Intercepts of the Quadratic

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

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

Case1: $\triangle>0$

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

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

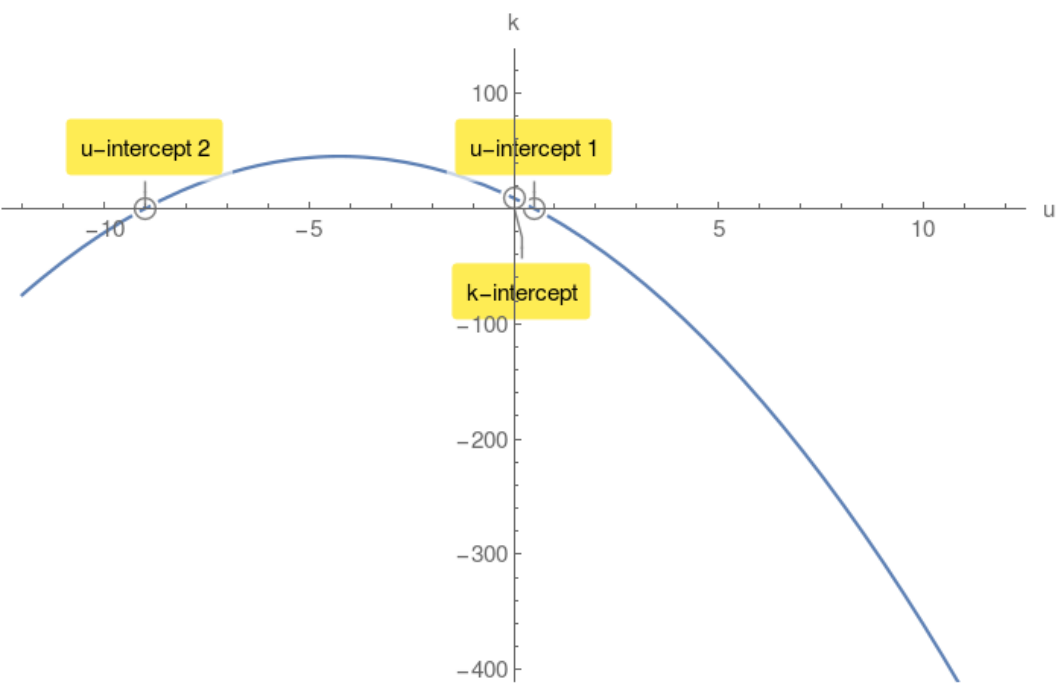
Example 1.

$k(u)=-2\,u^2-17\,u+9$ compute its discriminant $\triangle$:

$\triangle=361>0$

$u_{1,2}=\frac{1}{2},-9$

$k(0)=9$ k-intercept.



Case2: $\triangle=0$

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

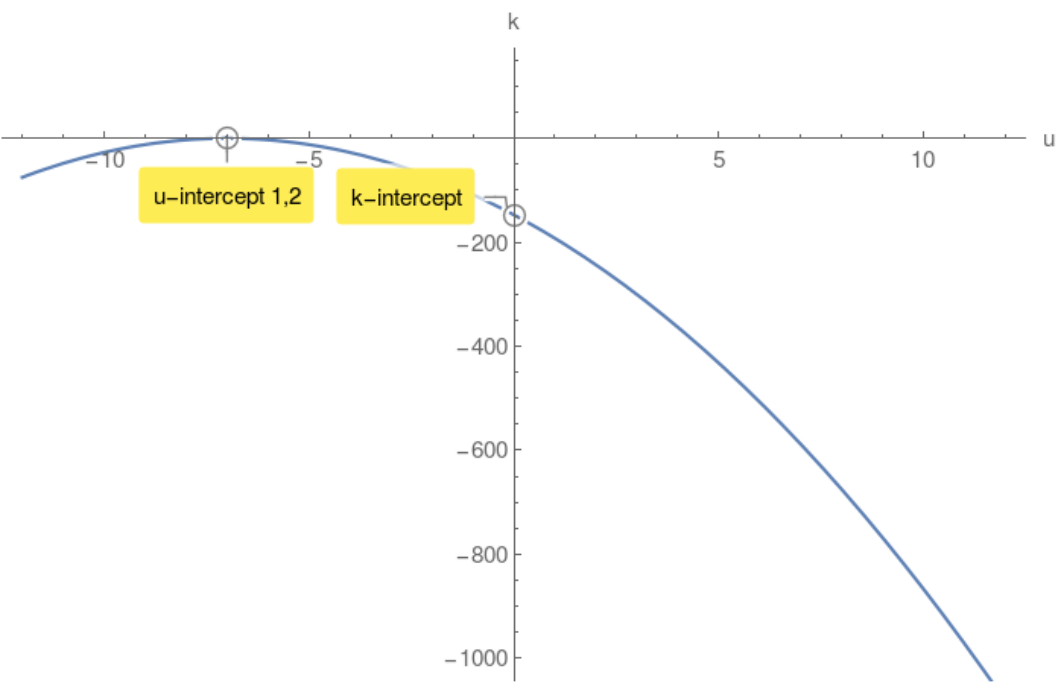
Example 2.

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

$\triangle=0$

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

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



Case3: $\triangle<0$

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

However there is a k-intercept.

Example 3.

$k(u)=4\,u^2+56\,u+245$ compute its discriminant $\triangle$:

$\triangle=-784<0$

$k(0)=245$ k-intercept.