Intercepts of the Quadratic

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

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

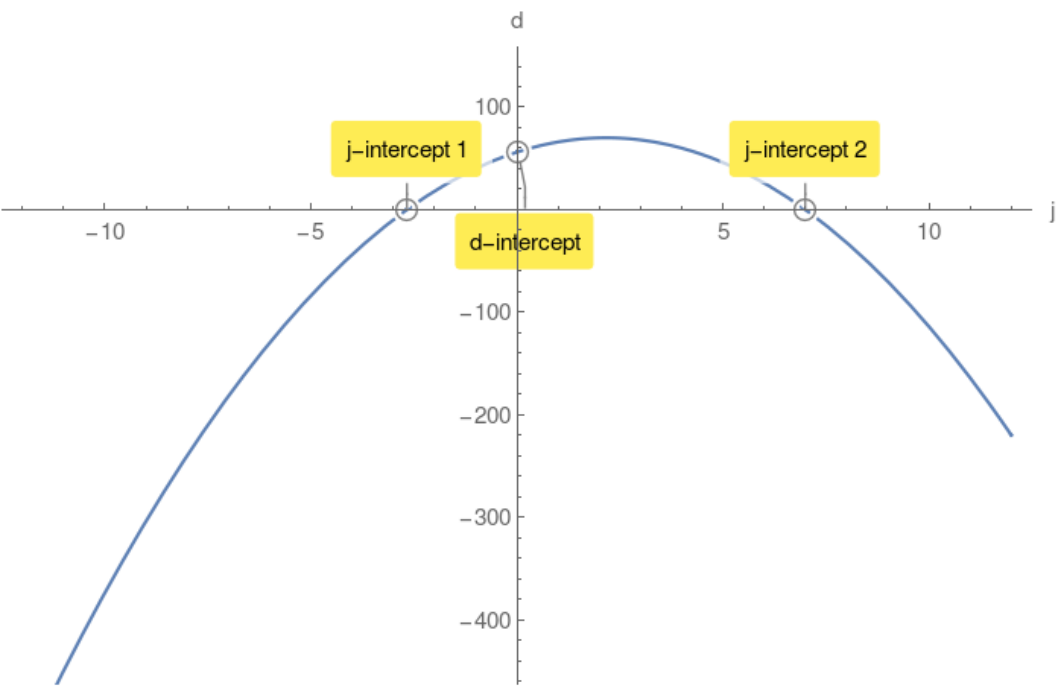
Example 1.

$d(j)=-3\,j^2+13\,j+56$ compute its discriminant $\triangle$:

$\triangle=841>0$

$j_{1,2}=-\frac{8}{3},7$

$d(0)=56$ d-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.

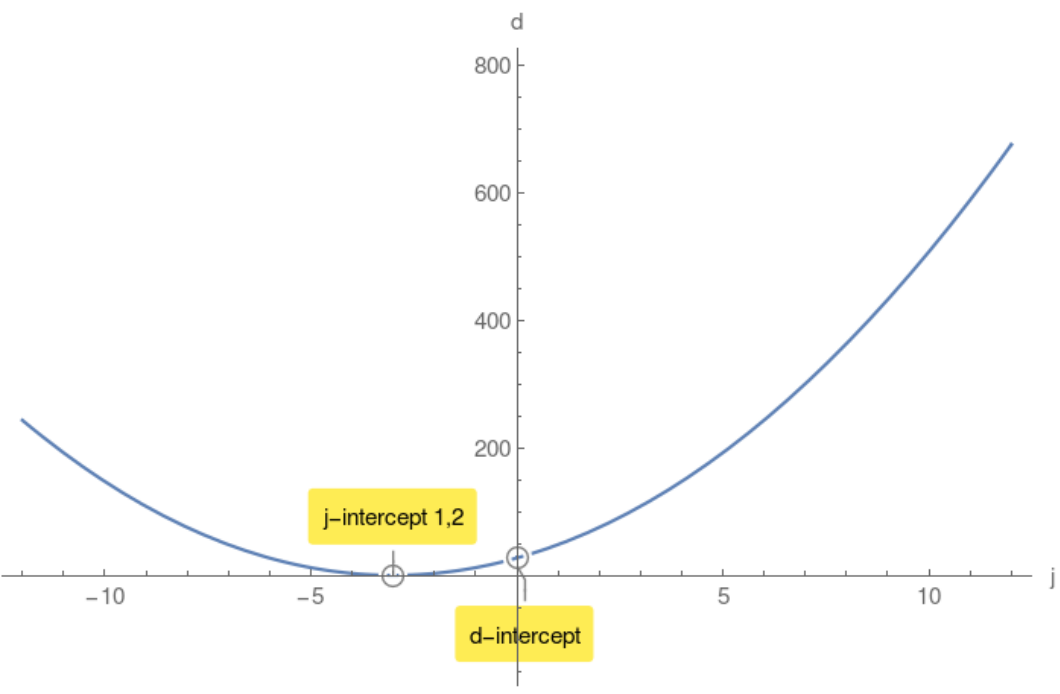
Example 2.

$d(j)=3\,j^2+18\,j+27$ compute its discriminant $\triangle$:

$\triangle=0$

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

$d(0)=27$ d-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 d-intercept.

Example 3.

$d(j)=4\,j^2-64\,j+320$ compute its discriminant $\triangle$:

$\triangle=-1024<0$

$d(0)=320$ d-intercept.