Intercepts of the Quadratic

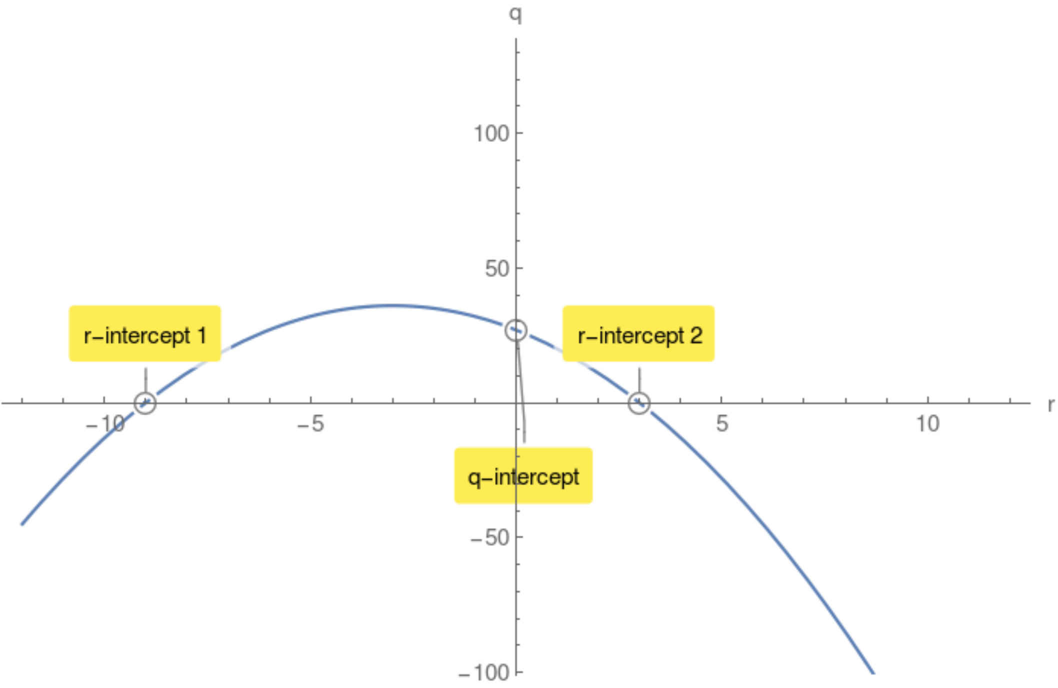
Given a quadratic $q(r)=a r^2+b r+c$ compute its discriminant $\triangle$:
$\triangle=\sqrt{b^2-4ac}$

Case1: $\triangle>0$

$r_{1,2}=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$ computes the r-intercepts of multiplicity 1.
$q(0)=c$ computes the single q-intercept.

Example 1.

$q(r)=-r^2-6r+27$ compute its discriminant $\triangle$:
$\triangle=144>0$
$r_{1,2}=-9,3$
$q(0)=27$ q-intercept.

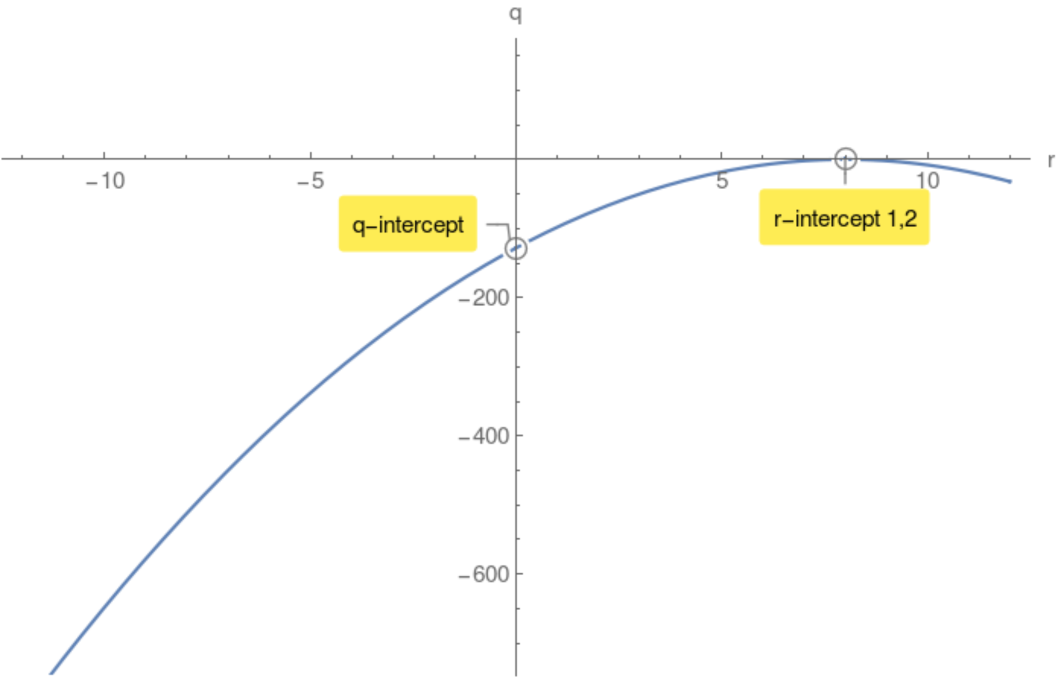


Case2: $\triangle=0$

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

Example 2.

$q(r)=-2r^2+32r-128$ compute its discriminant $\triangle$:
$\triangle=0$
$r_{1,2}=8,8$
$q(0)=-128$ q-intercept.



Case3: $\triangle<0$

$\sqrt{b^2-4ac}$ has no value in Real Numbers. Therefore there are no r-intercepts.
However there is a q-intercept.

Example 3.

$q(r)=-9r^2+180r-1000$ compute its discriminant $\triangle$:
$\triangle=-3600<0$
$q(0)=-1000$ q-intercept.