Intercepts of the Quadratic

Given a quadratic $f(v)=a v^2+b v+c$ compute its discriminant Δ:

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

Case1: $\Delta>0$

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

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

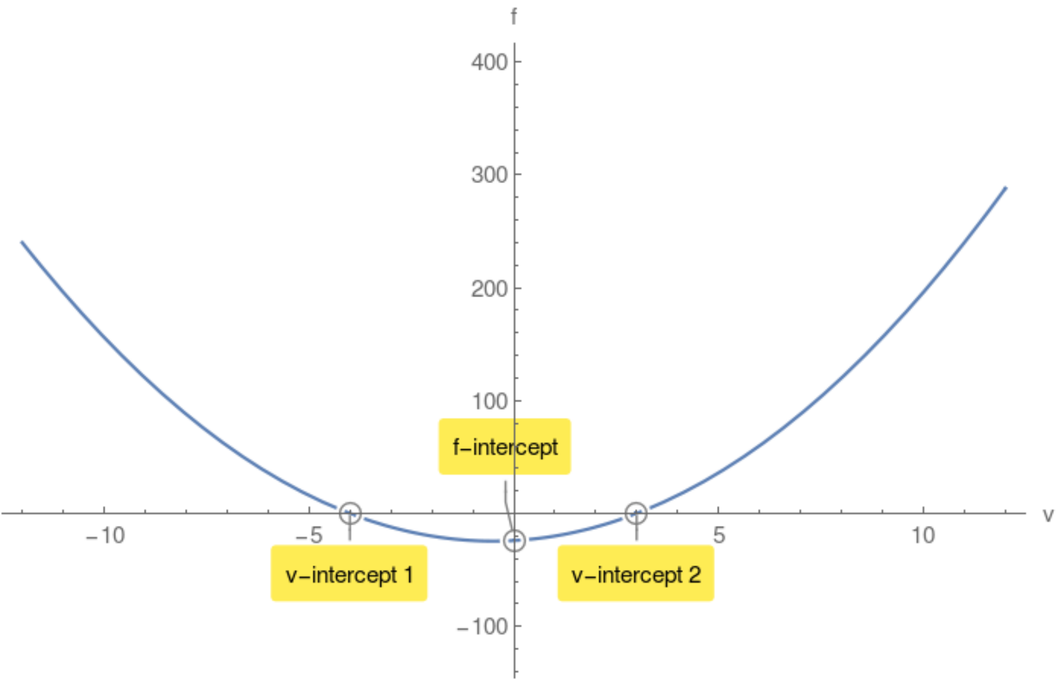
Example 1.

$f(v)=2v^2+2v-24$ compute its discriminant Δ:

$\Delta=196>0$

$v_{1,2}=-4,3$

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



Case2: $\Delta=0$

$v_{1,2}=\frac{-b\pm\sqrt{b^2-4ac}}{2a}=\frac{-b\pm 0}{2a}=\frac{-b}{2a}$ single v-intercept of multiplicity 2.

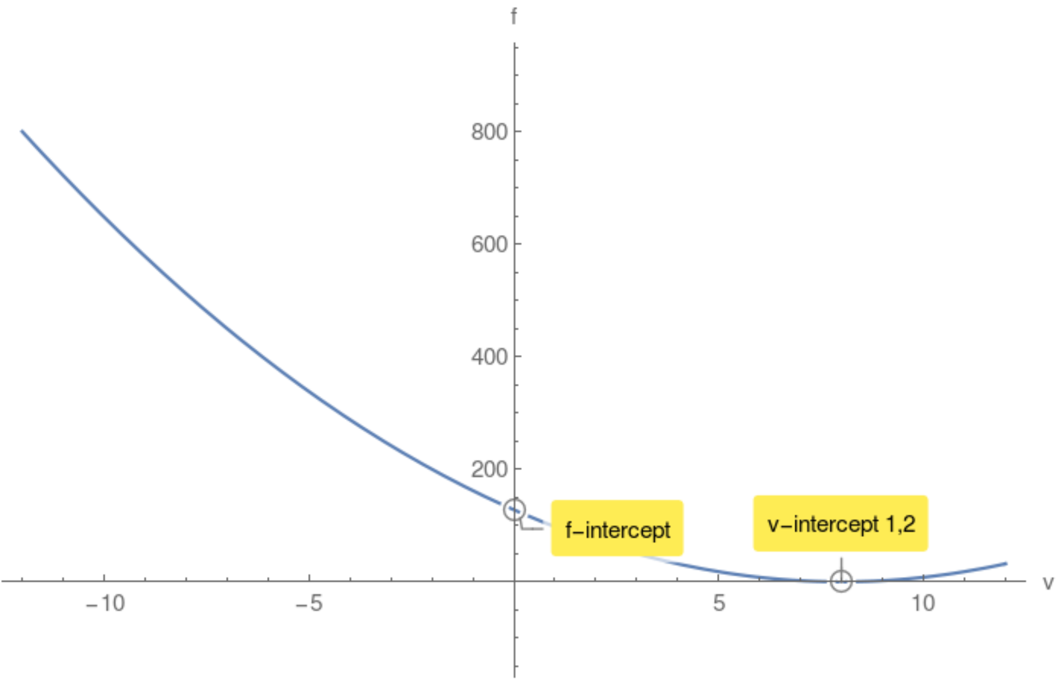
Example 2.

$f(v)=2v^2-32v+128$ compute its discriminant Δ:

$\Delta=0$

$v_{1,2}=8,8$

$f(0)=128$ f-intercept.



Case3: $\Delta<0$

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

However there is a f-intercept.

Example 3.

$f(v)=9v^2+144v+640$ compute its discriminant Δ:

$\Delta=-2304<0$

$f(0)=640$ f-intercept.