Intercepts of the Quadratic

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

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

Case1: $\triangle>0$

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

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

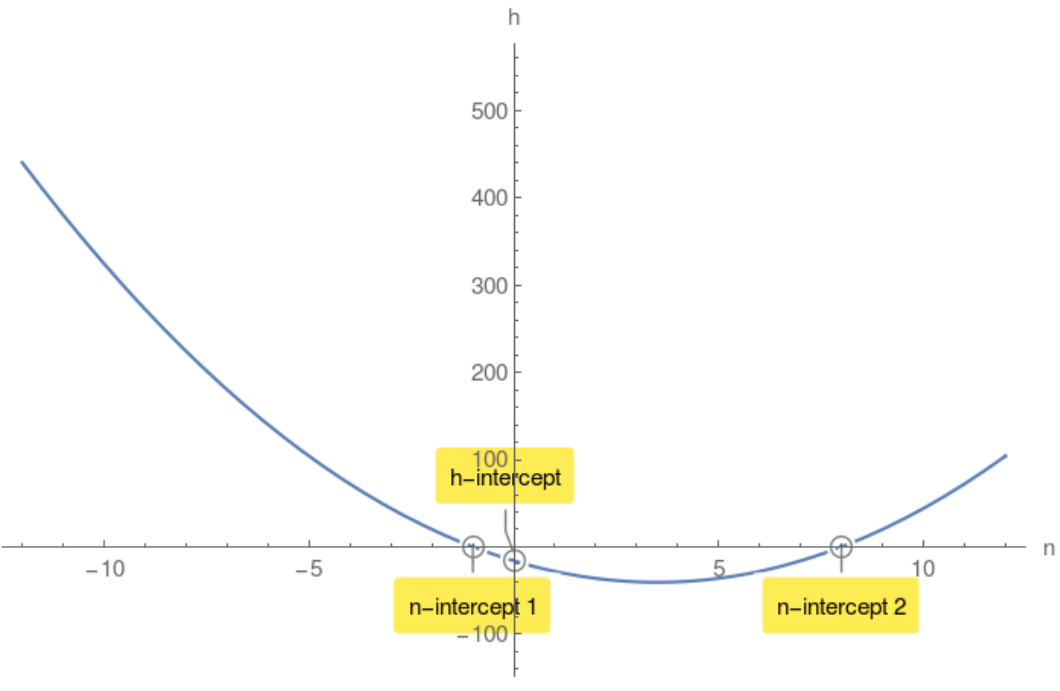
Example 1.

$h(n)=2\,n^2-14\,n-16$ compute its discriminant $\triangle$:

$\triangle=324>0$

$n_{1,2}=-1,8$

$h(0)=-16$ h-intercept.



Case2: $\triangle=0$

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

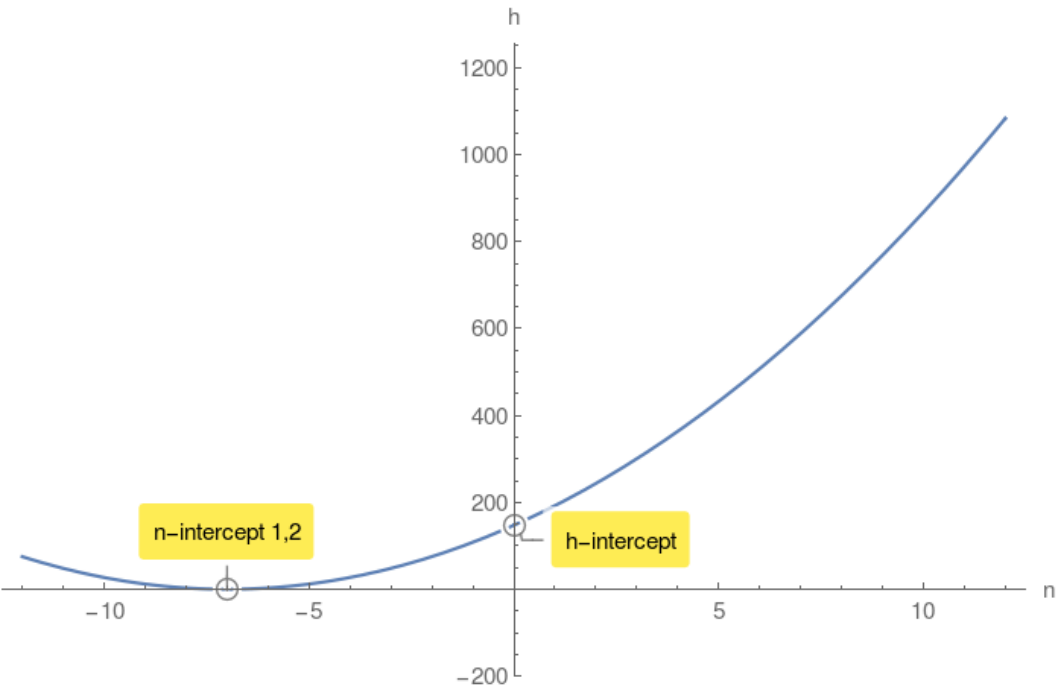
Example 2.

$h(n)=3\,n^2+42\,n+147$ compute its discriminant $\triangle$:

$\triangle=0$

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

$h(0)=147$ h-intercept.



Case3: $\triangle<0$

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

However there is a h-intercept.

Example 3.

$h(n)=4\,n^2+64\,n+320$ compute its discriminant $\triangle$:

$\triangle=-1024<0$

$h(0)=320$ h-intercept.