Intercepts of the Quadratic

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

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

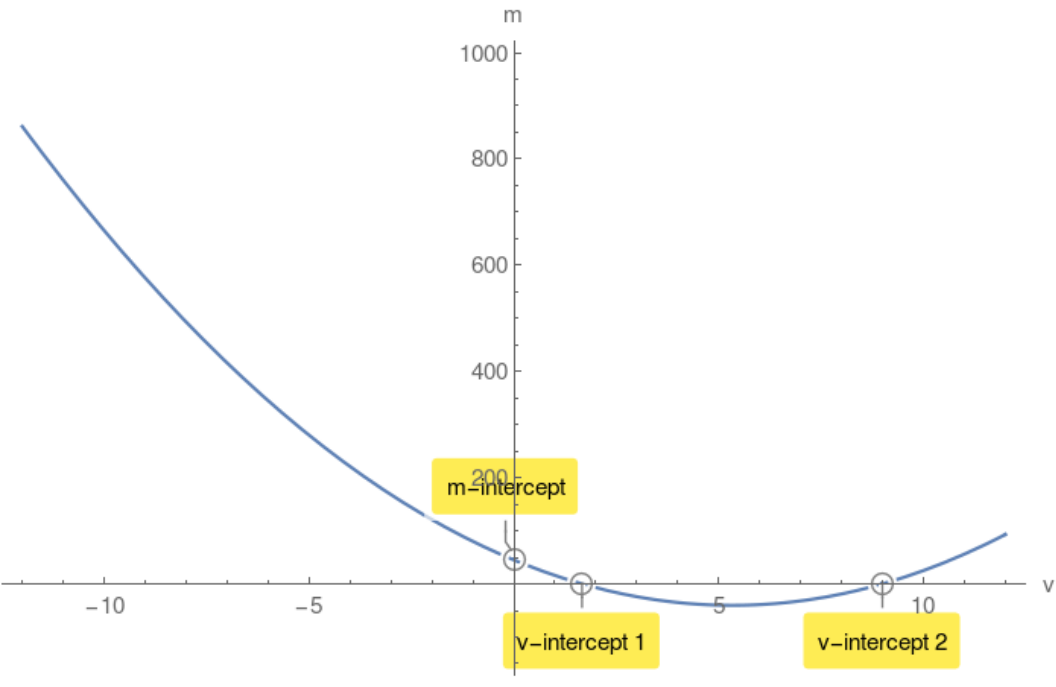
Example 1.

$m(v)=3\,v^2-32\,v+45$ compute its discriminant $\triangle$:

$\triangle=484>0$

$v_{1,2}=\frac{5}{3},9$

$m(0)=45$ m-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.

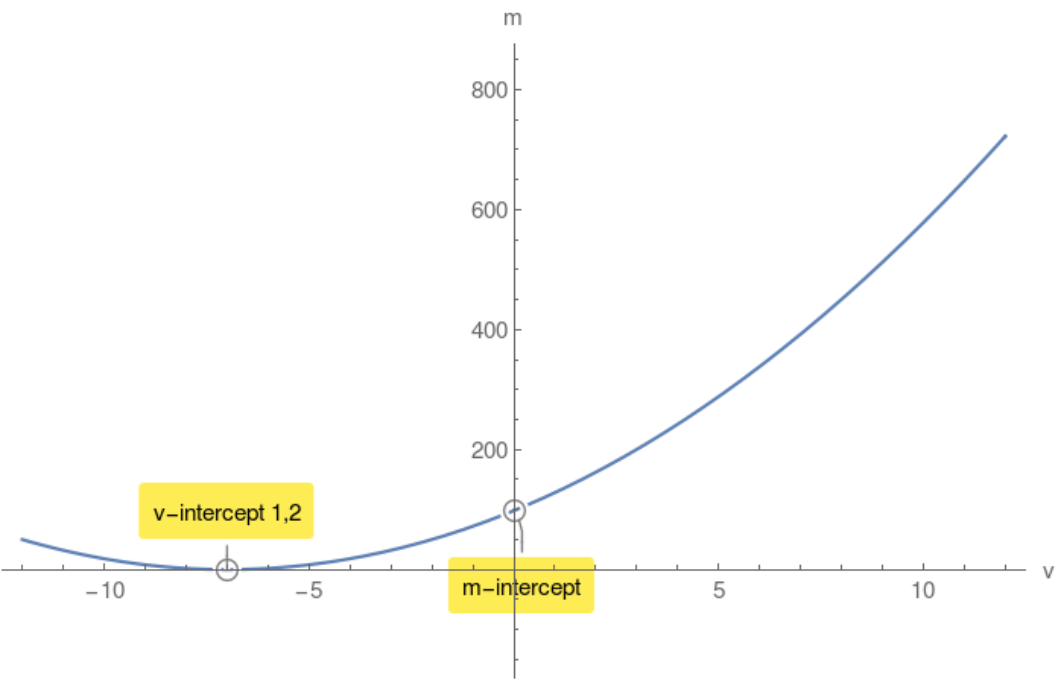
Example 2.

$m(v)=2\,v^2+28\,v+98$ compute its discriminant $\triangle$:

$\triangle=0$

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

$m(0)=98$ m-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 m-intercept.

Example 3.

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

$\triangle=-3600<0$

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