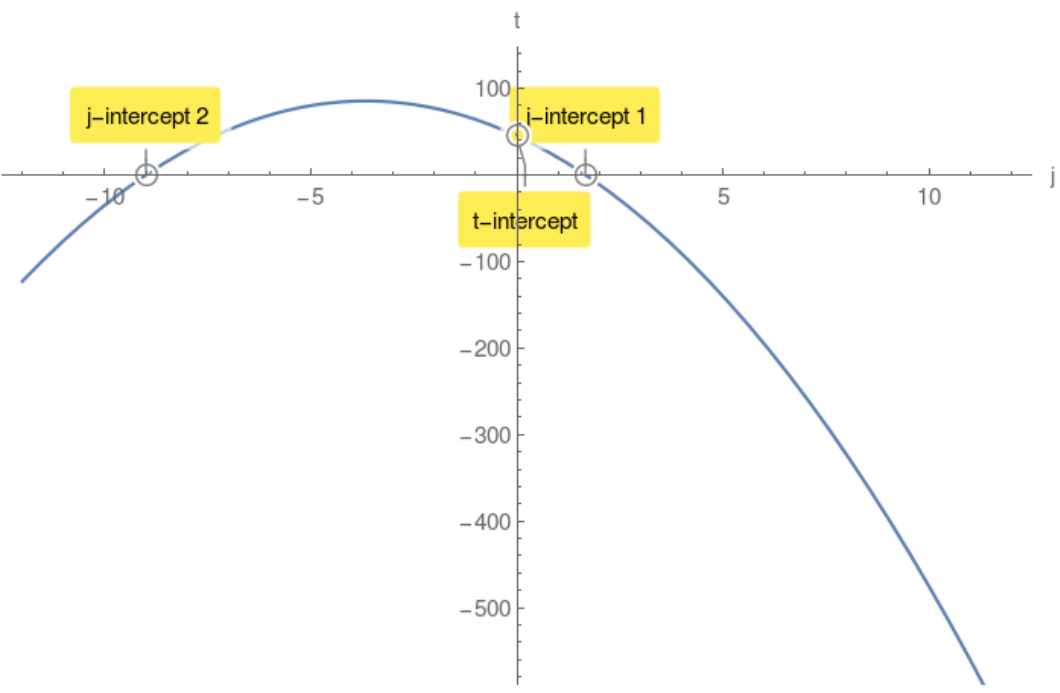
Example 1.

$t(j)=-3\,j^2-22\,j+45$ compute its discriminant $\triangle$:

$\triangle=1024>0$

$j_{1,2}=\frac{5}{3},-9$

$t(0)=45$ t-intercept.



Case2: $\triangle=0$

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

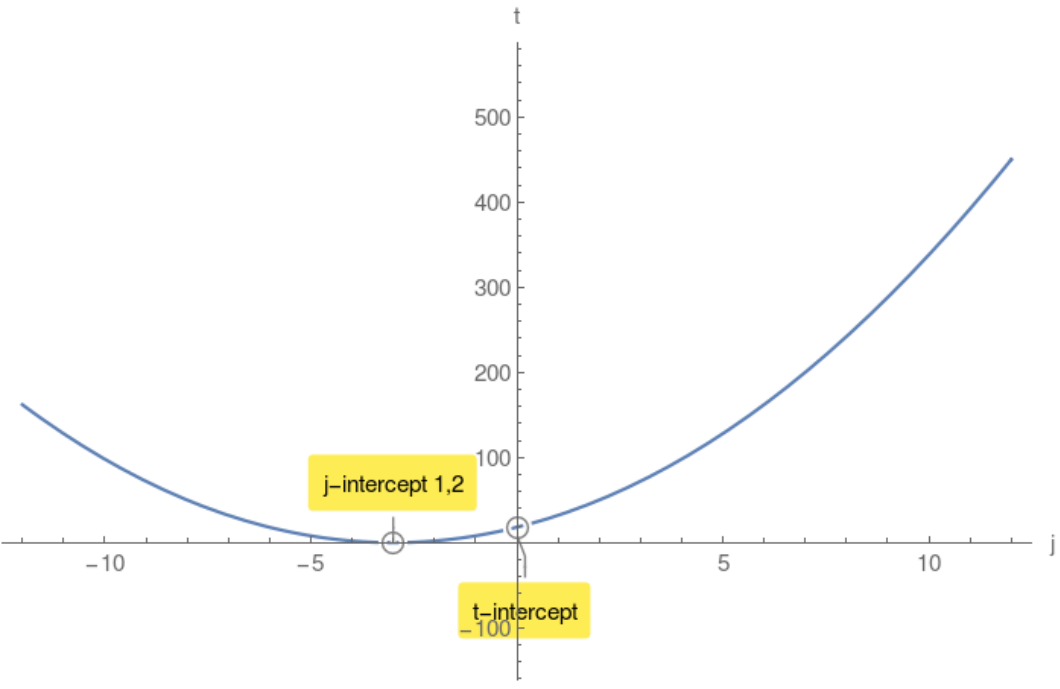
Example 2.

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

$\triangle=0$

$j_{1,2}=-3,-3$

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



Case3: $\triangle<0$

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

However there is a t-intercept.

Example 3.

$t(j)=-9\,j^2+180\,j-1000$ compute its discriminant $\triangle$:

$\triangle=-3600<0$

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