Intercepts of the Quadratic

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

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

Case1: $\triangle>0$

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

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

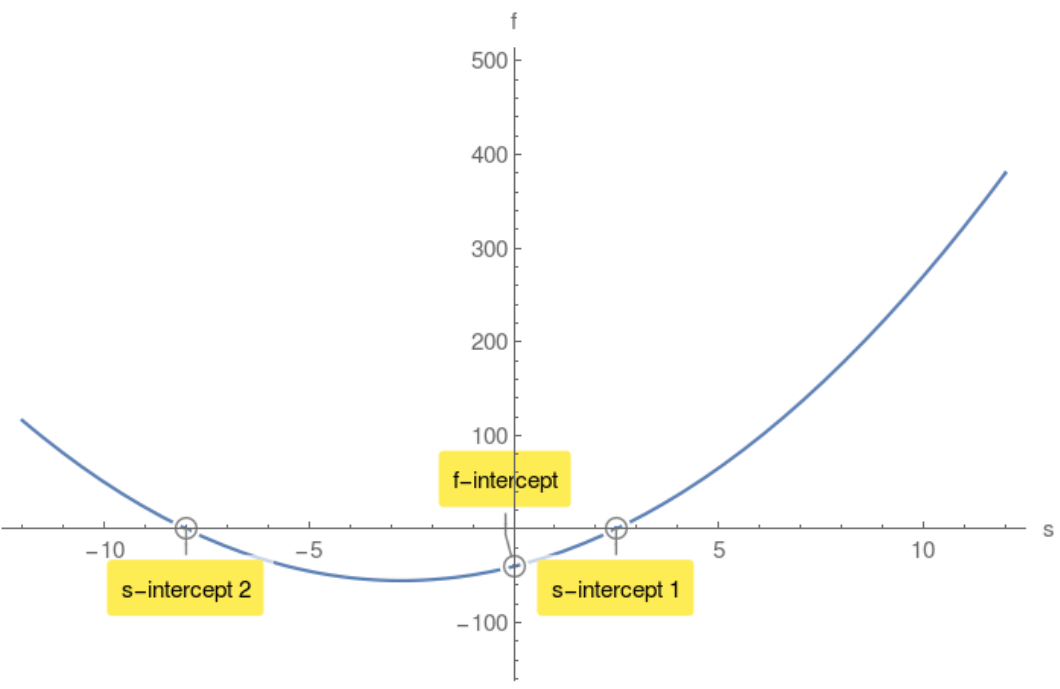
Example 1.

$f(s)=2\,s^2+11\,s-40$ compute its discriminant $\triangle$:

$\triangle=441>0$

$s_{1,2}=\frac{5}{2},-8$

$f(0)=-40$ f-intercept.



Case2: $\triangle=0$

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

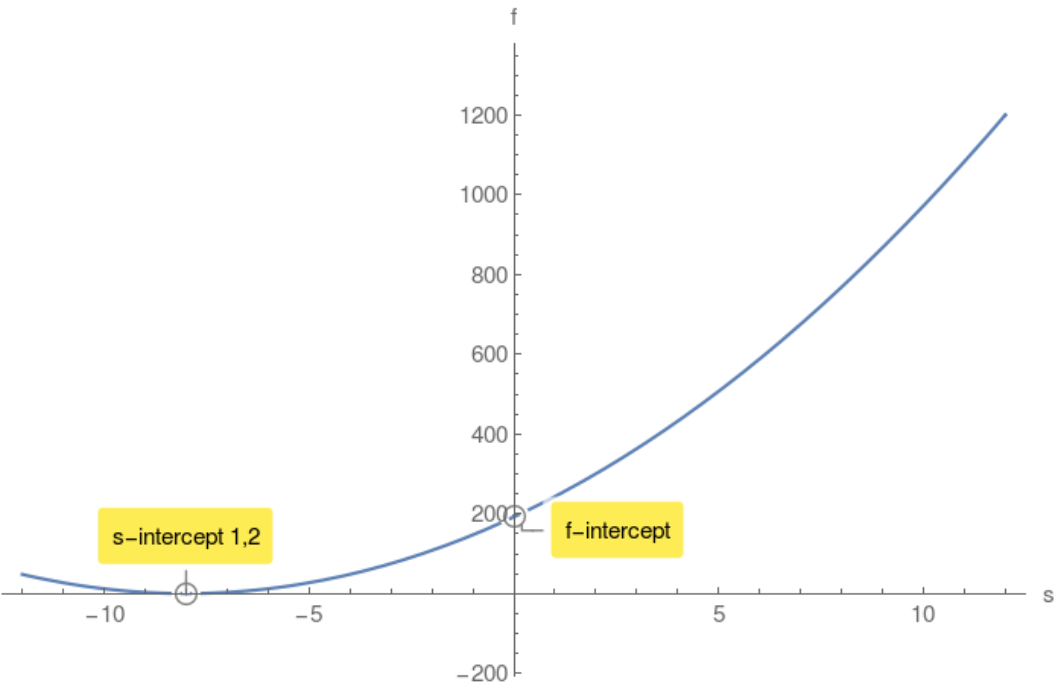
Example 2.

$f(s)=3\,s^2+48\,s+192$ compute its discriminant $\triangle$:

$\triangle=0$

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

$f(0)=192$ f-intercept.



Case3: $\triangle<0$

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

However there is a f-intercept.

Example 3.

$f(s)=-4\,s^2+64\,s-320$ compute its discriminant $\triangle$:

$\triangle=-1024<0$

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