Intercepts of the Quadratic

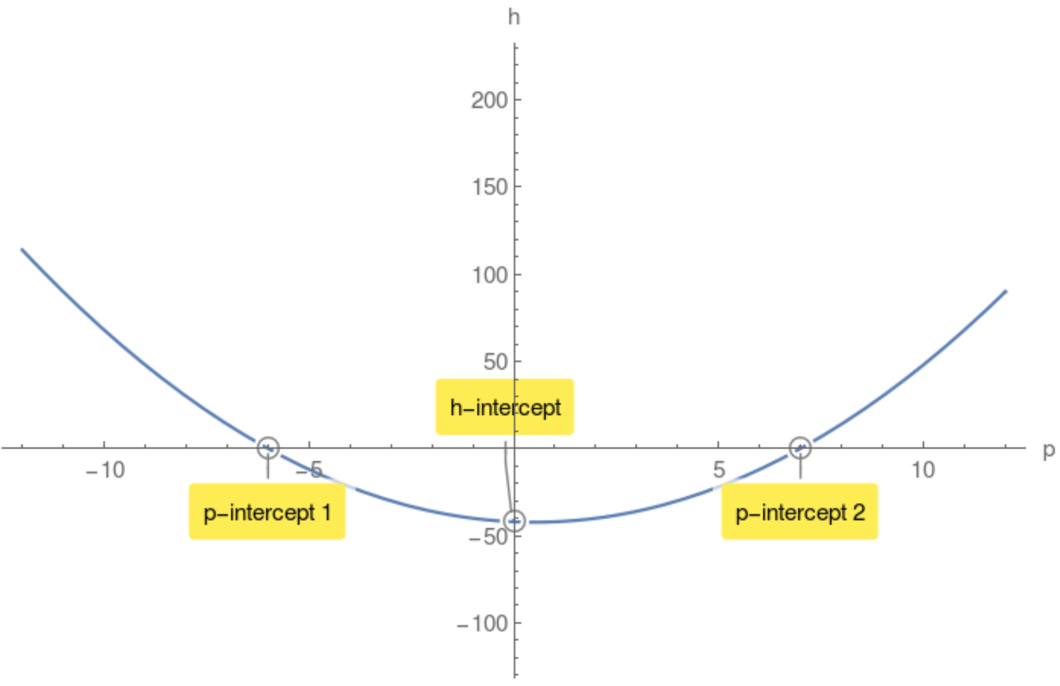
Given a quadratic $h(p)=a p^2+b p+c$ compute its discriminant Δ:
$\Delta=\sqrt{b^2-4ac}$

Case1: $\Delta>0$

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

Example 1.

$h(p)=p^2-p-42$ compute its discriminant Δ:
$\Delta=169>0$
$p_{1,2}=-6,7$
$h(0)=-42$ h-intercept.

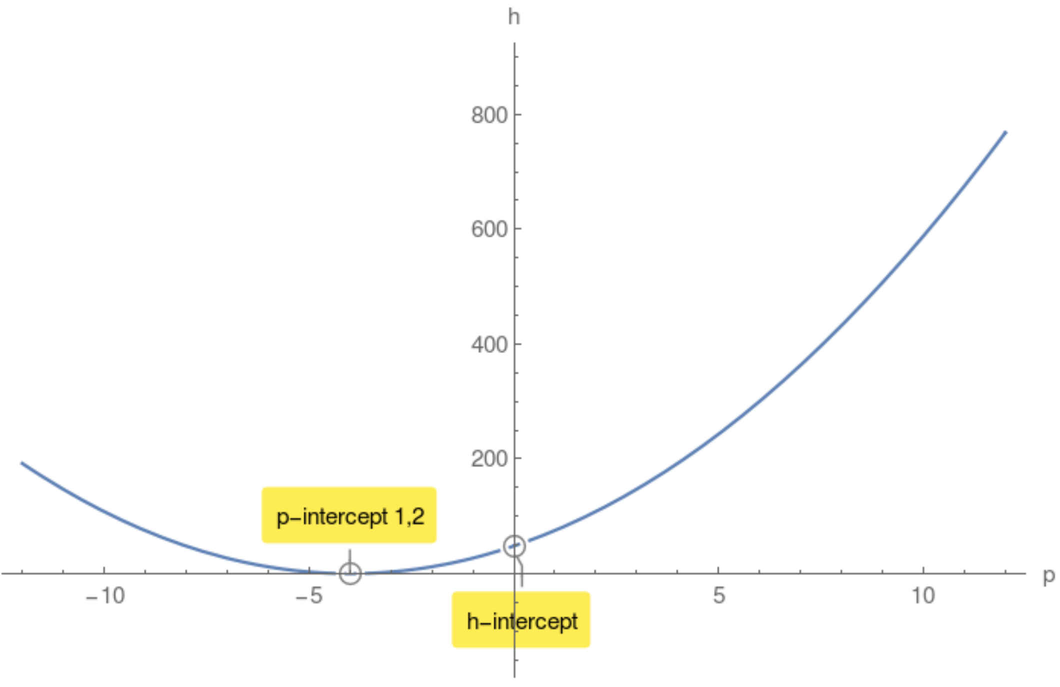


Case2: $\Delta=0$

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

Example 2.

$h(p)=3p^2+24p+48$ compute its discriminant Δ:
$\Delta=0$
$p_{1,2}=-4,-4$
$h(0)=48$ h-intercept.



Case3: $\Delta<0$

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

Example 3.

$h(p)=4p^2+80p+500$ compute its discriminant Δ:
$\Delta=-1600<0$
$h(0)=500$ h-intercept.