Intercepts of the Quadratic

Given a quadratic $j(t)=a\,t^2+b\,t+c$ 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.

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

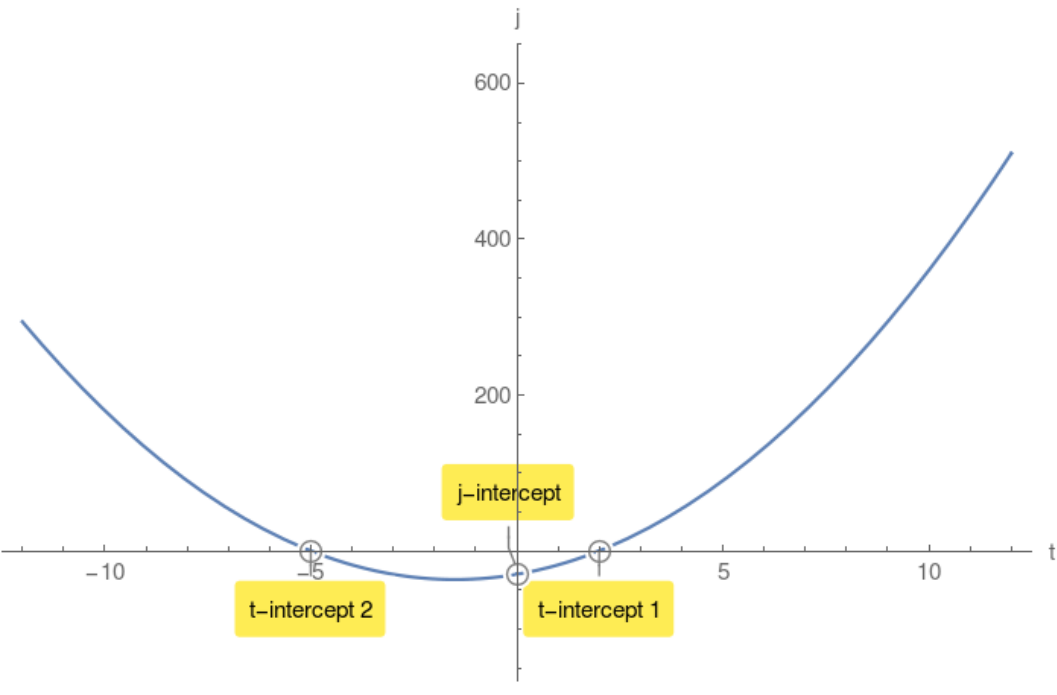
Example 1.

$j(t)=3\,t^2+9\,t-30$ compute its discriminant $\triangle$:

$\triangle=441>0$

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

$j(0)=-30$ j-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.

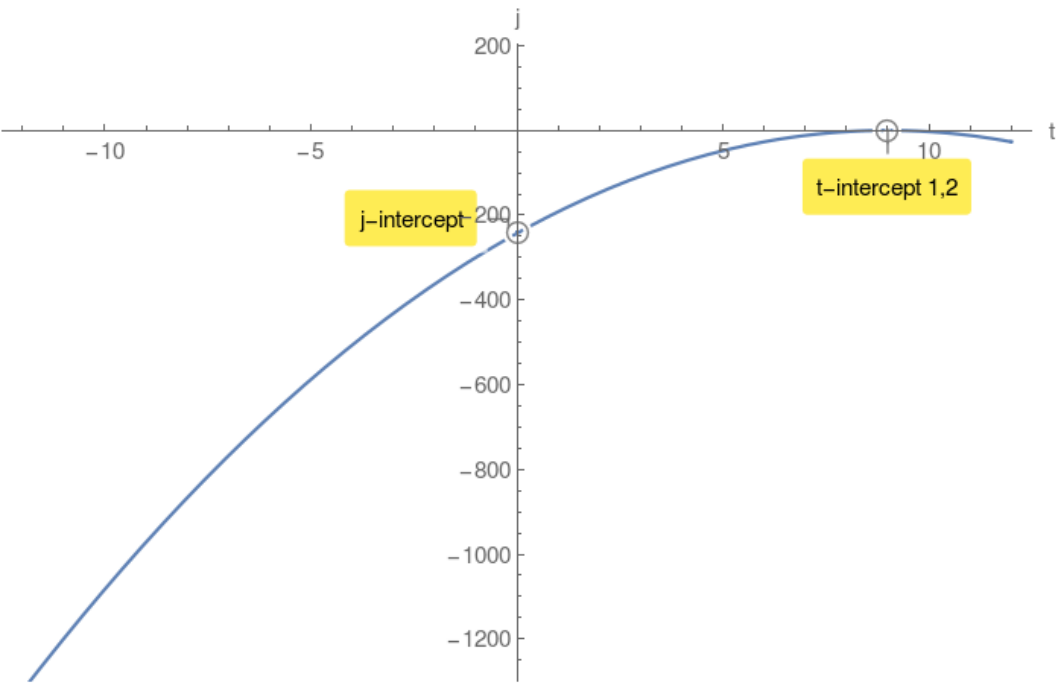
Example 2.

$j(t)=-3\,t^2+54\,t-243$ compute its discriminant $\triangle$:

$\triangle=0$

$t_{1,2}=9,9$

$j(0)=-243$ j-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 j-intercept.

Example 3.

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

$\triangle=-3600<0$

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