Intercepts of the Quadratic

Given a quadratic $f(n)=a\,n^2+b\,n+c$ 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.

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

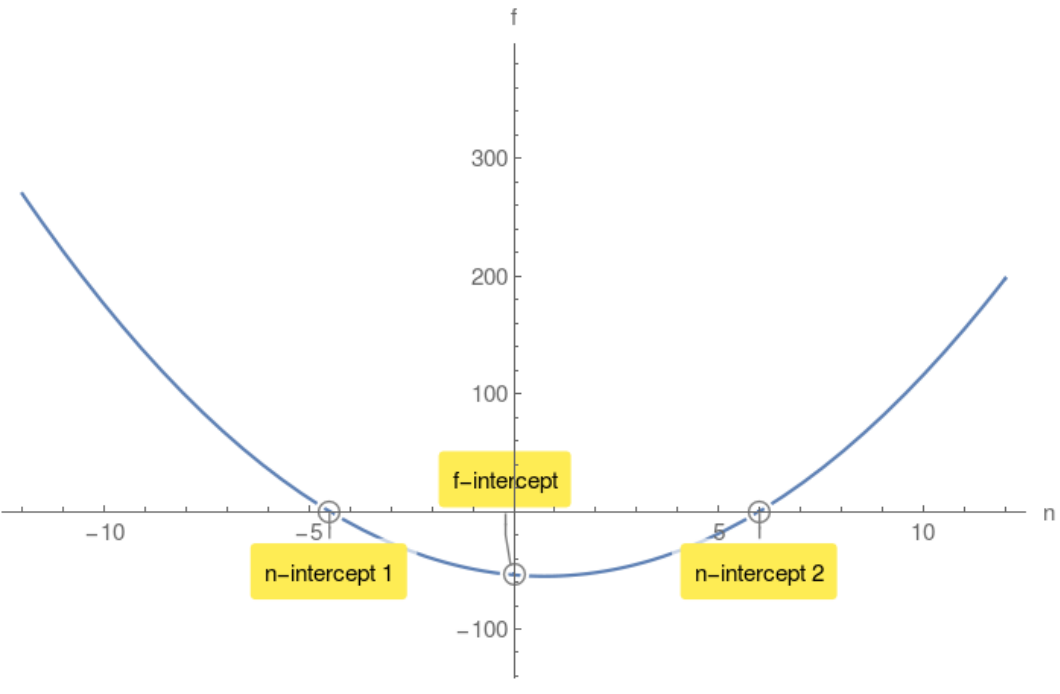
Example 1.

$f(n)=2\,n^2-3\,n-54$ compute its discriminant $\triangle$:

$\triangle=441>0$

$n_{1,2}=-\frac{9}{2},6$

$f(0)=-54$ f-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.

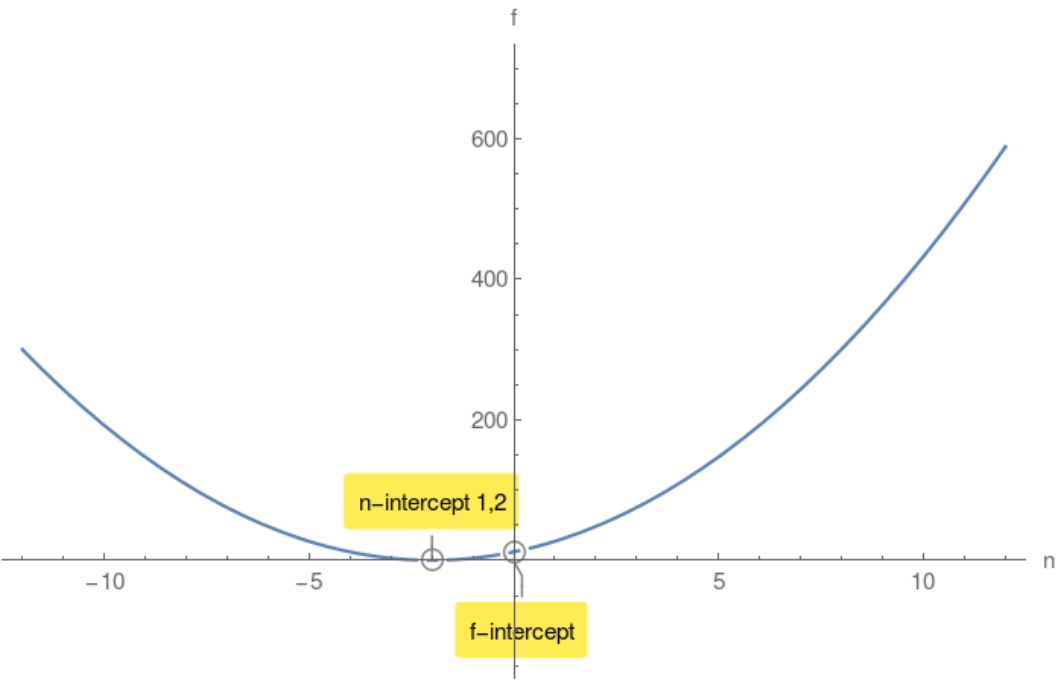
Example 2.

$f(n)=3\,n^2+12\,n+12$ compute its discriminant $\triangle$:

$\triangle=0$

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

$f(0)=12$ f-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 f-intercept.

Example 3.

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

$\triangle=-2916<0$

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