Intercepts of the Quadratic

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

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

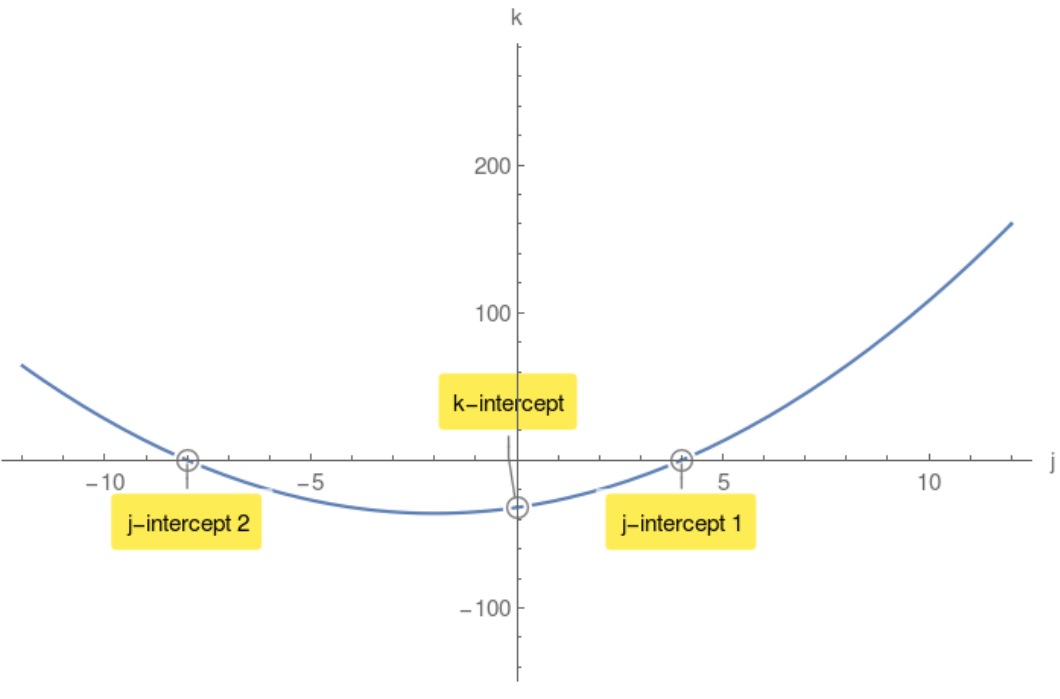
Example 1.

$k(j)=j^2+4\,j-32$ compute its discriminant $\triangle$:

$\triangle=144>0$

$j_{1,2}=4,-8$

$k(0)=-32$ k-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.

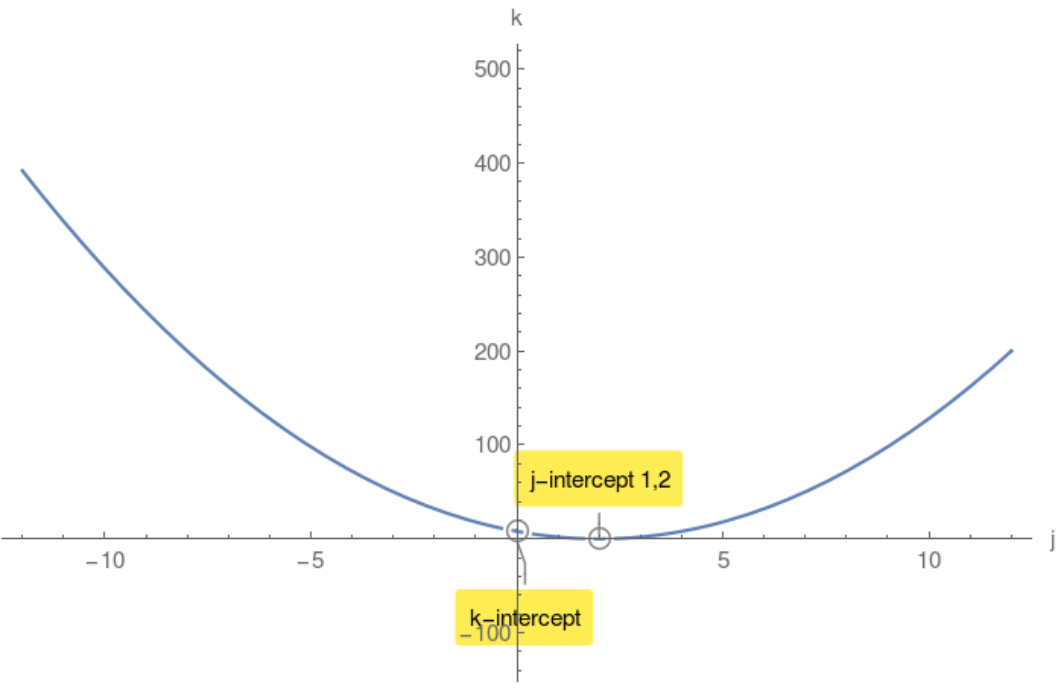
Example 2.

$k(j)=2\,j^2-8\,j+8$ compute its discriminant $\triangle$:

$\triangle=0$

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

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

Example 3.

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

$\triangle=-1024<0$

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