Intercepts of the Quadratic

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

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

Case1: $\triangle>0$

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

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

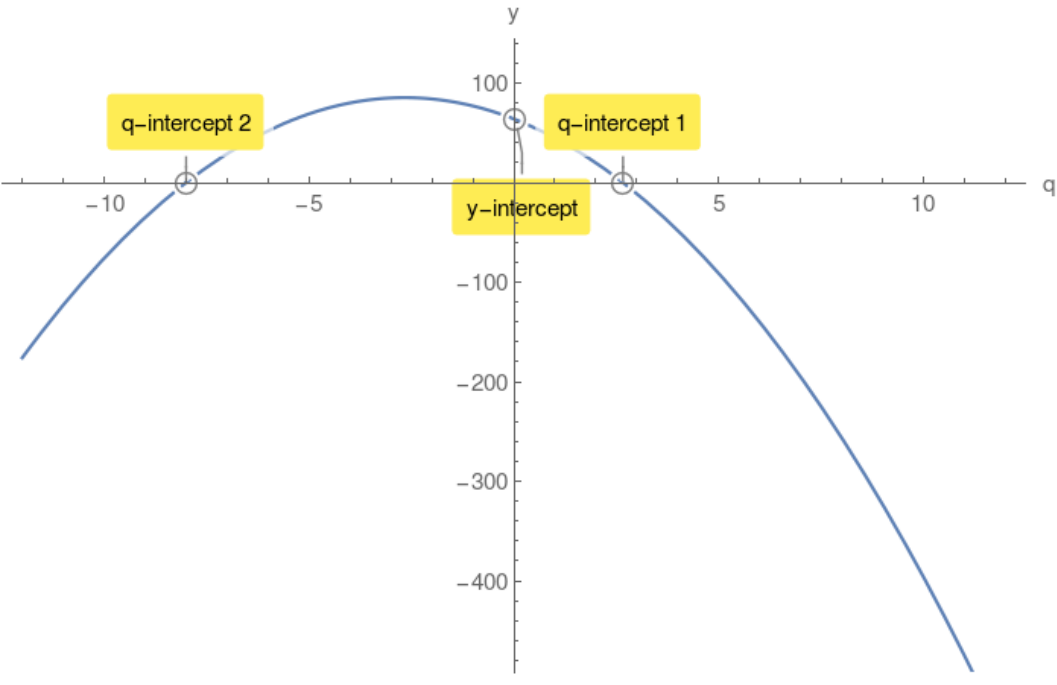
Example 1.

$y(q)=-3\,q^2-16\,q+64$ compute its discriminant $\triangle$:

$\triangle=1024>0$

$q_{1,2}=\frac{8}{3},-8$

$y(0)=64$ y-intercept.



Case2: $\triangle=0$

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

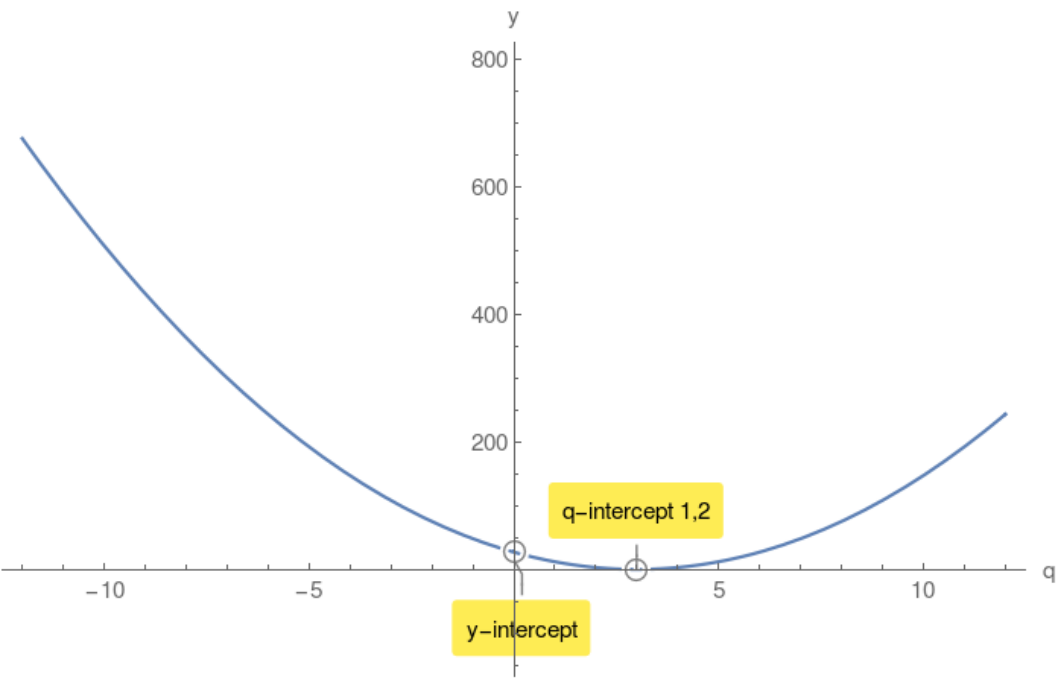
Example 2.

$y(q)=3\,q^2-18\,q+27$ compute its discriminant $\triangle$:

$\triangle=0$

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

$y(0)=27$ y-intercept.



Case3: $\triangle<0$

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

However there is a y-intercept.

Example 3.

$y(q)=9\,q^2+126\,q+490$ compute its discriminant $\triangle$:

$\triangle=-1764<0$

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