Intercepts of the Quadratic

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

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

Case1: $\triangle>0$

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

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

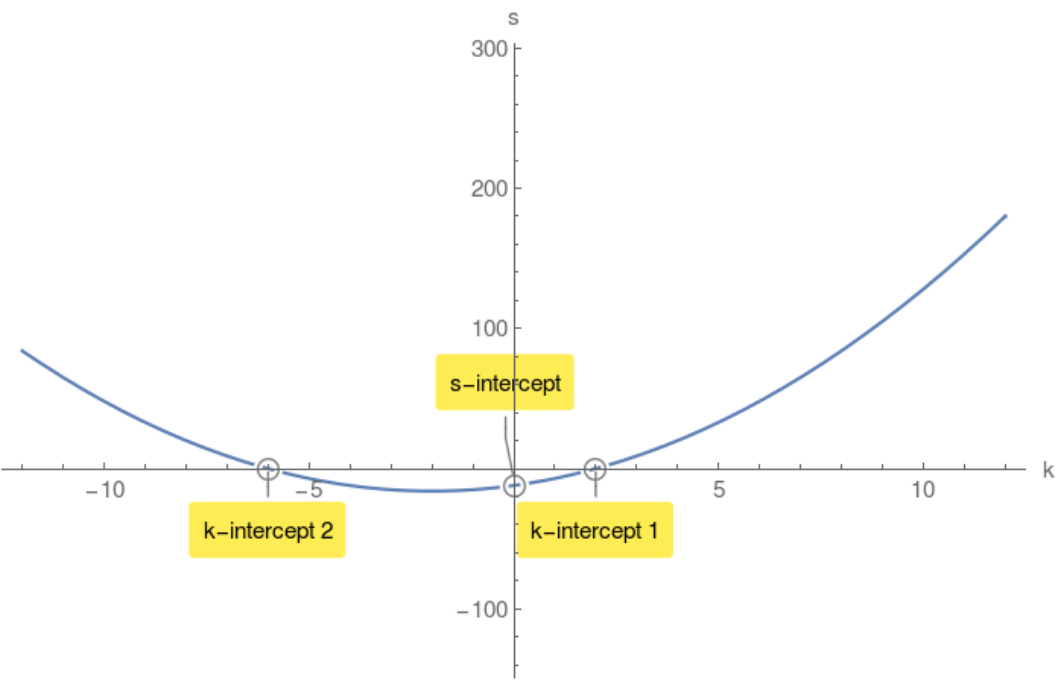
Example 1.

$s(k)=k^2+4\,k-12$ compute its discriminant $\triangle$:

$\triangle=64>0$

$k_{1,2}=2,-6$

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



Case2: $\triangle=0$

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

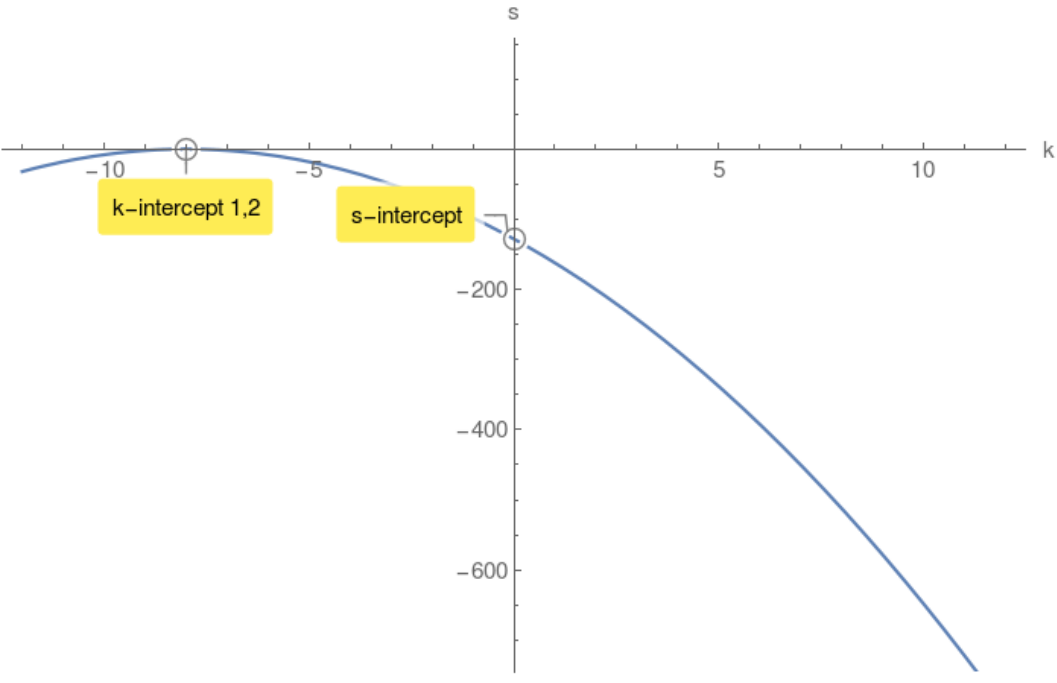
Example 2.

$s(k)=-2\,k^2-32\,k-128$ compute its discriminant $\triangle$:

$\triangle=0$

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

$s(0)=-128$ s-intercept.



Case3: $\triangle<0$

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

However there is a s-intercept.

Example 3.

$s(k)=-9\,k^2-126\,k-490$ compute its discriminant $\triangle$:

$\triangle=-1764<0$

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