Intercepts of the Quadratic

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

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

Case1: $\triangle>0$

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

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

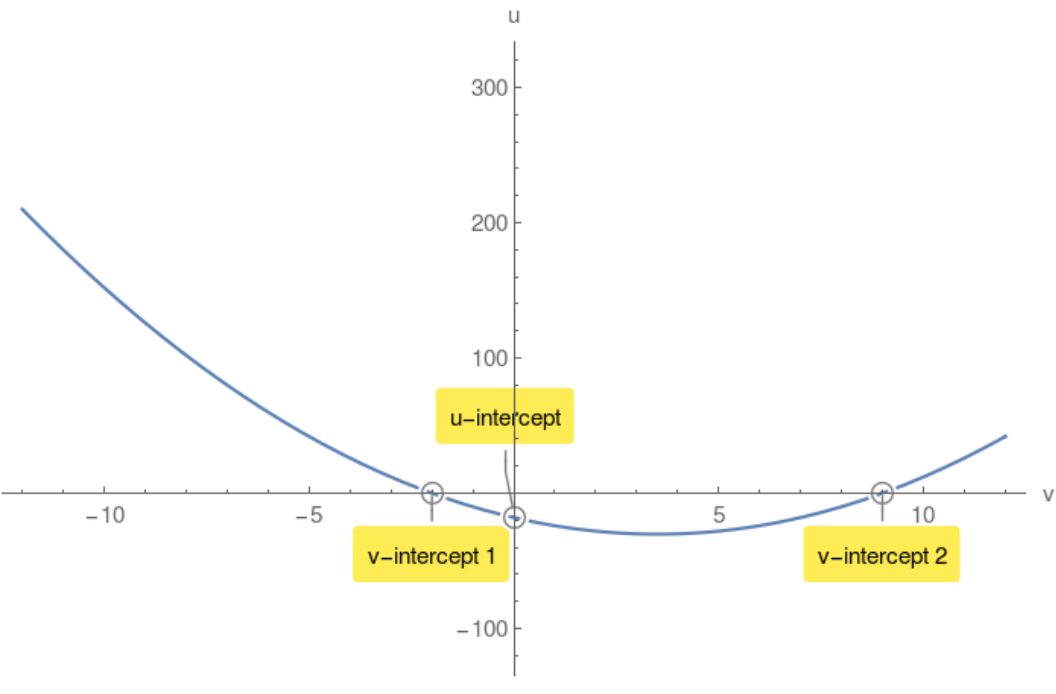
Example 1.

$u(v)=v^2-7\,v-18$ compute its discriminant $\triangle$:

$\triangle=121>0$

$v_{1,2}=-2,9$

$u(0)=-18$ u-intercept.



Case2: $\triangle=0$

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

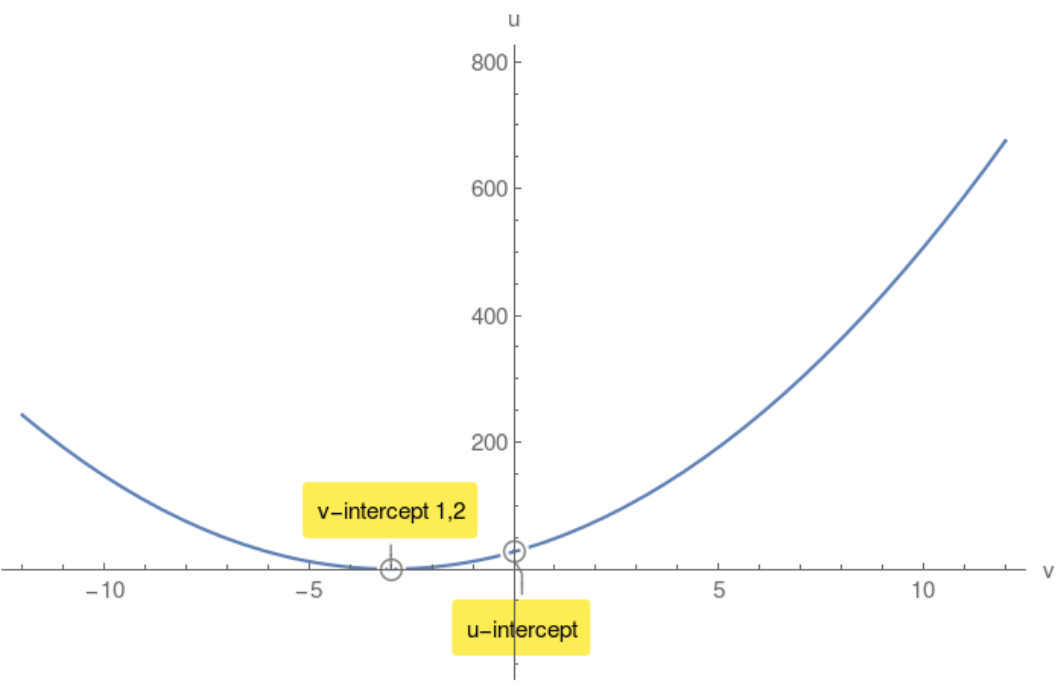
Example 2.

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

$\triangle=0$

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

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



Case3: $\triangle<0$

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

However there is a u-intercept.

Example 3.

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

$\triangle=-1764<0$

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