Intercepts of the Quadratic

Given a quadratic $v(y)=a\,y^2+b\,y+c$ 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.

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

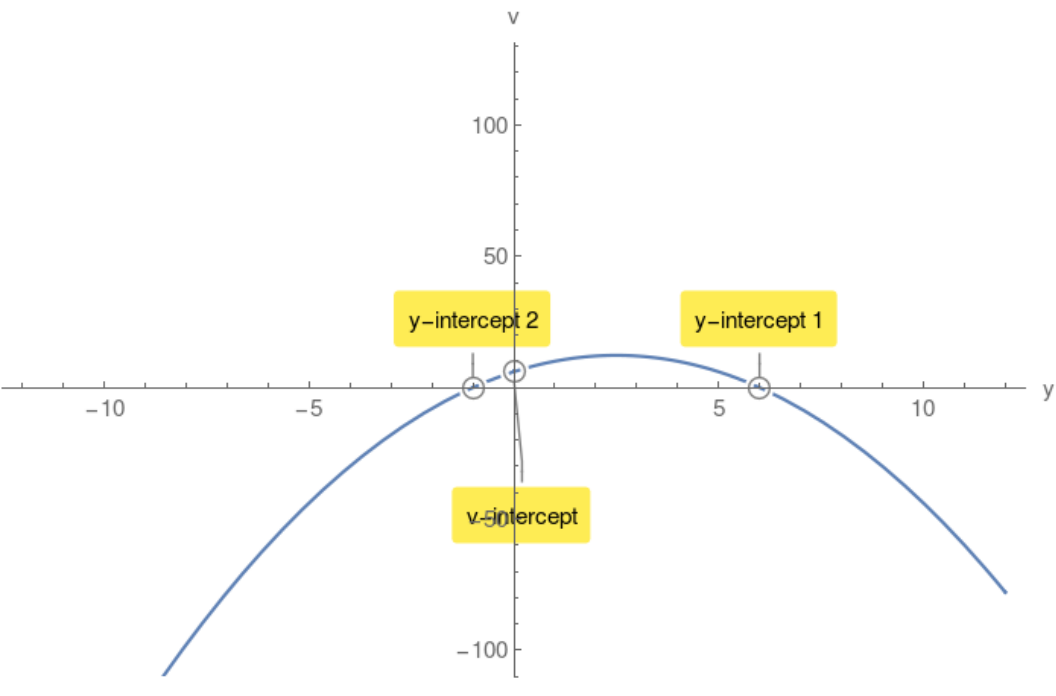
Example 1.

$v(y)=-y^2+5\,y+6$ compute its discriminant $\triangle$:

$\triangle=49>0$

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

$v(0)=6$ v-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.

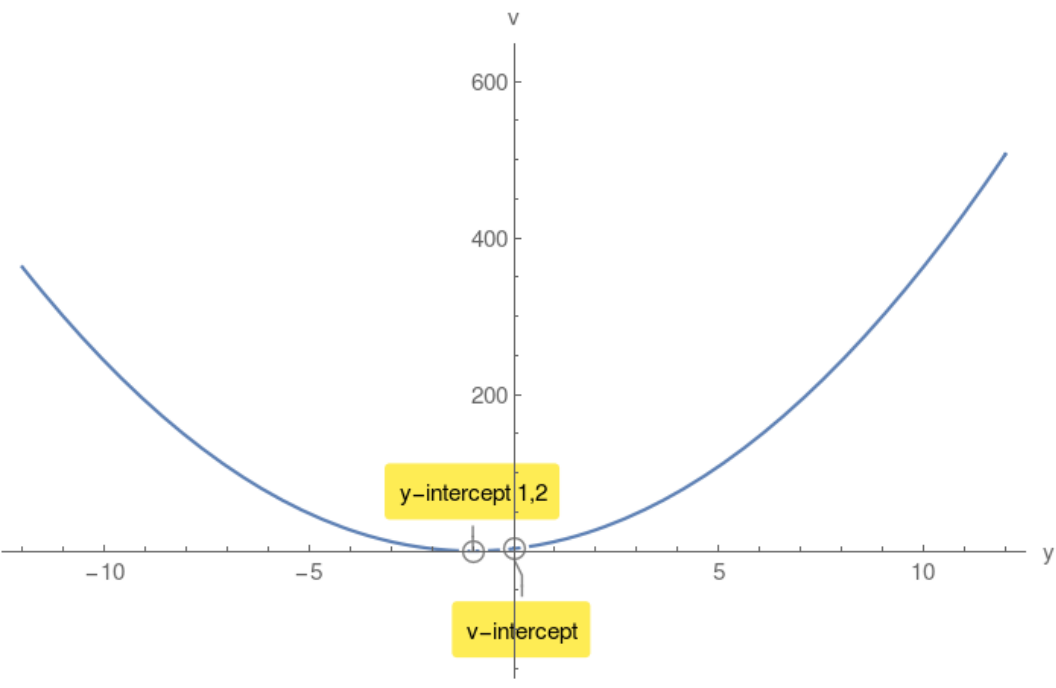
Example 2.

$v(y)=3\,y^2+6\,y+3$ compute its discriminant $\triangle$:

$\triangle=0$

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

$v(0)=3$ v-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 v-intercept.

Example 3.

$v(y)=4\,y^2+72\,y+405$ compute its discriminant $\triangle$:

$\triangle=-1296<0$

$v(0)=405$ v-intercept.