Intercepts of the Quadratic

Given a quadratic $n(w)=a w^2+b w+c$ compute its discriminant $\triangle$:

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

Case1: $\triangle>0$

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

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

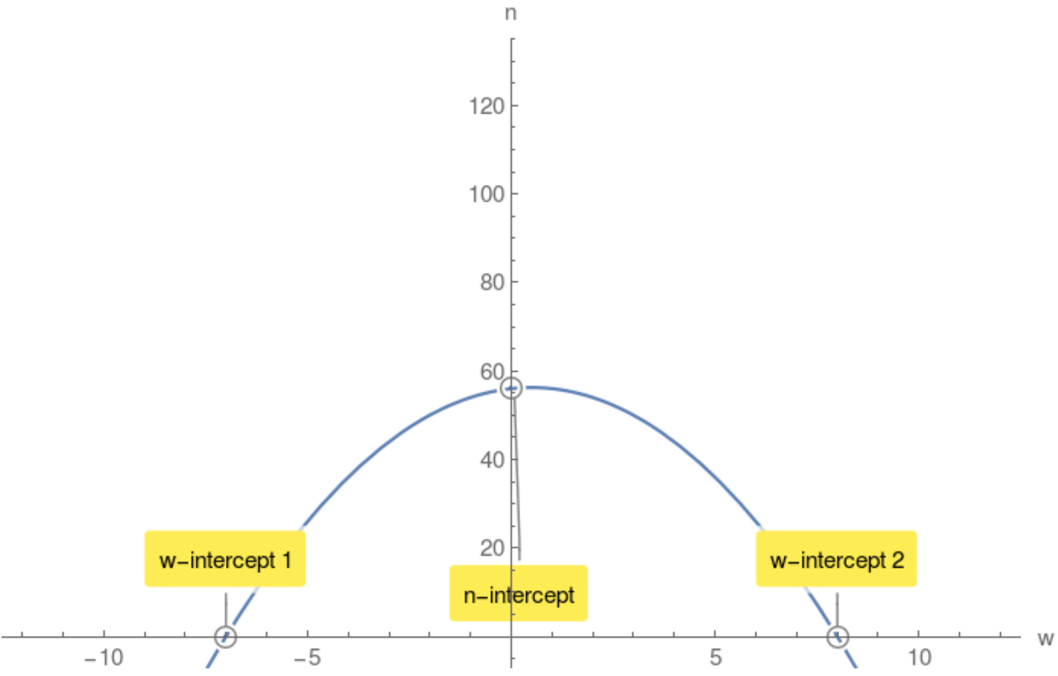
Example 1.

$n(w)=-w^2+w+56$ compute its discriminant $\triangle$:

$\triangle=225>0$

$w_{1,2}=-7,8$

$n(0)=56$ n-intercept.



Case2: $\triangle=0$

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

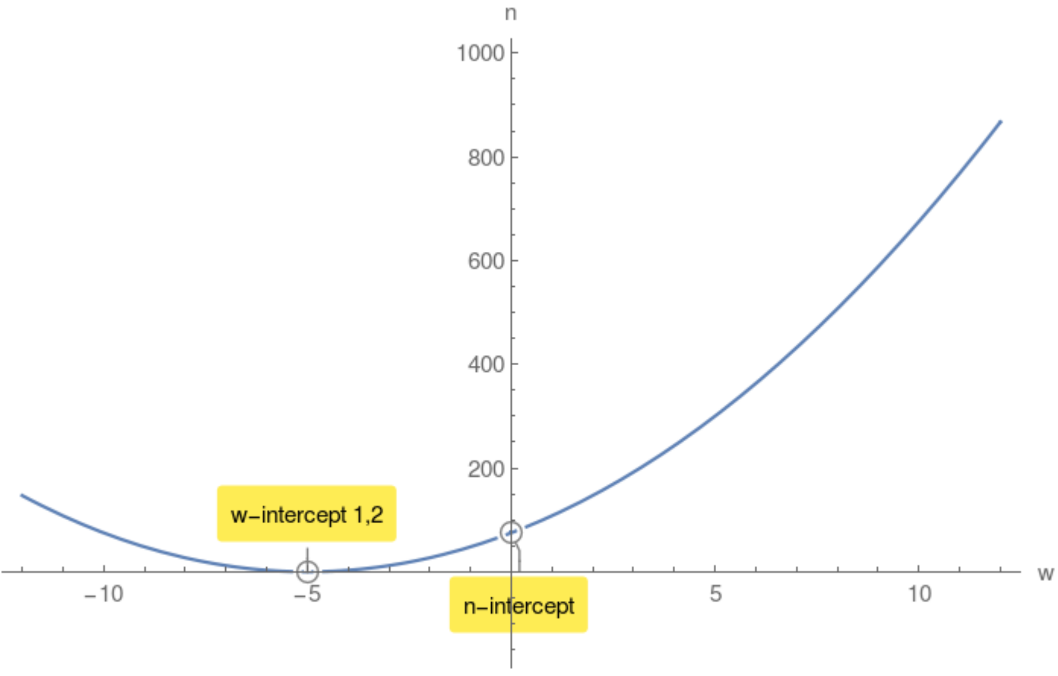
Example 2.

$n(w)=3w^2+30w+75$ compute its discriminant $\triangle$:

$\triangle=0$

$w_{1,2}=-5,-5$

$n(0)=75$ n-intercept.



Case3: $\triangle<0$

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

However there is a n-intercept.

Example 3.

$n(w)=9w^2+126w+490$ compute its discriminant $\triangle$:

$\triangle=-1764<0$

$n(0)=490$ n-intercept.