Intercepts of the Quadratic

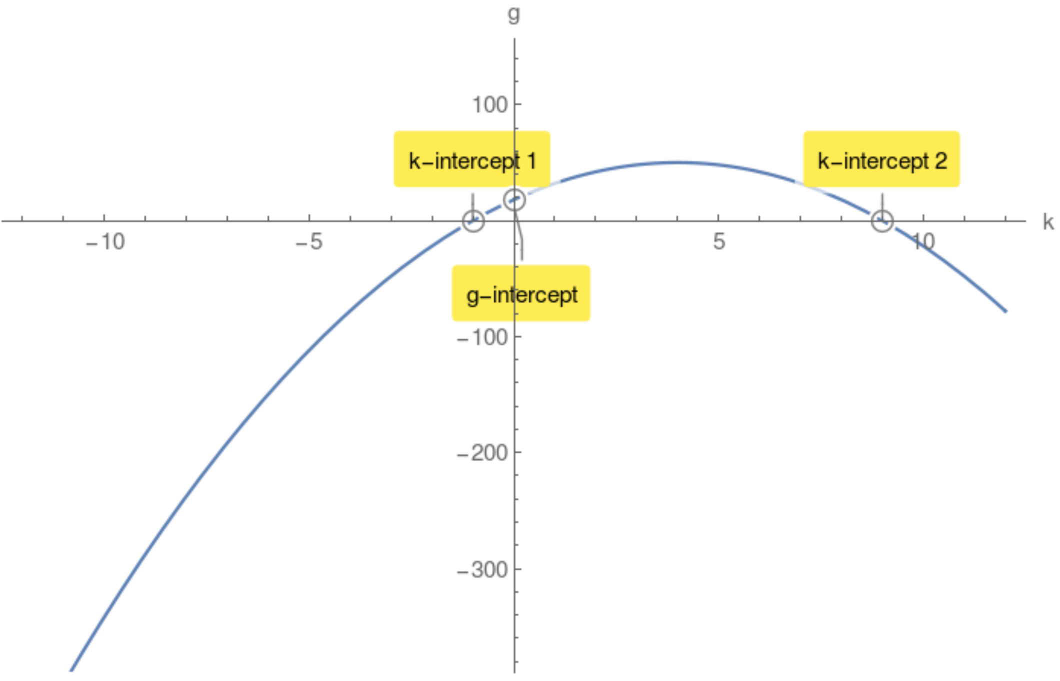
Given a quadratic $g(k) = a\,k^2 + b\,k + c$ compute its discriminant $\triangle$:
$\triangle = \sqrt{b^2 - 4\,ac}$

Case1: $\triangle > 0$

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

Example 1.

$g(k) = -2\,k^2 + 16\,k + 18$ compute its discriminant $\triangle$:
$\triangle = 400 > 0$
$k_{1,2} = -1, 9$
$g(0) = 18$ g-intercept.

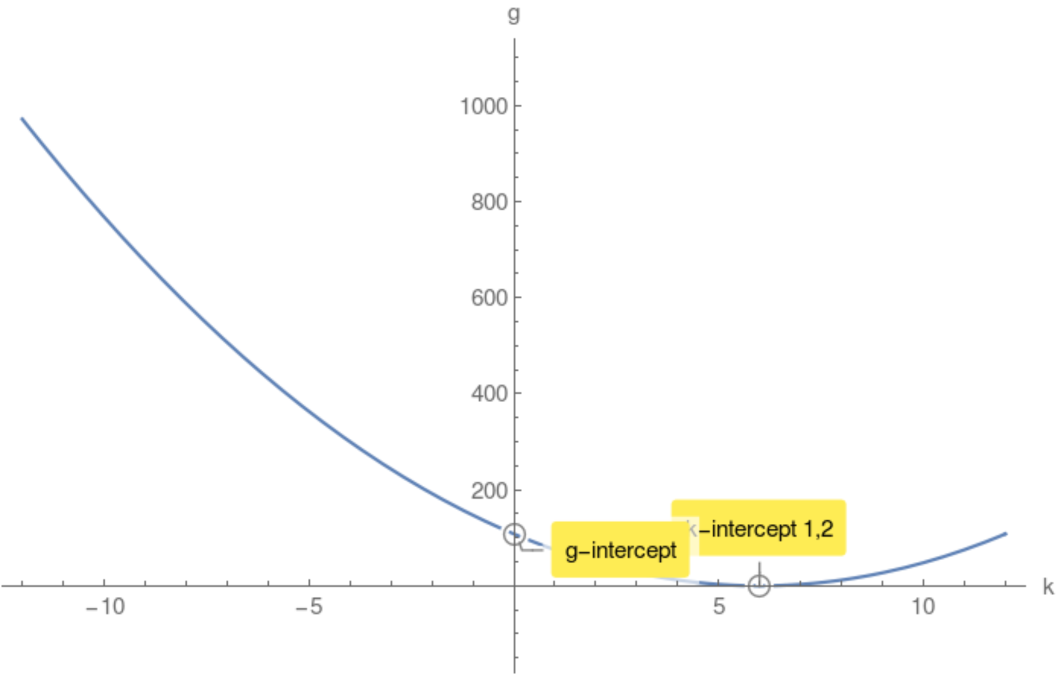


Case2: $\triangle = 0$

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

Example 2.

$g(k) = 3\,k^2 - 36\,k + 108$ compute its discriminant $\triangle$:
$\triangle = 0$
$k_{1,2} = 6, 6$
$g(0) = 108$ g-intercept.



Case3: $\triangle < 0$

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

Example 3.

$g(k) = -9\,k^2 - 162\,k - 810$ compute its discriminant $\triangle$:
$\triangle = -2916 < 0$
$g(0) = -810$ g-intercept.