Intercepts of the Quadratic

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

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

Case1: $\triangle>0$

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

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

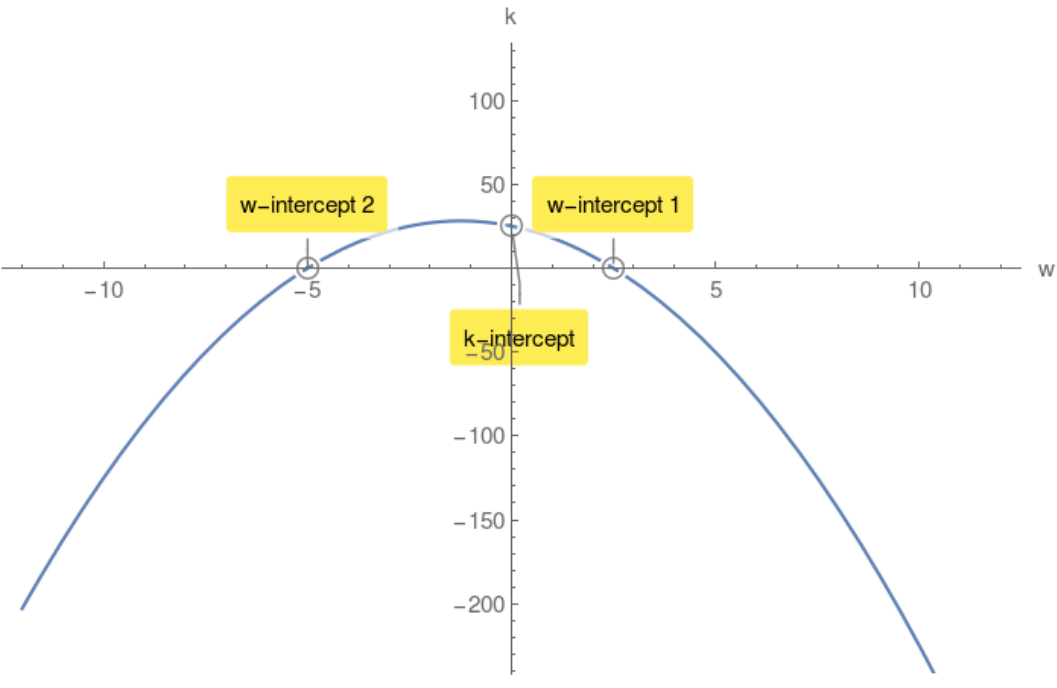
Example 1.

$k(w)=-2\,w^2-5\,w+25$ compute its discriminant $\triangle$:

$\triangle=225>0$

$w_{1,2}=\frac{5}{2},-5$

$k(0)=25$ k-intercept.



Case2: $\triangle=0$

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

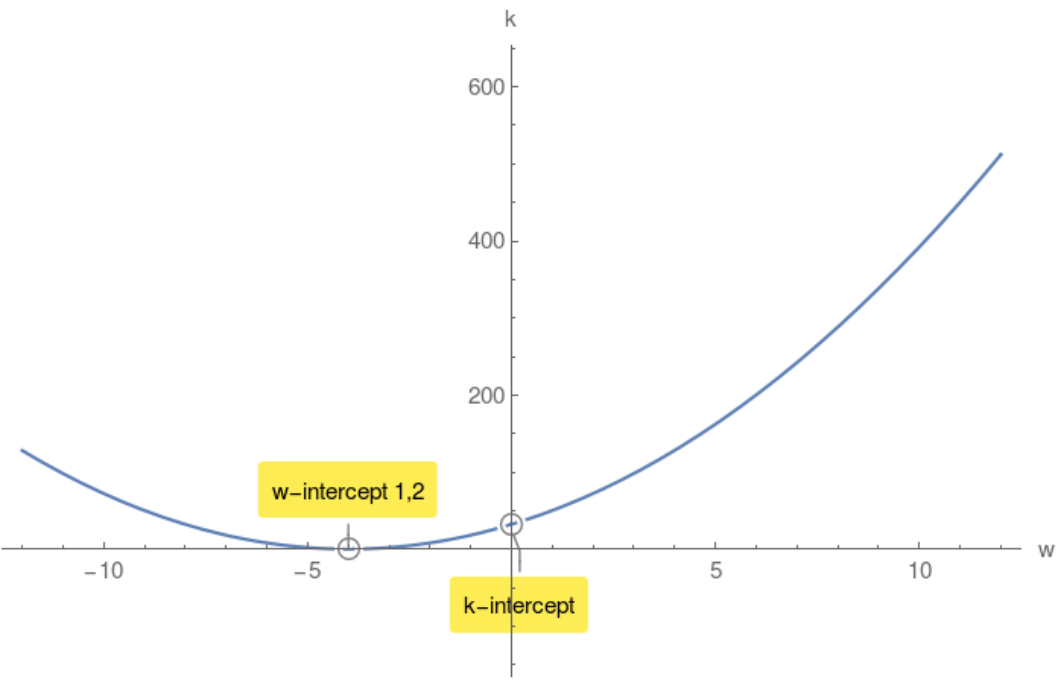
Example 2.

$k(w)=2\,w^2+16\,w+32$ compute its discriminant $\triangle$:

$\triangle=0$

$w_{1,2}=-4,-4$

$k(0)=32$ k-intercept.



Case3: $\triangle<0$

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

However there is a k-intercept.

Example 3.

$k(w)=4\,w^2-80\,w+500$ compute its discriminant $\triangle$:

$\triangle=-1600<0$

$k(0)=500$ k-intercept.