Intercepts of the Quadratic

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

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

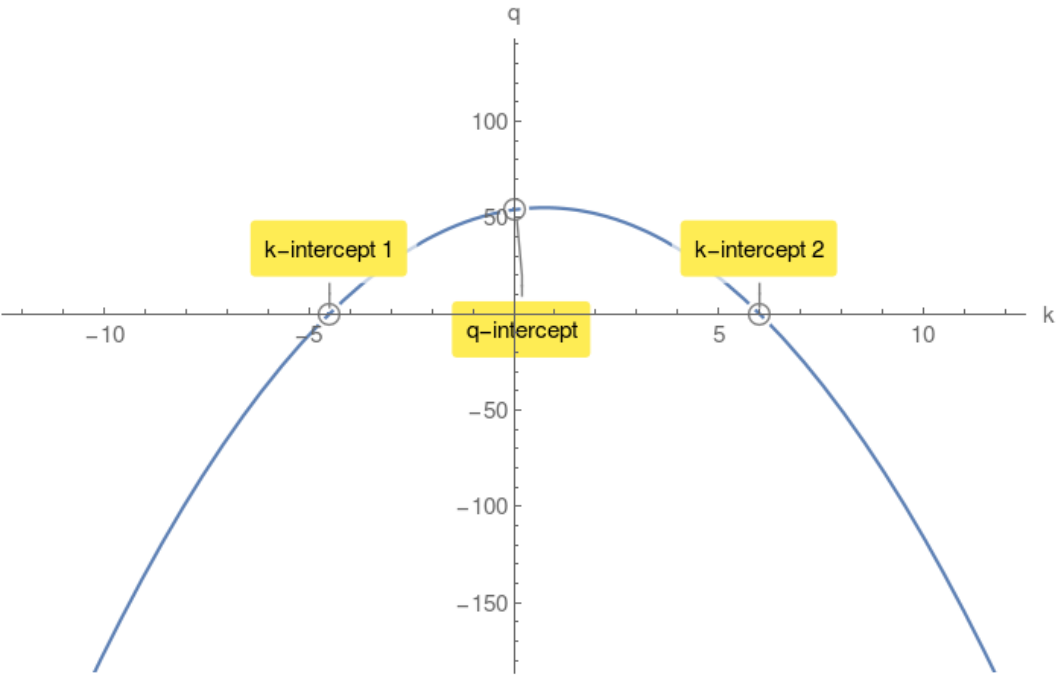
Example 1.

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

$\triangle=441>0$

$k_{1,2}=-\frac{9}{2},6$

$q(0)=54$ q-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.

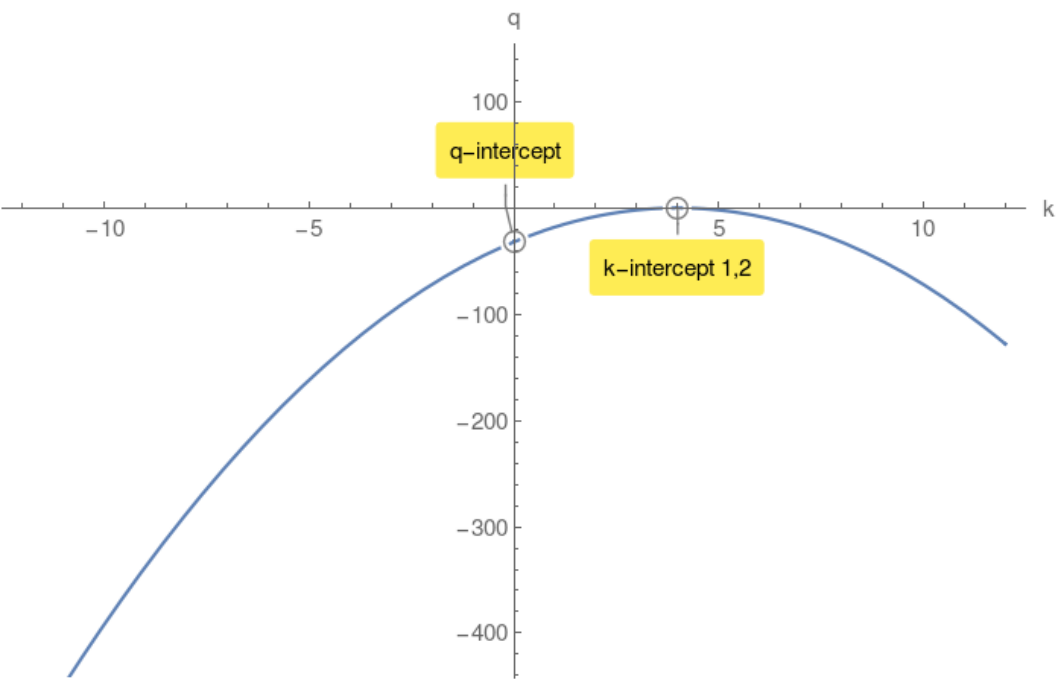
Example 2.

$q(k)=-2\,k^2+16\,k-32$ compute its discriminant $\triangle$:

$\triangle=0$

$k_{1,2}=4,4$

$q(0)=-32$ q-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 q-intercept.

Example 3.

$q(k)=-9\,k^2-144\,k-640$ compute its discriminant $\triangle$:

$\triangle=-2304<0$

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