Intercepts of the Quadratic

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

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

Case1: $\triangle > 0$

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

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

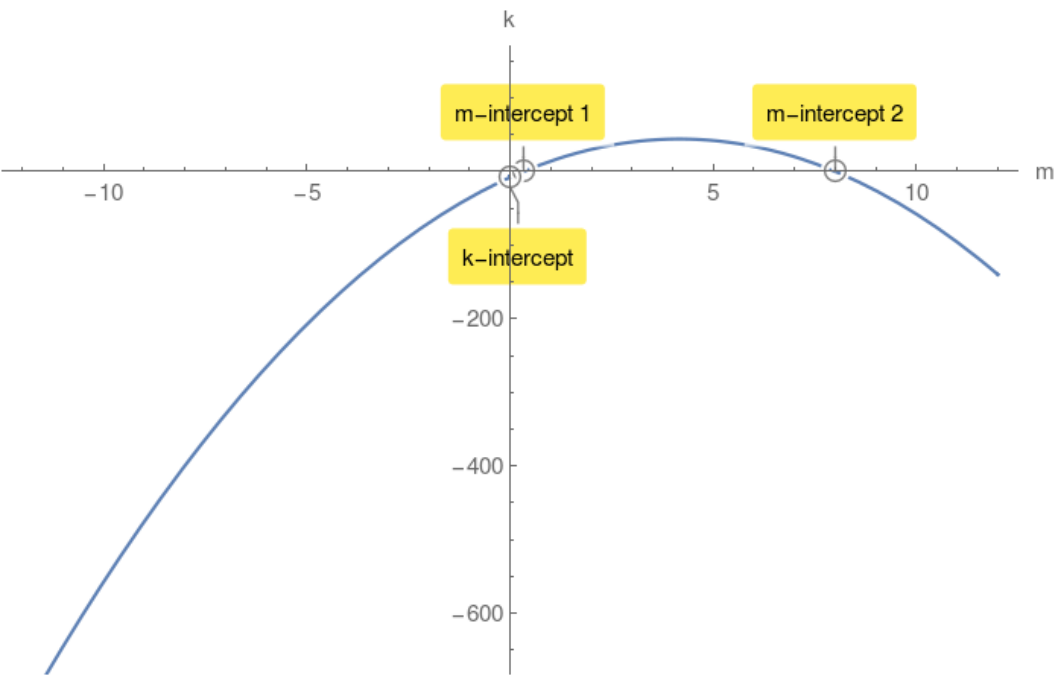
Example 1.

$k(m) = -3\,m^2 + 25\,m - 8$ compute its discriminant $\triangle$:

$\triangle = 529 > 0$

$m_{1,2} = \frac{1}{3}, 8$

$k(0) = -8$ k-intercept.



Case2: $\triangle = 0$

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

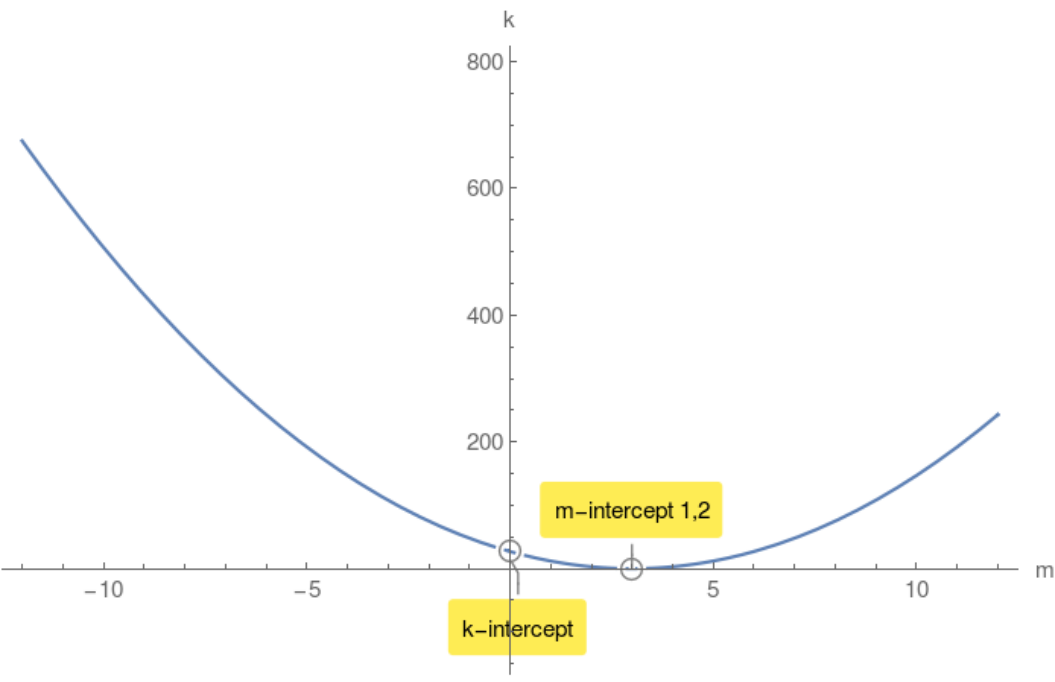
Example 2.

$k(m) = 3\,m^2 - 18\,m + 27$ compute its discriminant $\triangle$:

$\triangle = 0$

$m_{1,2} = 3, 3$

$k(0) = 27$ k-intercept.



Case3: $\triangle < 0$

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

Example 3.

$k(m) = -9\,m^2 - 162\,m - 810$ compute its discriminant $\triangle$:

$\triangle = -2916 < 0$

$k(0) = -810$ k-intercept.