Intercepts of the Quadratic

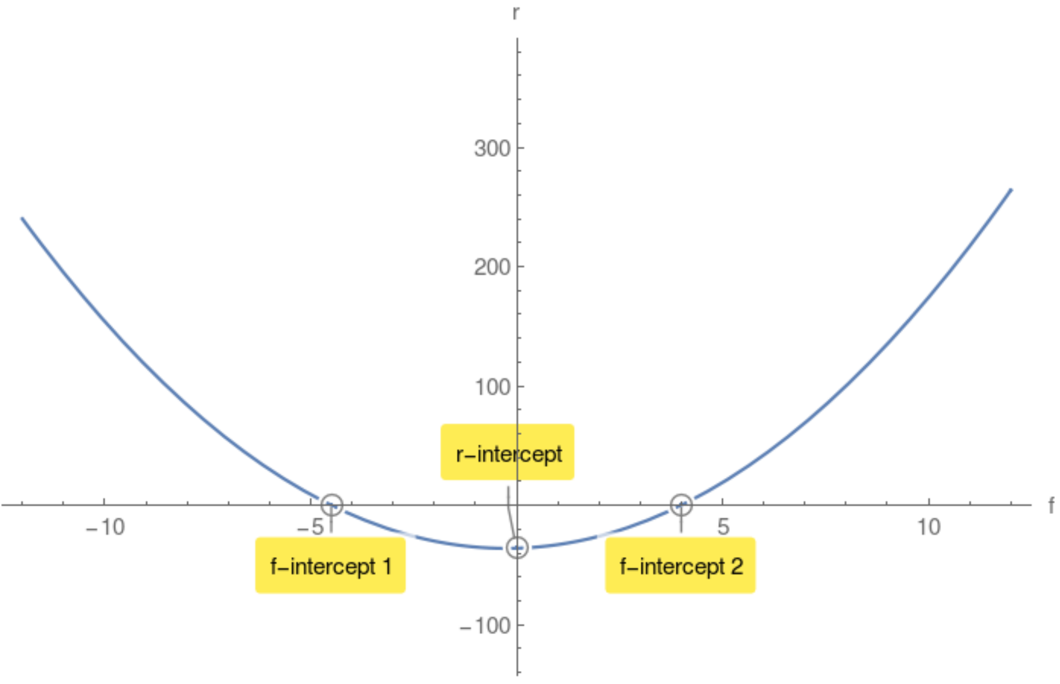
Given a quadratic $r(f)=a f^2+b f+c$ compute its discriminant Δ:
$\Delta=\sqrt{b^2-4ac}$

Case1: $\Delta>0$

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

Example 1.

$r(f)=2f^2+f-36$ compute its discriminant Δ:
$\Delta=289>0$
$f_{1,2}=-\frac{9}{2},4$
$r(0)=-36$ r-intercept.

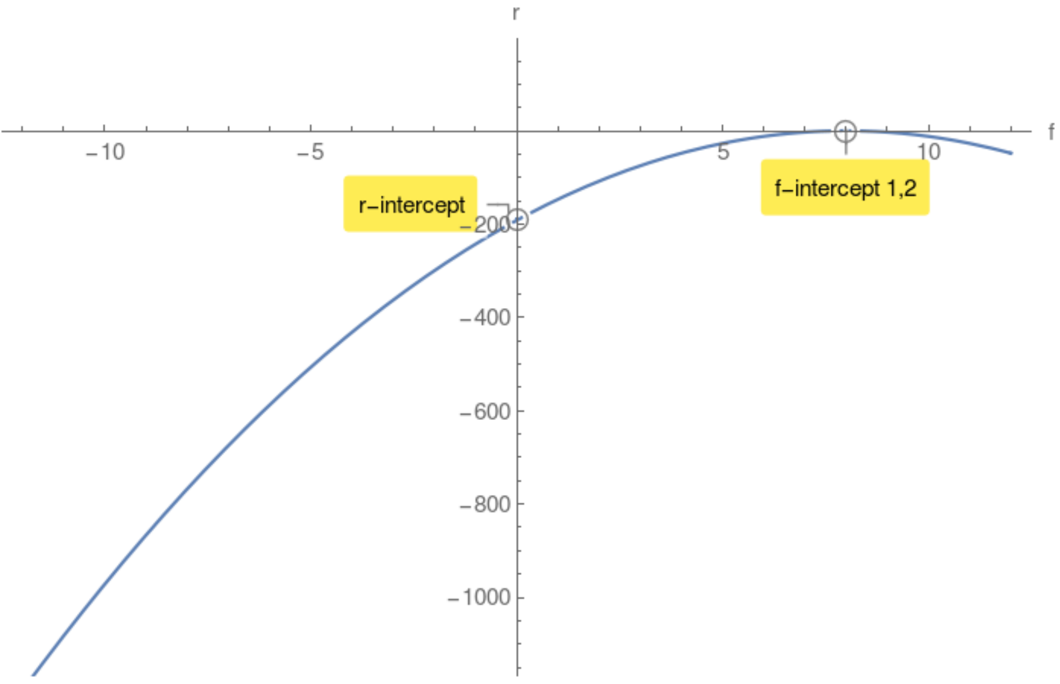


Case2: $\Delta=0$

$f_{1,2}=\frac{-b\pm\sqrt{b^2-4ac}}{2a}=\frac{-b\pm 0}{2a}=\frac{-b}{2a}$ single f-intercept of multiplicity 2.

Example 2.

$r(f)=-3f^2+48f-192$ compute its discriminant Δ:
$\Delta=0$
$f_{1,2}=8,8$
$r(0)=-192$ r-intercept.



Case3: $\Delta<0$

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

Example 3.

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