Intercepts of the Quadratic

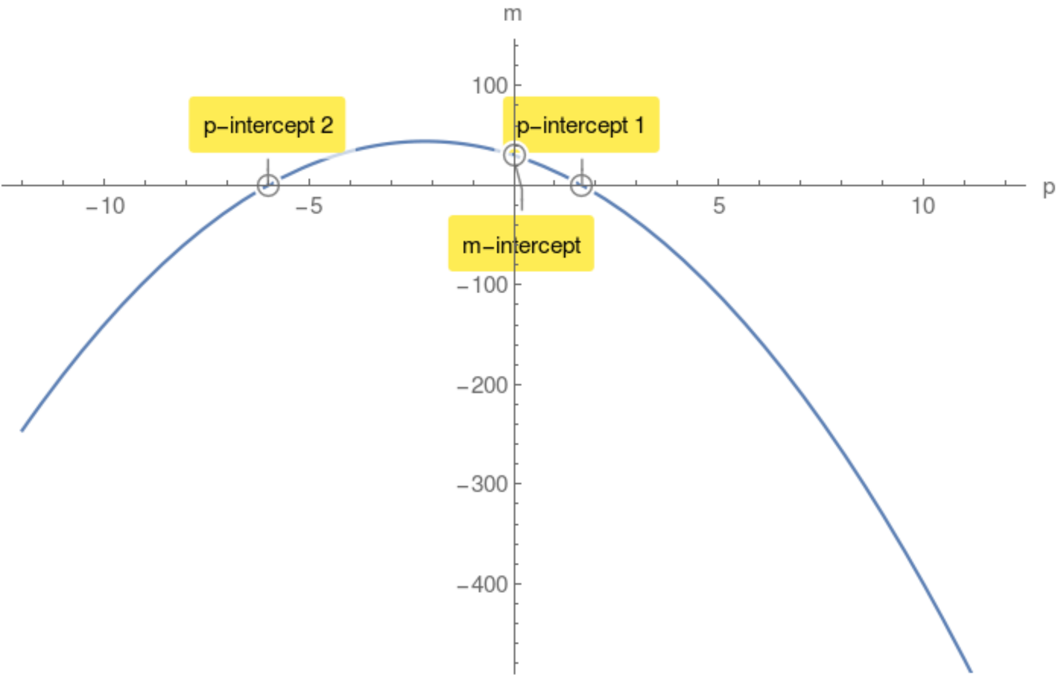
Given a quadratic $m(p) = a\,p^2 + b\,p + c$ compute its discriminant $\triangle$:
$\triangle = \sqrt{b^2 - 4\,ac}$

Case1: $\triangle > 0$

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

Example 1.

$m(p) = -3\,p^2 - 13\,p + 30$ compute its discriminant $\triangle$:
$\triangle = 529 > 0$
$p_{1,2} = \frac{5}{3}, -6$
$m(0) = 30$ m-intercept.

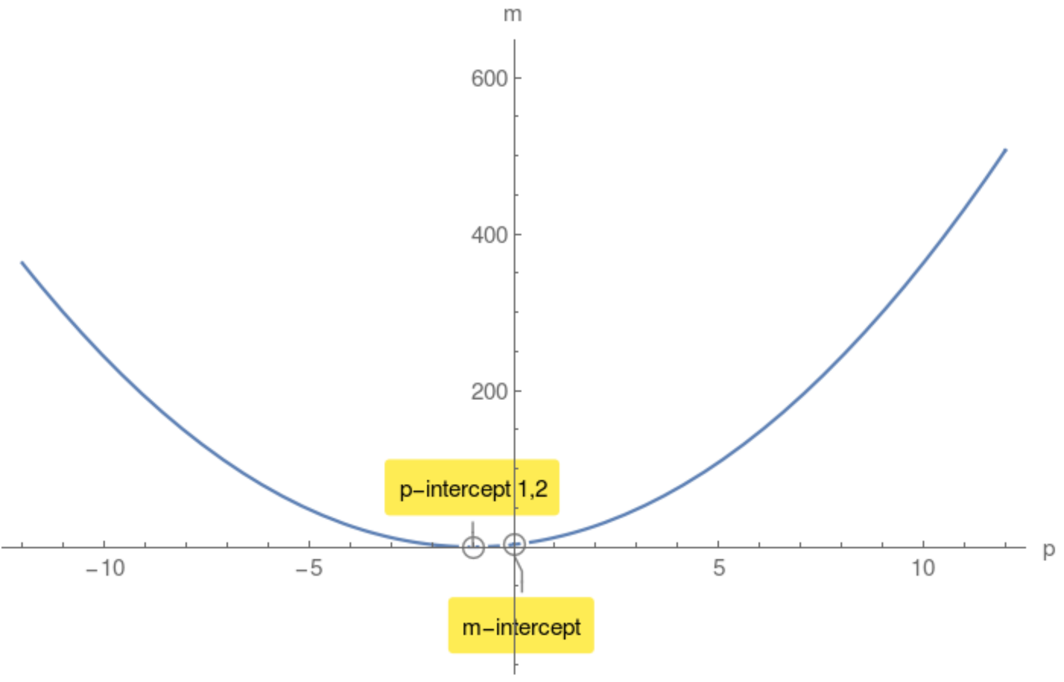


Case2: $\triangle = 0$

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

Example 2.

$m(p) = 3\,p^2 + 6\,p + 3$ compute its discriminant $\triangle$:
$\triangle = 0$
$p_{1,2} = -1, -1$
$m(0) = 3$ m-intercept.



Case3: $\triangle < 0$

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

Example 3.

$m(p) = 4\,p^2 - 56\,p + 245$ compute its discriminant $\triangle$:
$\triangle = -784 < 0$
$m(0) = 245$ m-intercept.