Intercepts of the Quadratic

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

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

Case1: $\triangle>0$

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

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

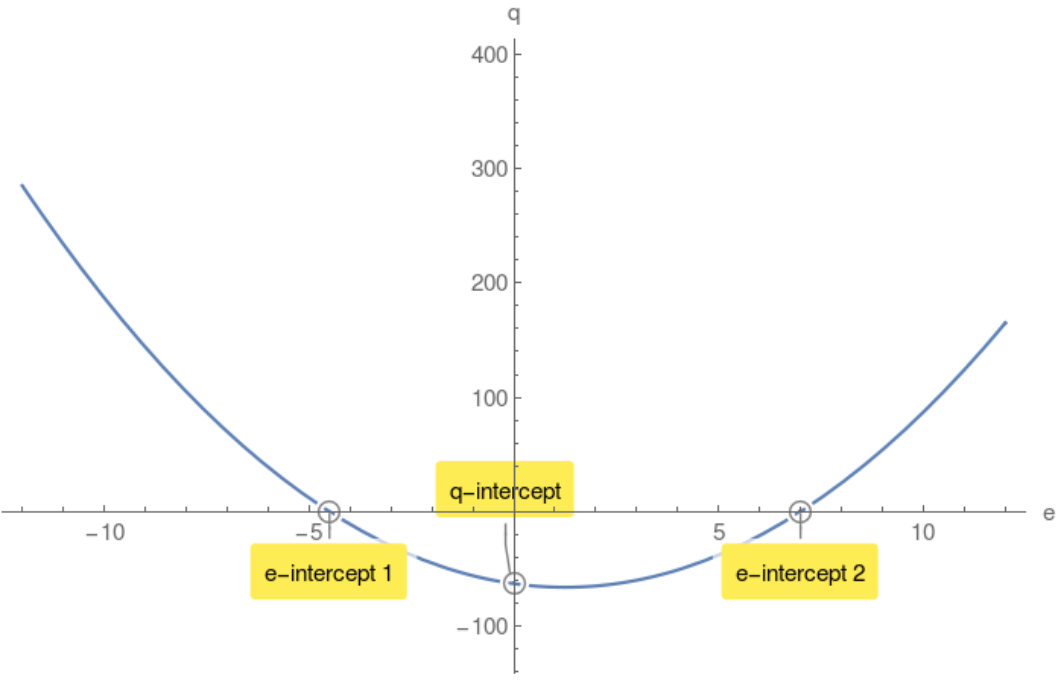
Example 1.

$q(e)=2\,e^2-5\,e-63$ compute its discriminant $\triangle$:

$\triangle=529>0$

$e_{1,2}=-\frac{9}{2},7$

$q(0)=-63$ q-intercept.



Case2: $\triangle=0$

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

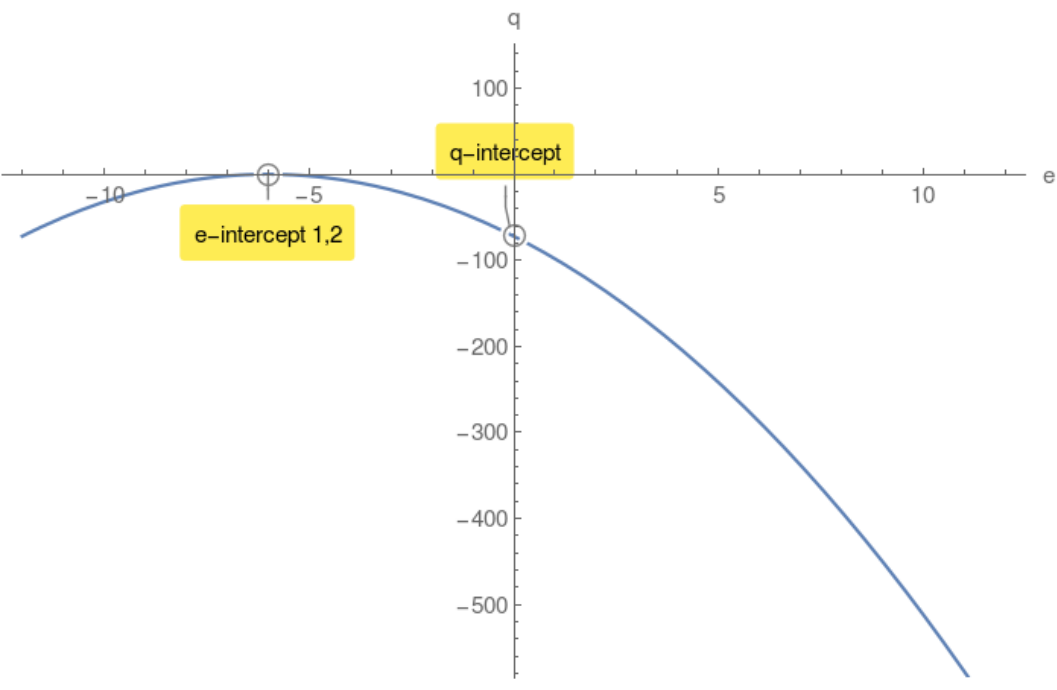
Example 2.

$q(e)=-2\,e^2-24\,e-72$ compute its discriminant $\triangle$:

$\triangle=0$

$e_{1,2}=-6,-6$

$q(0)=-72$ q-intercept.



Case3: $\triangle<0$

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

However there is a q-intercept.

Example 3.

$q(e)=-4\,e^2-64\,e-320$ compute its discriminant $\triangle$:

$\triangle=-1024<0$

$q(0)=-320$ q-intercept.