Intercepts of the Quadratic

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

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

Case1: $\triangle>0$

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

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

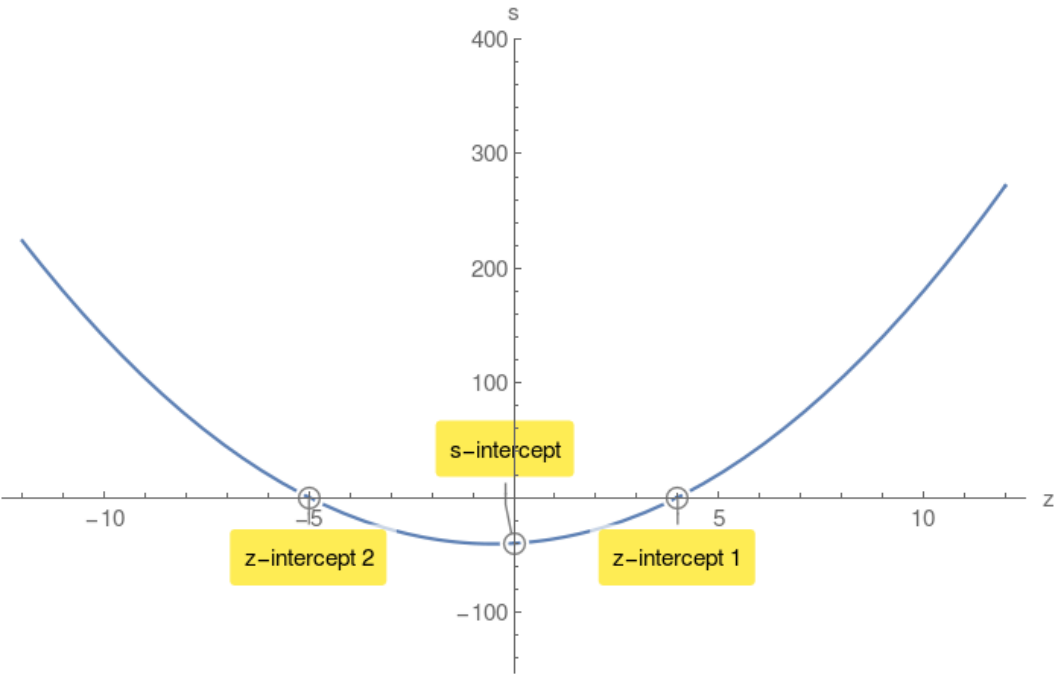
Example 1.

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

$\triangle=324>0$

$z_{1,2}=4,-5$

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



Case2: $\triangle=0$

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

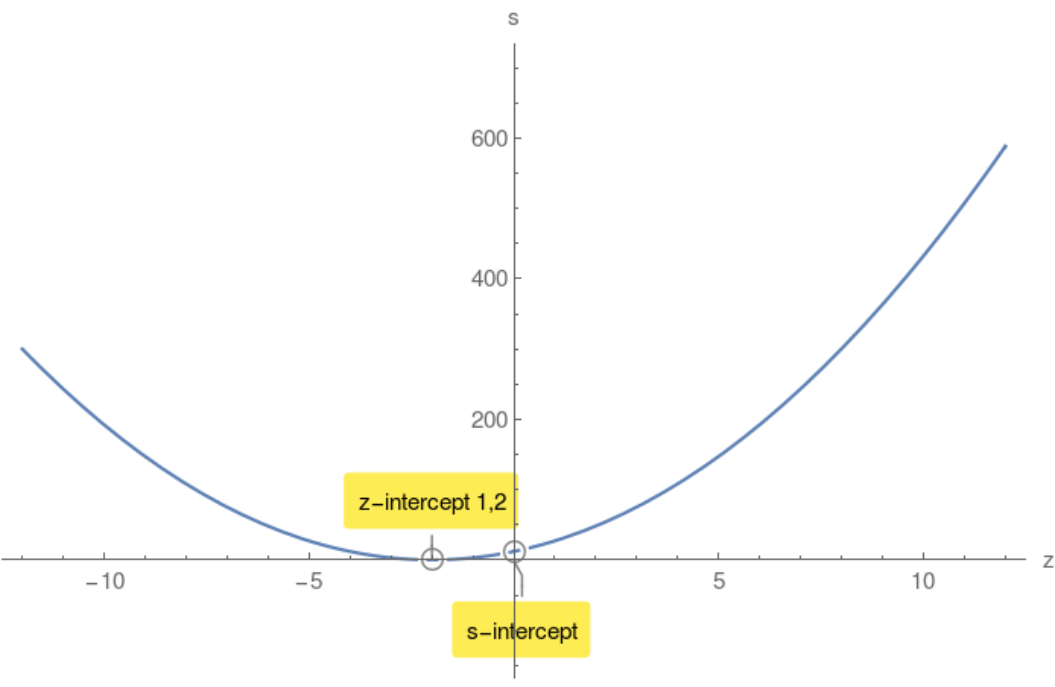
Example 2.

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

$\triangle=0$

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

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



Case3: $\triangle<0$

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

However there is a s-intercept.

Example 3.

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

$\triangle=-784<0$

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