Intercepts of the Quadratic

Given a quadratic $q(m) = a m^2 + b m + c$ 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.

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

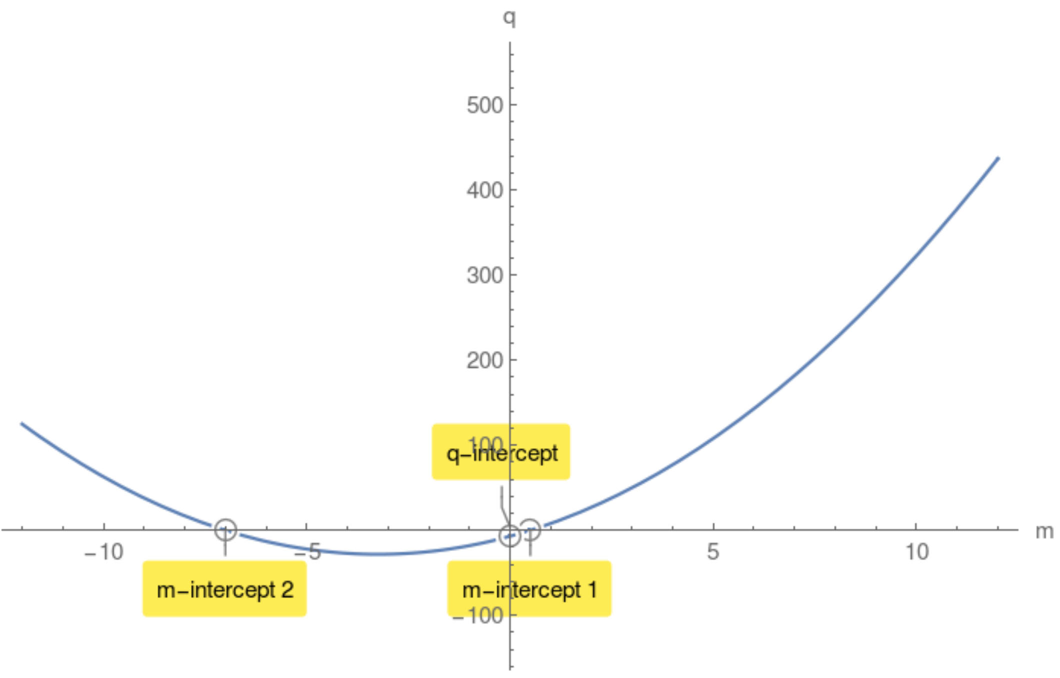
Example 1.

$q(m) = 2 m^2 + 13 m - 7$ compute its discriminant $\triangle$:

$\triangle = 225 > 0$

$m_{1,2} = \frac{1}{2}, -7$

$q(0) = -7$ q-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.

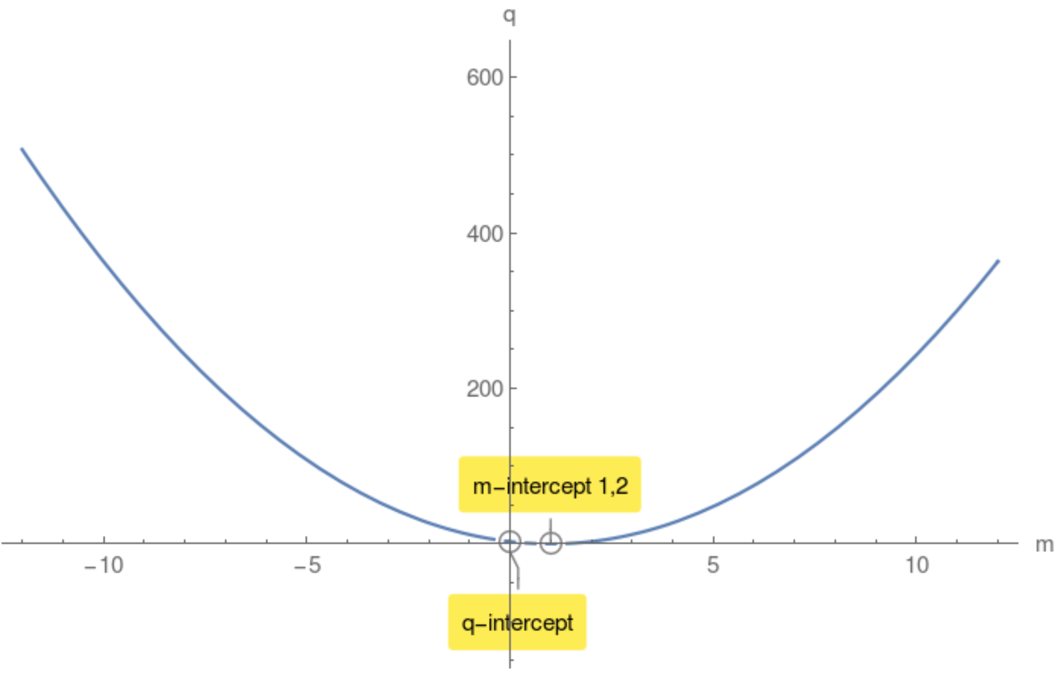
Example 2.

$q(m) = 3 m^2 - 6 m + 3$ compute its discriminant $\triangle$:

$\triangle = 0$

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

$q(0) = 3$ q-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 q-intercept.

Example 3.

$q(m) = -4 m^2 + 64 m - 320$ compute its discriminant $\triangle$:

$\triangle = -1024 < 0$

$q(0) = -320$ q-intercept.