Intercepts of the Quadratic

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

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

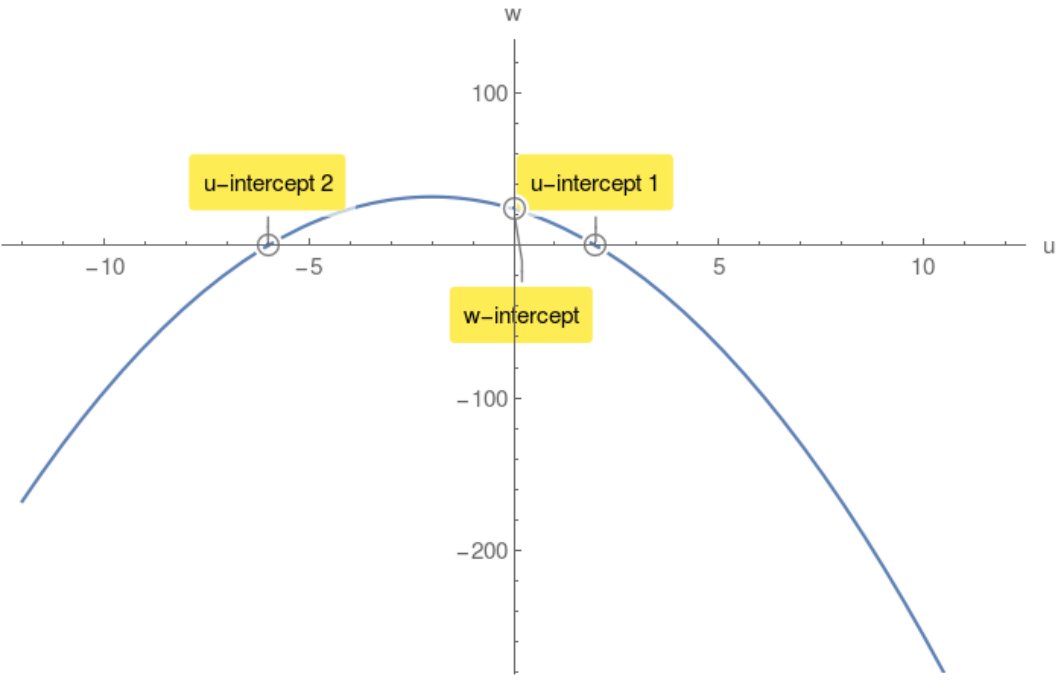
Example 1.

$w(u)=-2\,u^2-8\,u+24$ compute its discriminant $\triangle$:

$\triangle=256>0$

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

$w(0)=24$ w-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.

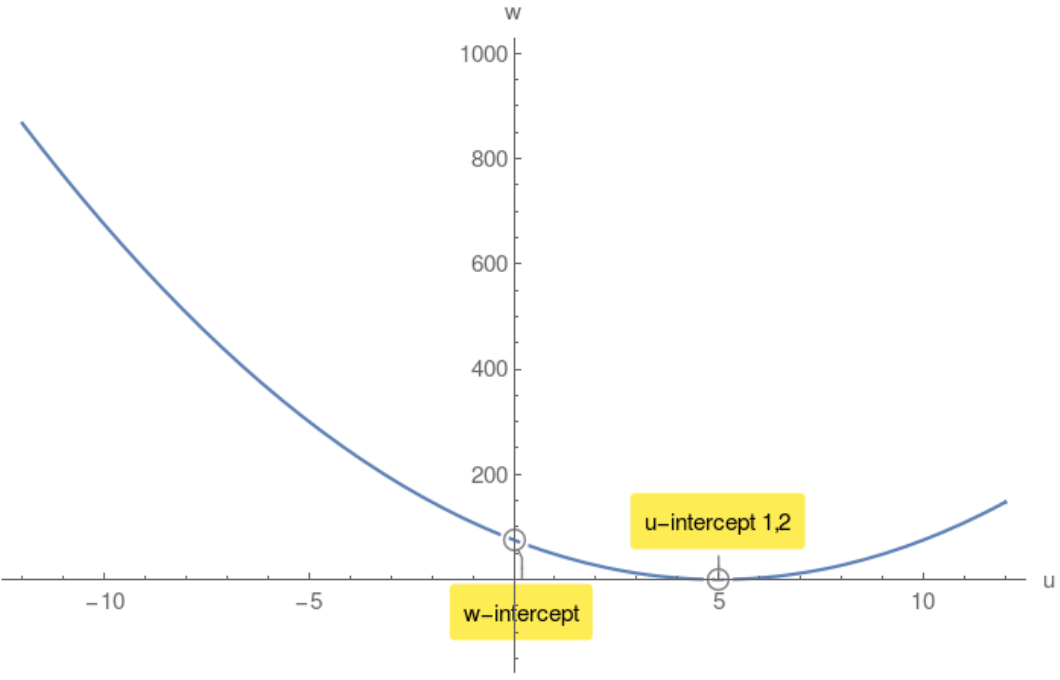
Example 2.

$w(u)=3\,u^2-30\,u+75$ compute its discriminant $\triangle$:

$\triangle=0$

$u_{1,2}=5,5$

$w(0)=75$ w-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 w-intercept.

Example 3.

$w(u)=-9\,u^2+180\,u-1000$ compute its discriminant $\triangle$:

$\triangle=-3600<0$

$w(0)=-1000$ w-intercept.