Intercepts of the Quadratic

Given a quadratic $g(z)=a\,z^2+b\,z+c$ 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.

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

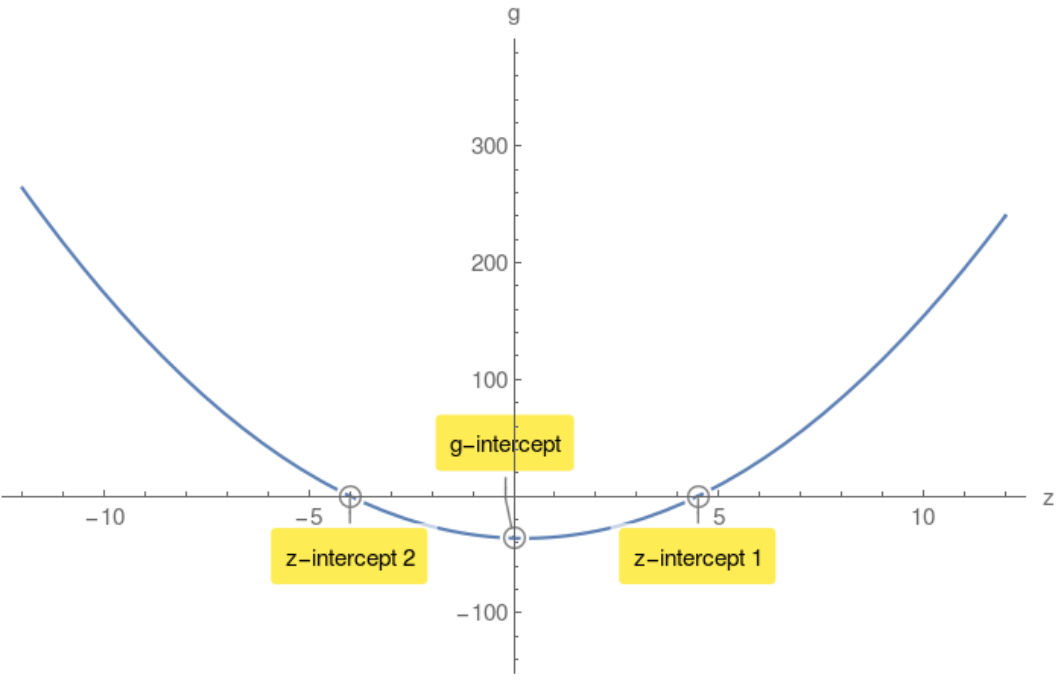
Example 1.

$g(z)=2\,z^2-z-36$ compute its discriminant $\triangle$:

$\triangle=289>0$

$z_{1,2}=\frac{9}{2},-4$

$g(0)=-36$ g-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.

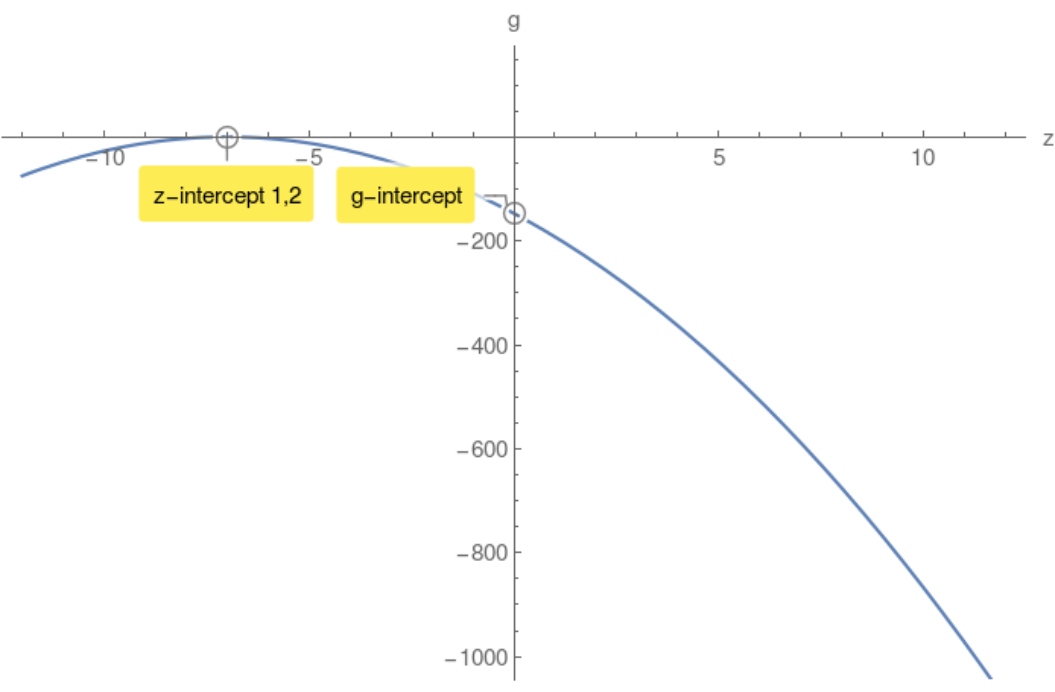
Example 2.

$g(z)=-3\,z^2-42\,z-147$ compute its discriminant $\triangle$:

$\triangle=0$

$z_{1,2}=-7,-7$

$g(0)=-147$ g-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 g-intercept.

Example 3.

$g(z)=-4\,z^2+56\,z-245$ compute its discriminant $\triangle$:

$\triangle=-784<0$

$g(0)=-245$ g-intercept.