Intercepts of the Quadratic

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

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

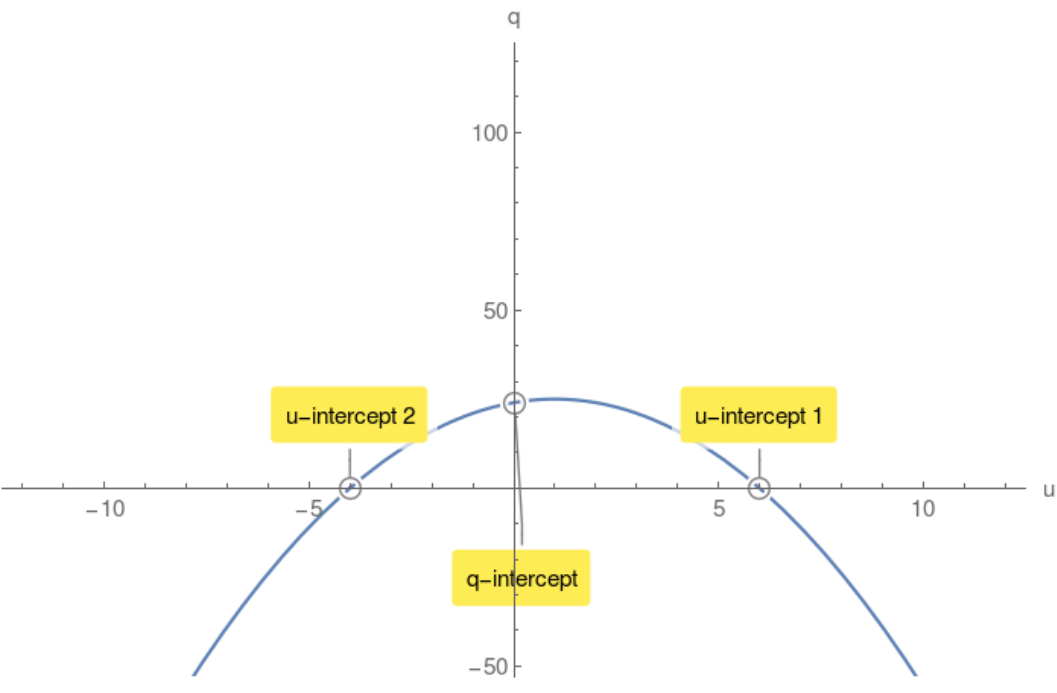
Example 1.

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

$\triangle=100>0$

$u_{1,2}=6,-4$

$q(0)=24$ q-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.

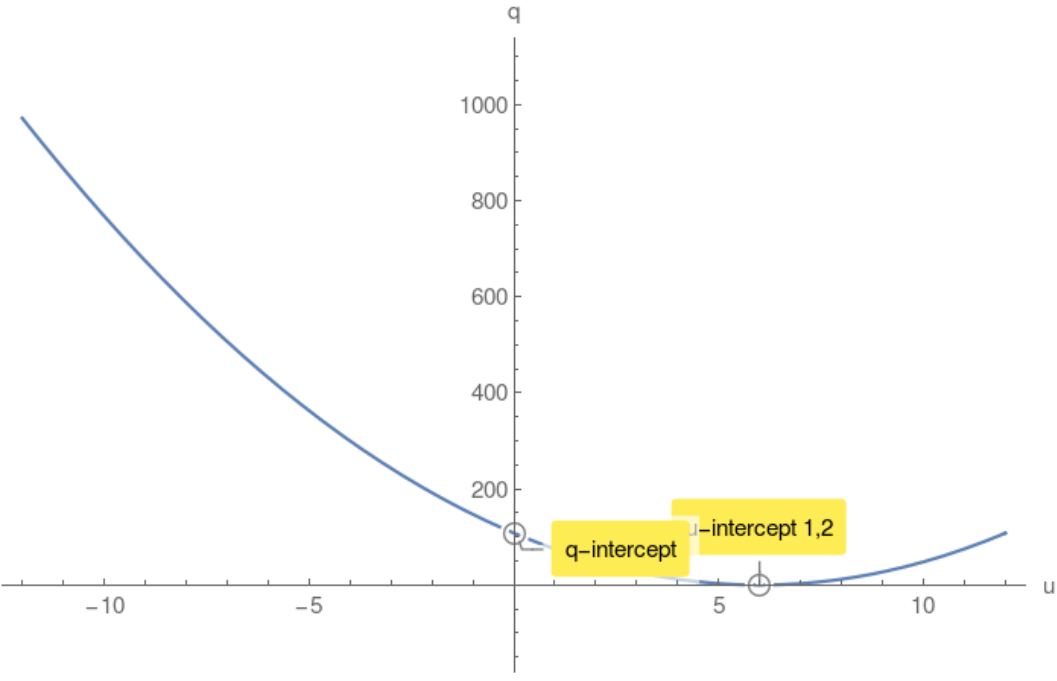
Example 2.

$q(u)=3\,u^2-36\,u+108$ compute its discriminant $\triangle$:

$\triangle=0$

$u_{1,2}=6,6$

$q(0)=108$ q-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 q-intercept.

Example 3.

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

$\triangle=-784<0$

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