Intercepts of the Quadratic

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

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

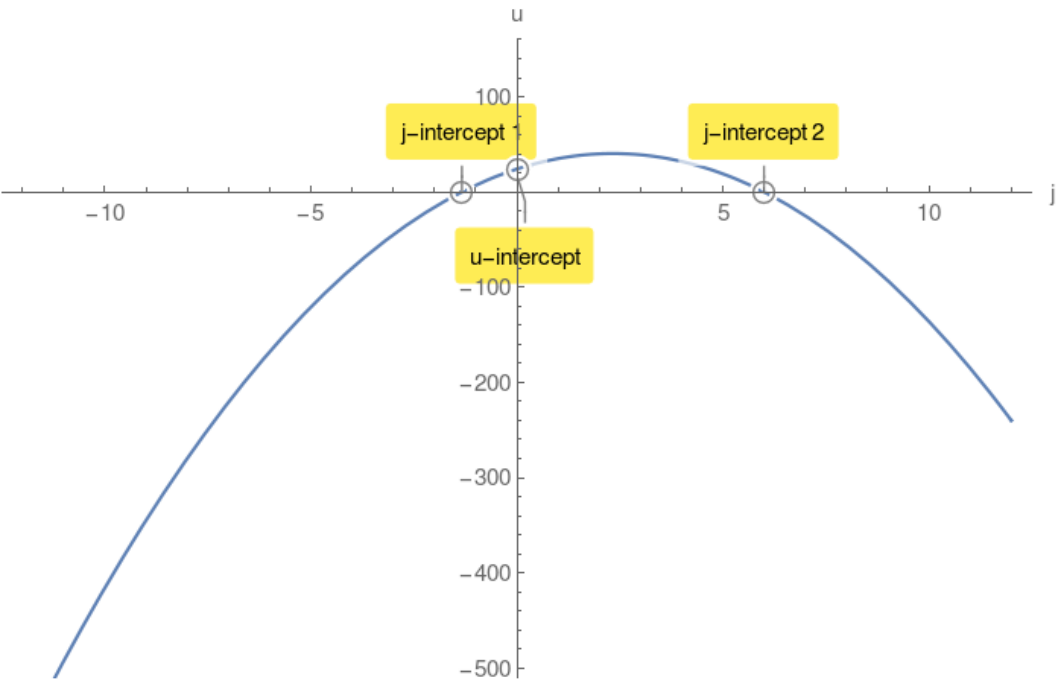
Example 1.

$u(j)=-3\,j^2+14\,j+24$ compute its discriminant $\triangle$:

$\triangle=484>0$

$j_{1,2}=-\frac{4}{3},6$

$u(0)=24$ u-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.

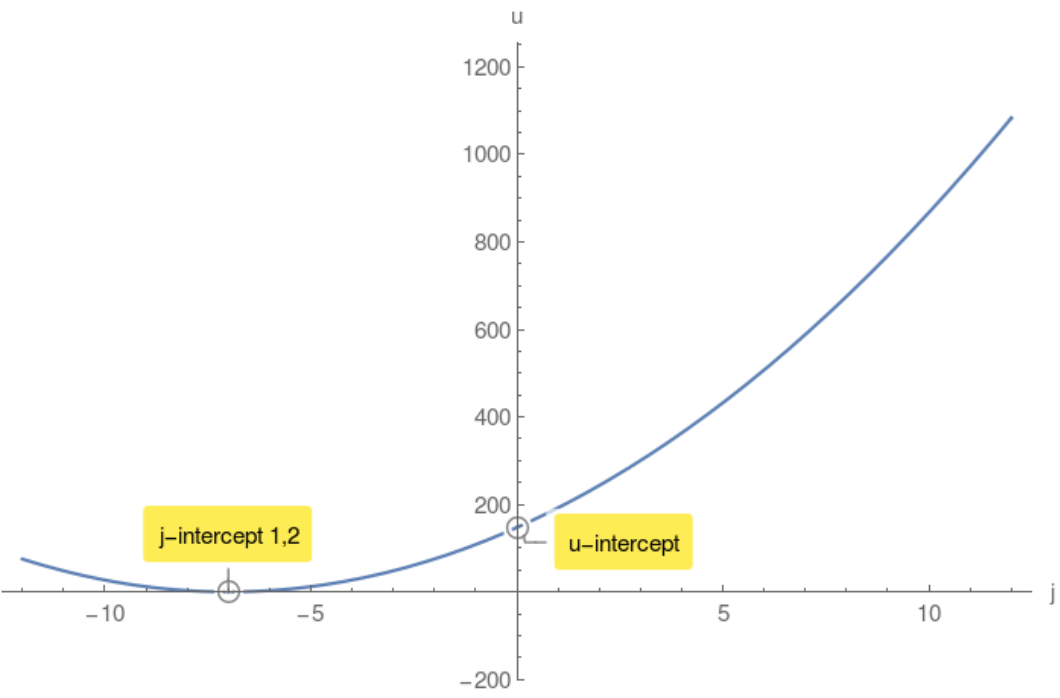
Example 2.

$u(j)=3\,j^2+42\,j+147$ compute its discriminant $\triangle$:

$\triangle=0$

$j_{1,2}=-7,-7$

$u(0)=147$ u-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 u-intercept.

Example 3.

$u(j)=-9\,j^2+126\,j-490$ compute its discriminant $\triangle$:

$\triangle=-1764<0$

$u(0)=-490$ u-intercept.