# Intercepts of the Quadratic

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

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

## Case1: $\triangle>0$

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

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

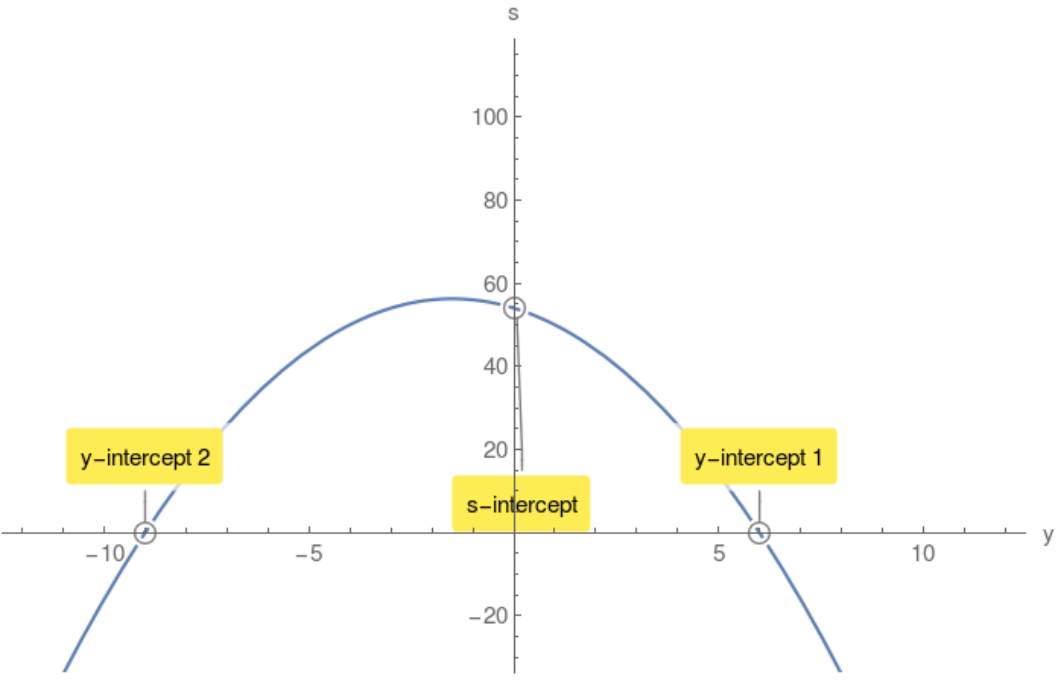
## Example 1.

$s(y)=-y^2-3\,y+54$ compute its discriminant $\triangle$:

$\triangle=225>0$

$y_{1,2}=6,-9$

$s(0)=54$ s-intercept.




## Case2: $\triangle=0$

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

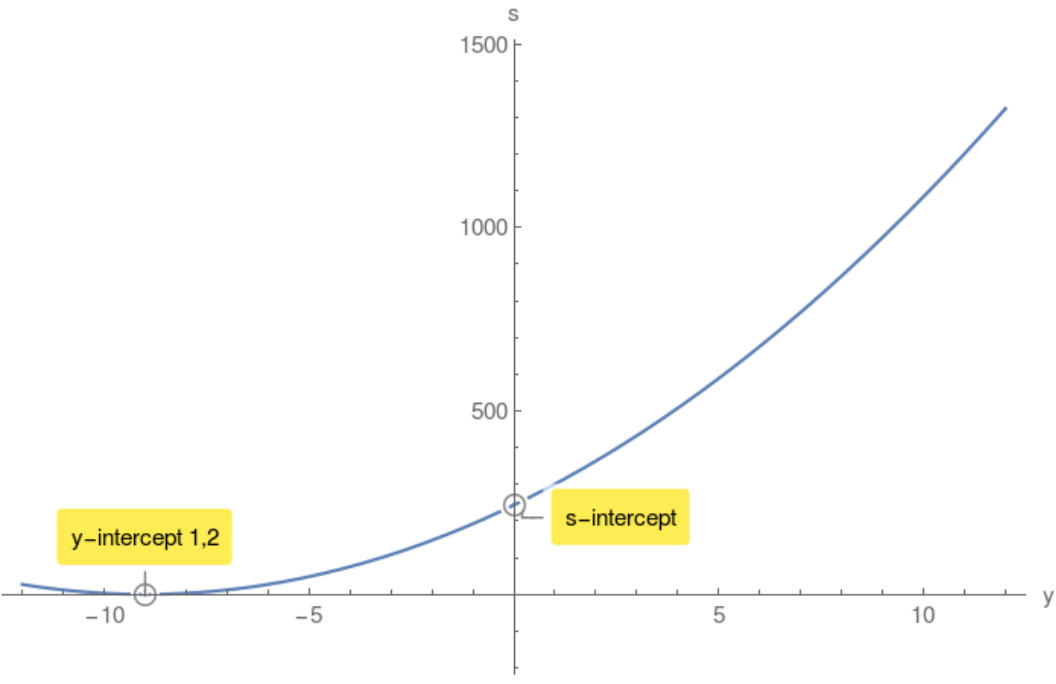
## Example 2.

$s(y)=3\,y^2+54\,y+243$ compute its discriminant $\triangle$:

$\triangle=0$

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

$s(0)=243$ s-intercept.




## Case3: $\triangle<0$

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

However there is a s-intercept.

## Example 3.

$s(y)=9\,y^2-144\,y+640$ compute its discriminant $\triangle$:

$\triangle=-2304<0$

$s(0)=640$ s-intercept.