Intercepts of the Quadratic

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

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

Case1: $\triangle>0$

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

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

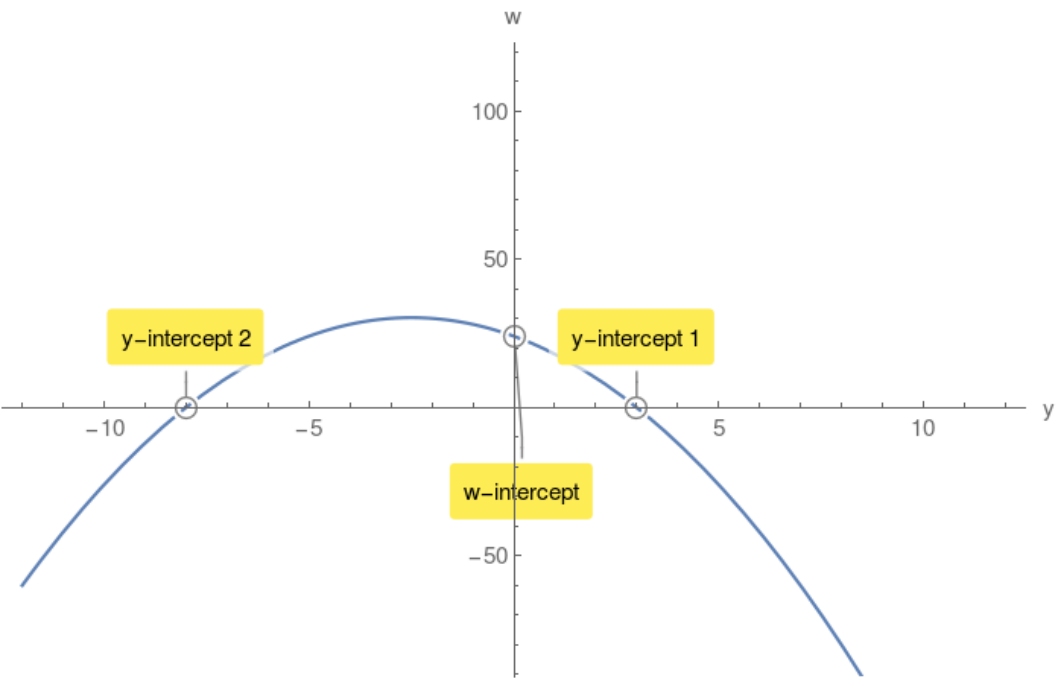
Example 1.

$w(y)=-y^2-5\,y+24$ compute its discriminant $\triangle$:

$\triangle=121>0$

$y_{1,2}=3,-8$

$w(0)=24$ w-intercept.



Case2: $\triangle=0$

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

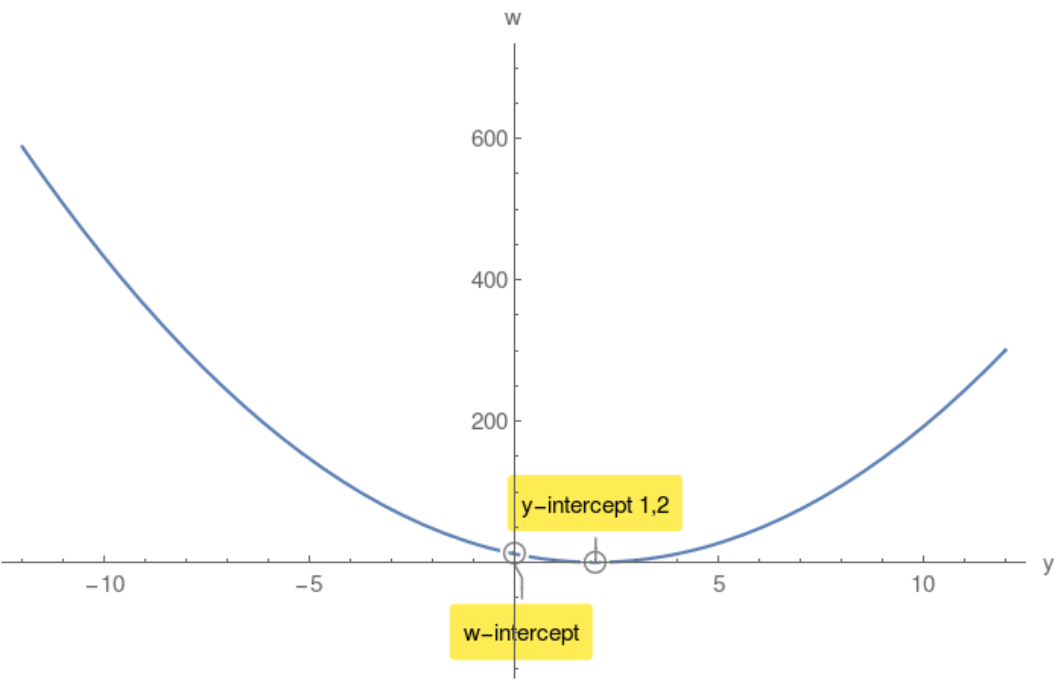
Example 2.

$w(y)=3\,y^2-12\,y+12$ compute its discriminant $\triangle$:

$\triangle=0$

$y_{1,2}=2,2$

$w(0)=12$ w-intercept.



Case3: $\triangle<0$

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

However there is a w-intercept.

Example 3.

$w(y)=9\,y^2-162\,y+810$ compute its discriminant $\triangle$:

$\triangle=-2916<0$

$w(0)=810$ w-intercept.