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.

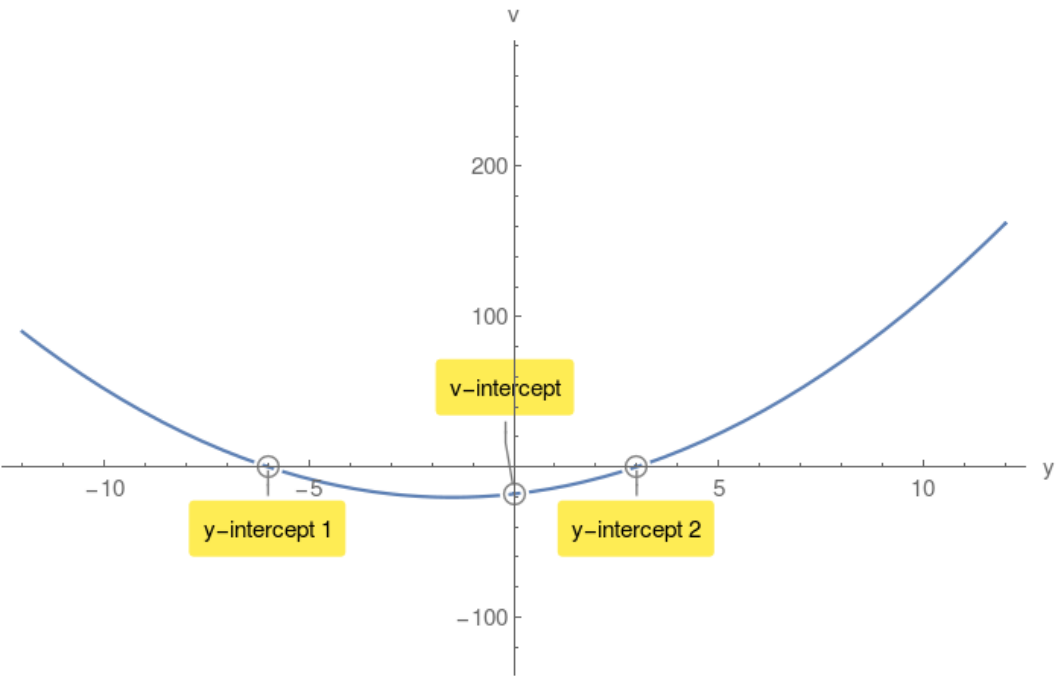
Example 1.

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

$\triangle=81>0$

$y_{1,2}=-6,3$

$v(0)=-18$ 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.

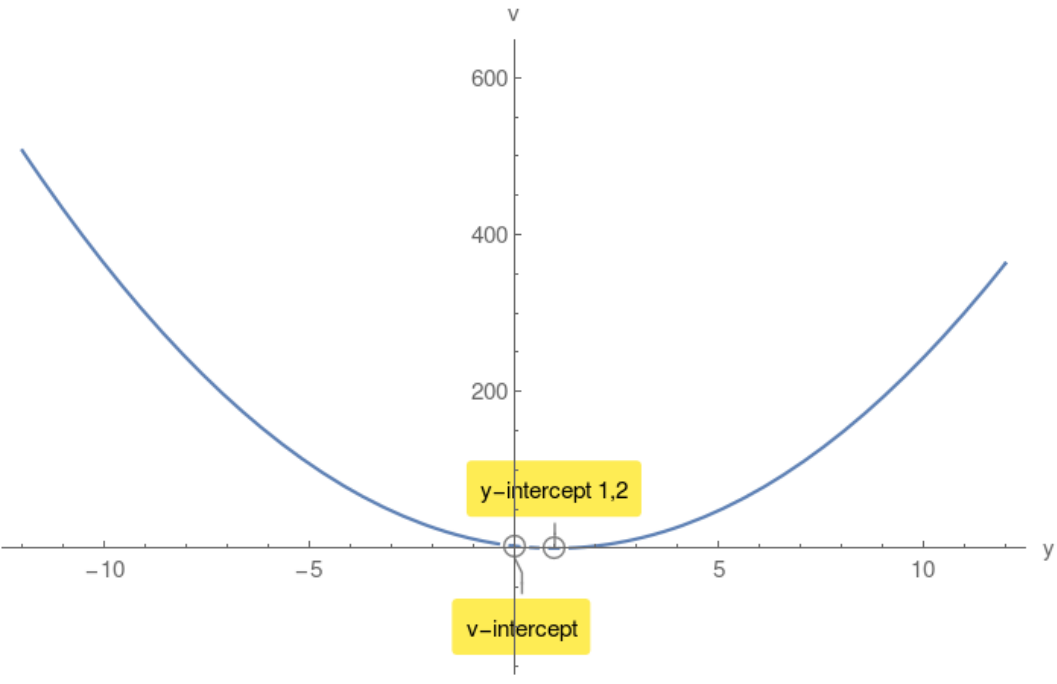
Example 2.

$v(y)=3\,y^2-6\,y+3$ 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.

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

$\triangle=-3600<0$

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