Intercepts of the Quadratic

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

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

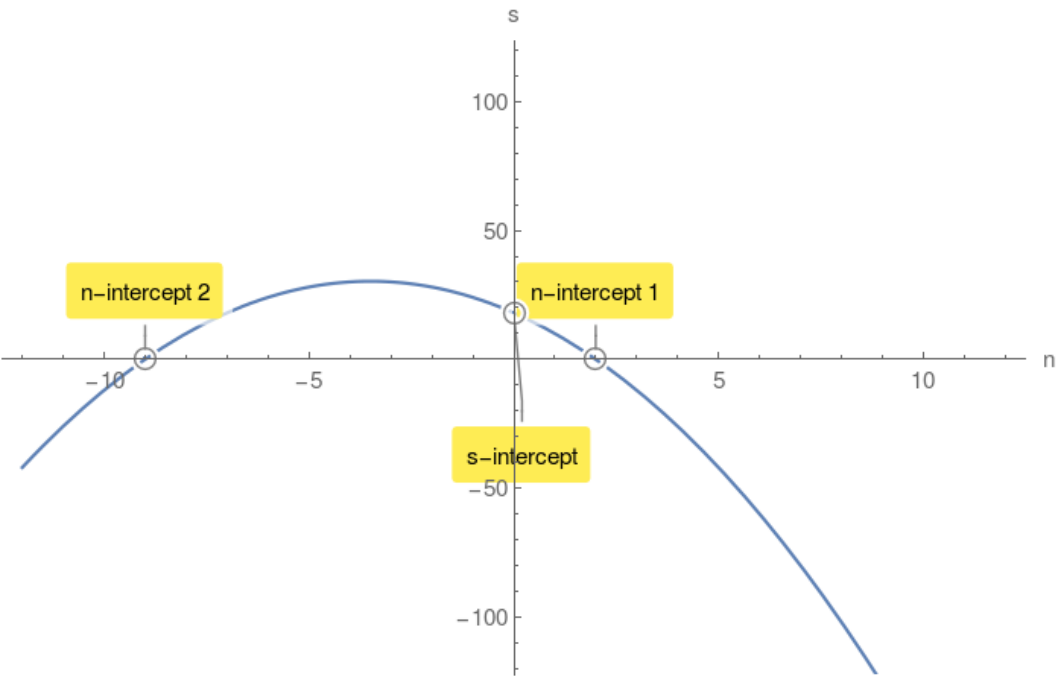
Example 1.

$s(n)=-n^2-7\,n+18$ compute its discriminant $\triangle$:

$\triangle=121>0$

$n_{1,2}=2,-9$

$s(0)=18$ s-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.

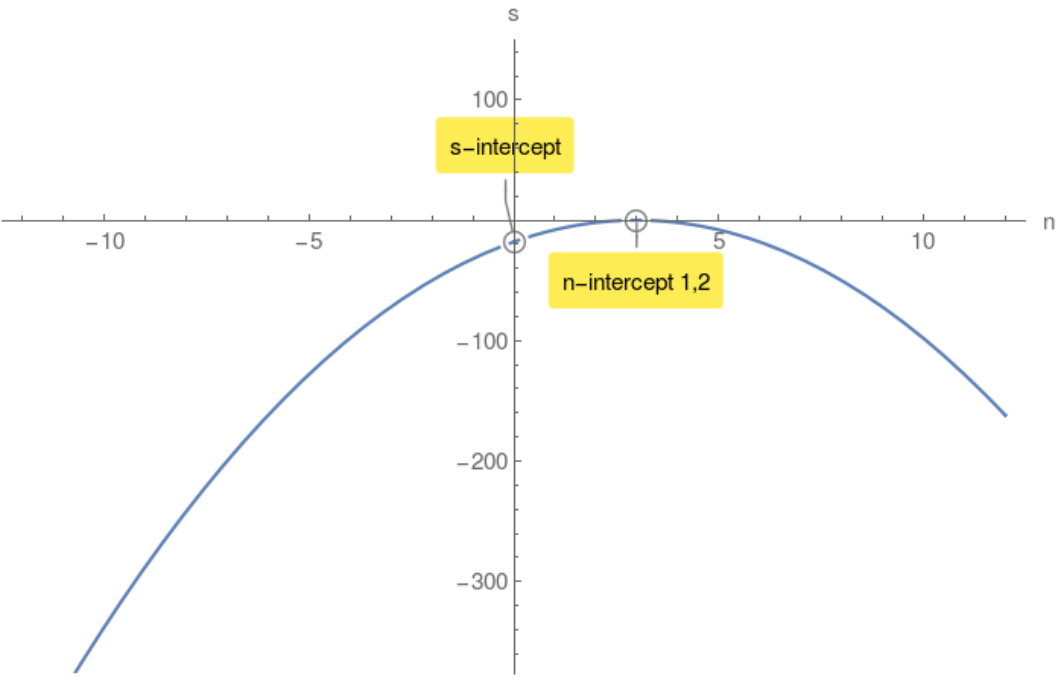
Example 2.

$s(n)=-2\,n^2+12\,n-18$ compute its discriminant $\triangle$:

$\triangle=0$

$n_{1,2}=3,3$

$s(0)=-18$ s-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 s-intercept.

Example 3.

$s(n)=4\,n^2-56\,n+245$ compute its discriminant $\triangle$:

$\triangle=-784<0$

$s(0)=245$ s-intercept.