Intercepts of the Quadratic

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

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

Case1: $\triangle>0$

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

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

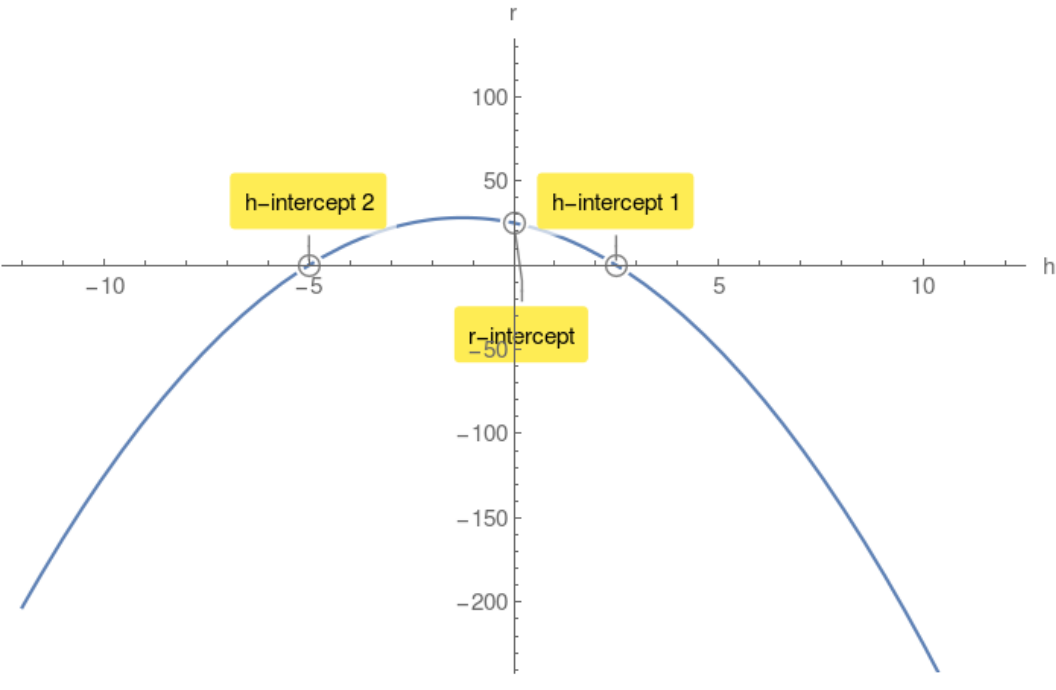
Example 1.

$r(h)=-2\,h^2-5\,h+25$ compute its discriminant $\triangle$:

$\triangle=225>0$

$h_{1,2}=\frac{5}{2},-5$

$r(0)=25$ r-intercept.



Case2: $\triangle=0$

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

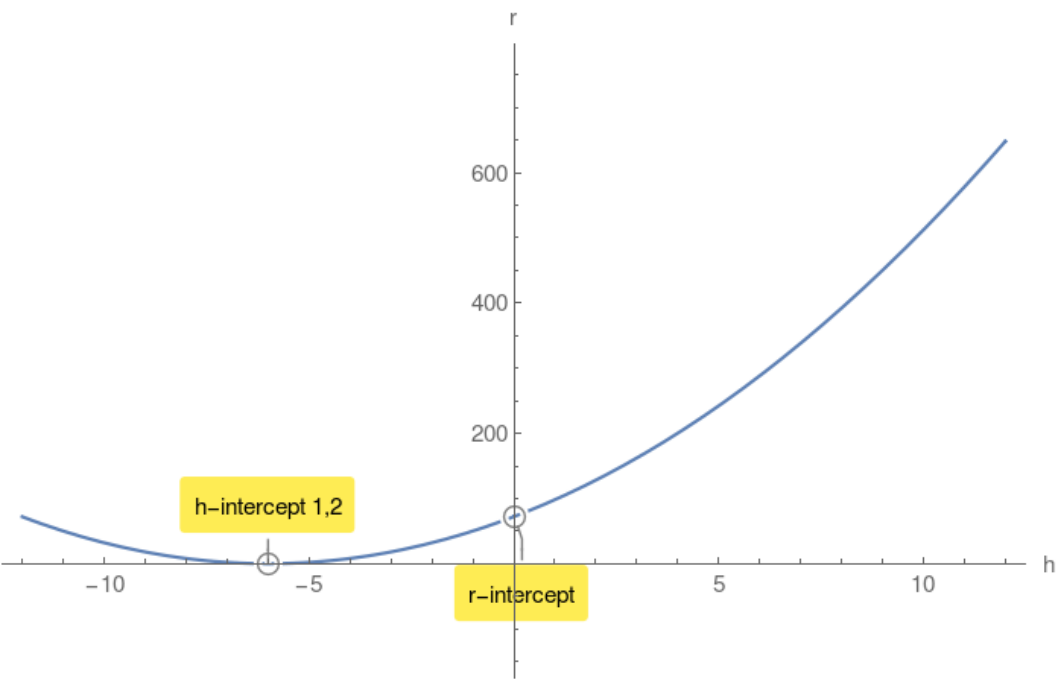
Example 2.

$r(h)=2\,h^2+24\,h+72$ compute its discriminant $\triangle$:

$\triangle=0$

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

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



Case3: $\triangle<0$

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

However there is a r-intercept.

Example 3.

$r(h)=-4\,h^2+80\,h-500$ compute its discriminant $\triangle$:

$\triangle=-1600<0$

$r(0)=-500$ r-intercept.