Intercepts of the Quadratic

Given a quadratic $f(q)=a\,q^2+b\,q+c$ 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.

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

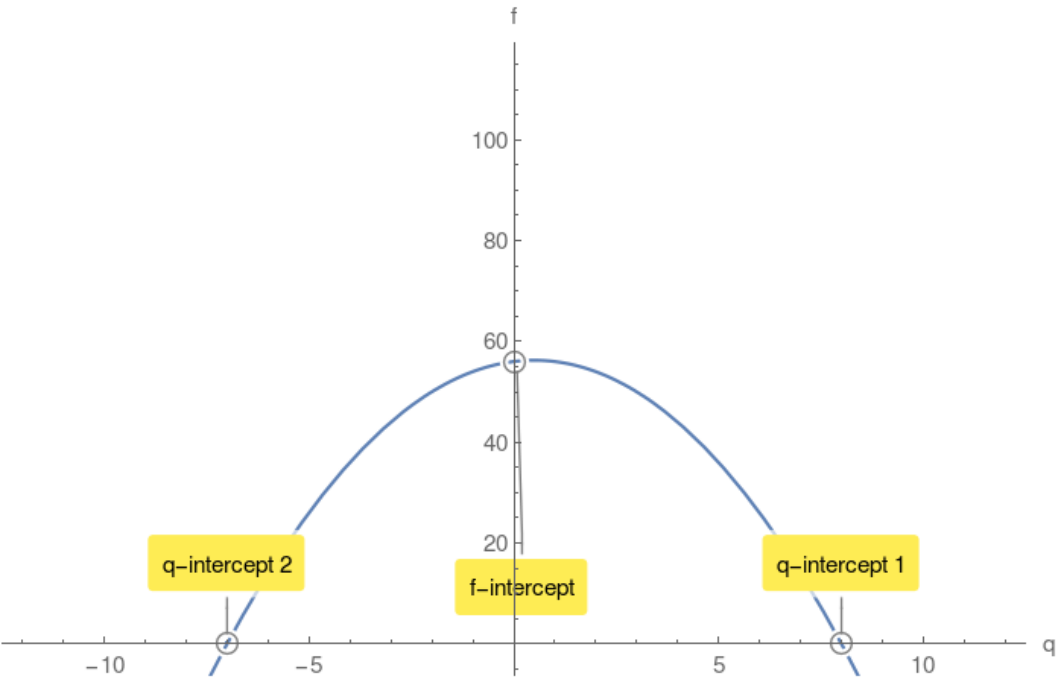
Example 1.

$f(q)=-q^2+q+56$ compute its discriminant $\triangle$:

$\triangle=225>0$

$q_{1,2}=8,-7$

$f(0)=56$ f-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.

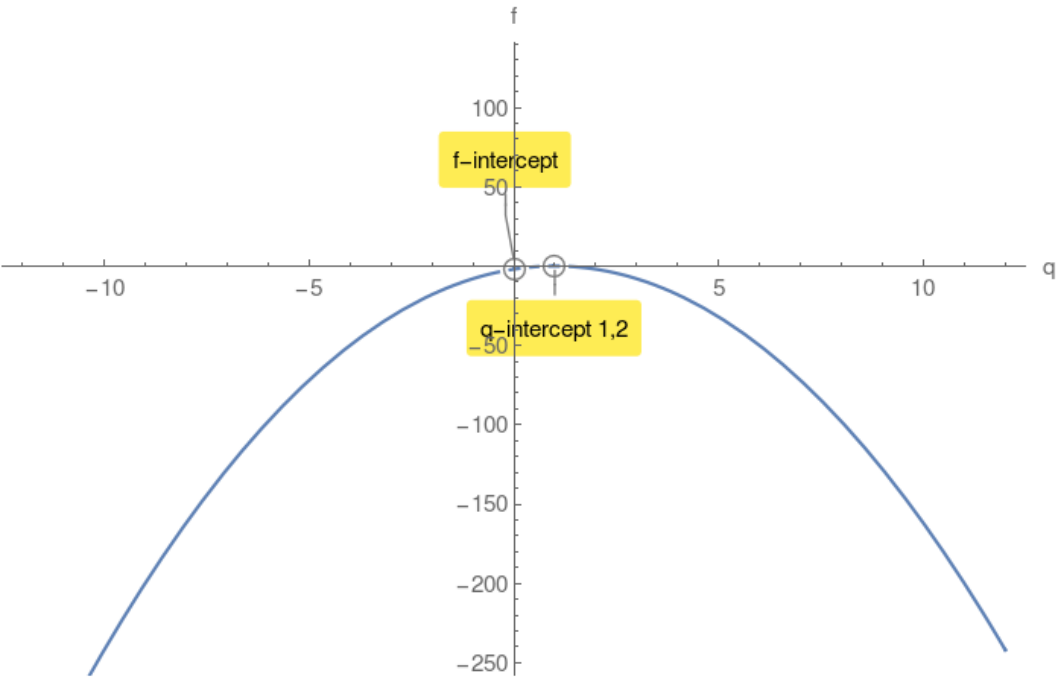
Example 2.

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

$\triangle=0$

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

$f(0)=-2$ f-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 f-intercept.

Example 3.

$f(q)=-4\,q^2+72\,q-405$ compute its discriminant $\triangle$:

$\triangle=-1296<0$

$f(0)=-405$ f-intercept.