Intercepts of the Quadratic

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

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

Case1: $\triangle>0$

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

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

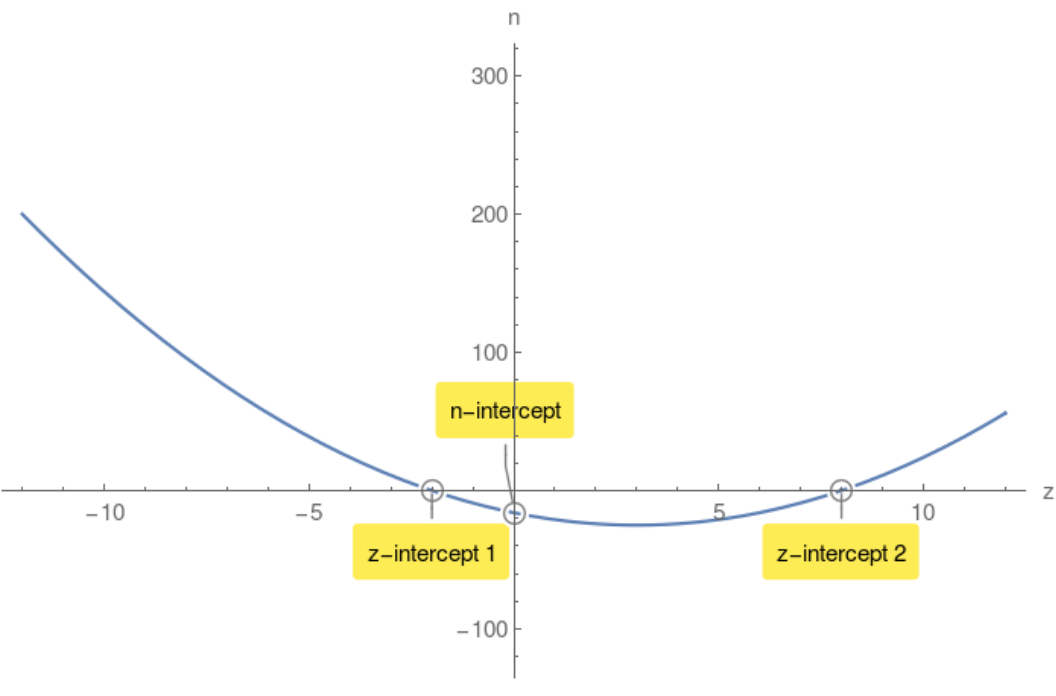
Example 1.

$n(z)=z^2-6\,z-16$ compute its discriminant $\triangle$:

$\triangle=100>0$

$z_{1,2}=-2,8$

$n(0)=-16$ n-intercept.



Case2: $\triangle=0$

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

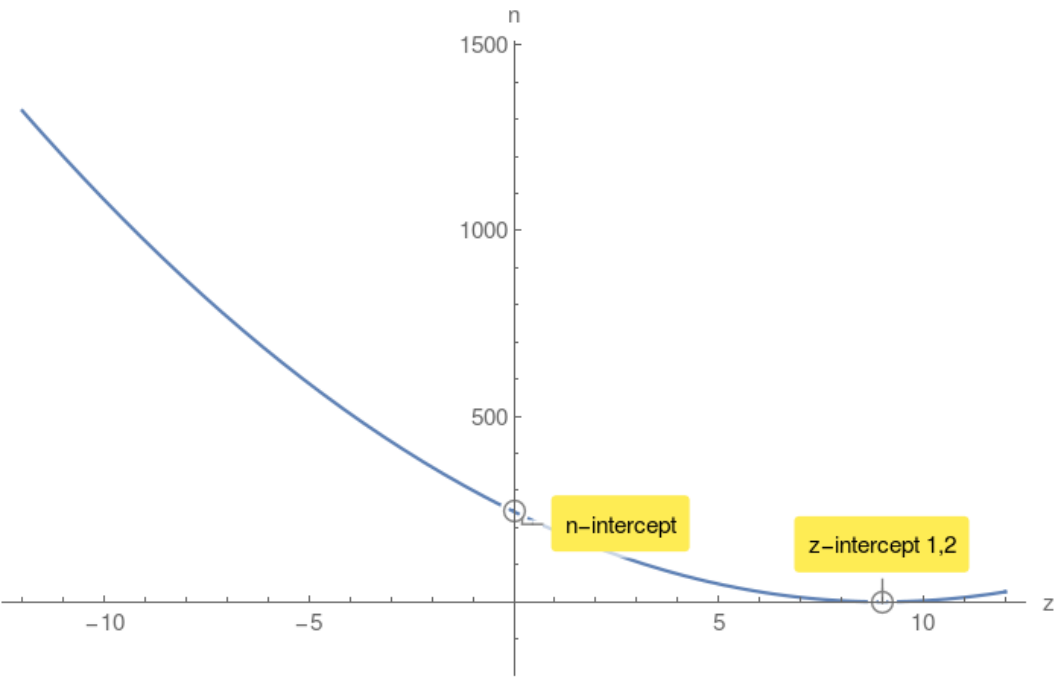
Example 2.

$n(z)=3\,z^2-54\,z+243$ compute its discriminant $\triangle$:

$\triangle=0$

$z_{1,2}=9,9$

$n(0)=243$ n-intercept.



Case3: $\triangle<0$

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

However there is a n-intercept.

Example 3.

$n(z)=-9\,z^2-126\,z-490$ compute its discriminant $\triangle$:

$\triangle=-1764<0$

$n(0)=-490$ n-intercept.