Intercepts of the Quadratic

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

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

Case1: $\triangle>0$

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

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

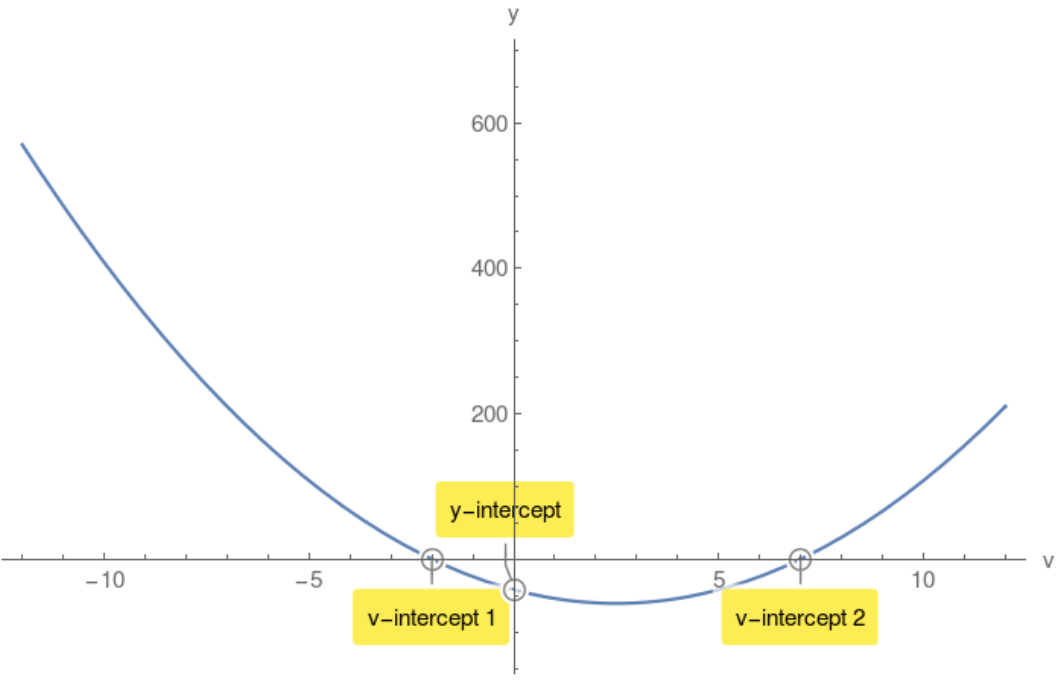
Example 1.

$y(v)=3\,v^2-15\,v-42$ compute its discriminant $\triangle$:

$\triangle=729>0$

$v_{1,2}=-2,7$

$y(0)=-42$ y-intercept.



Case2: $\triangle=0$

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

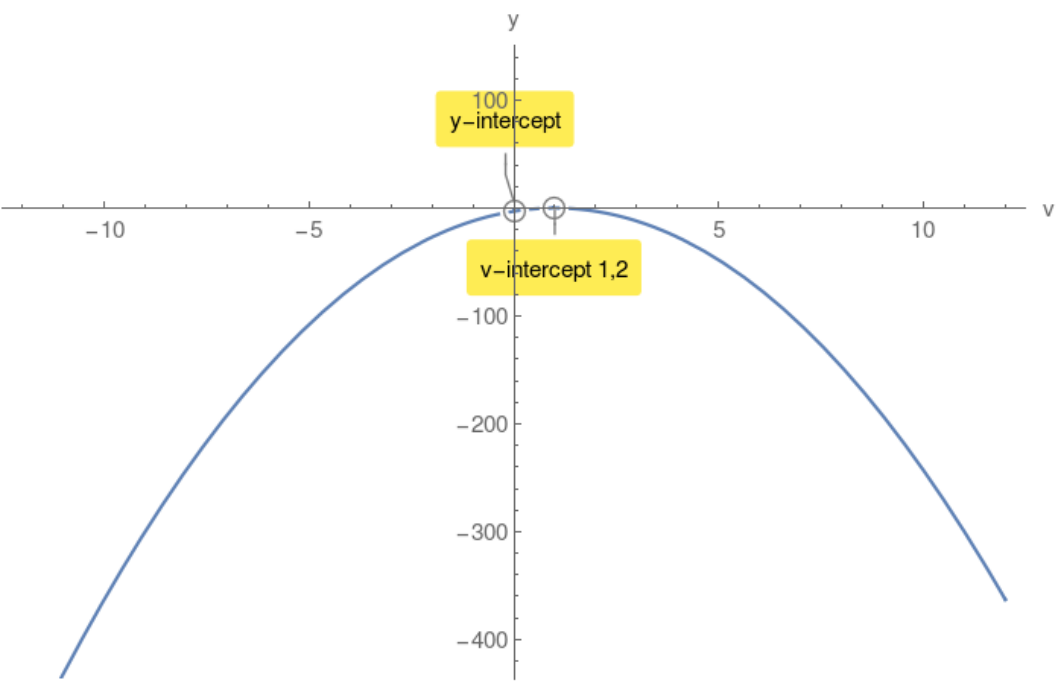
Example 2.

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

$\triangle=0$

$v_{1,2}=1,1$

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



Case3: $\triangle<0$

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

However there is a y-intercept.

Example 3.

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

$\triangle=-2916<0$

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