# Intercepts of the Quadratic

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

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

## Case1: $\triangle > 0$

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

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

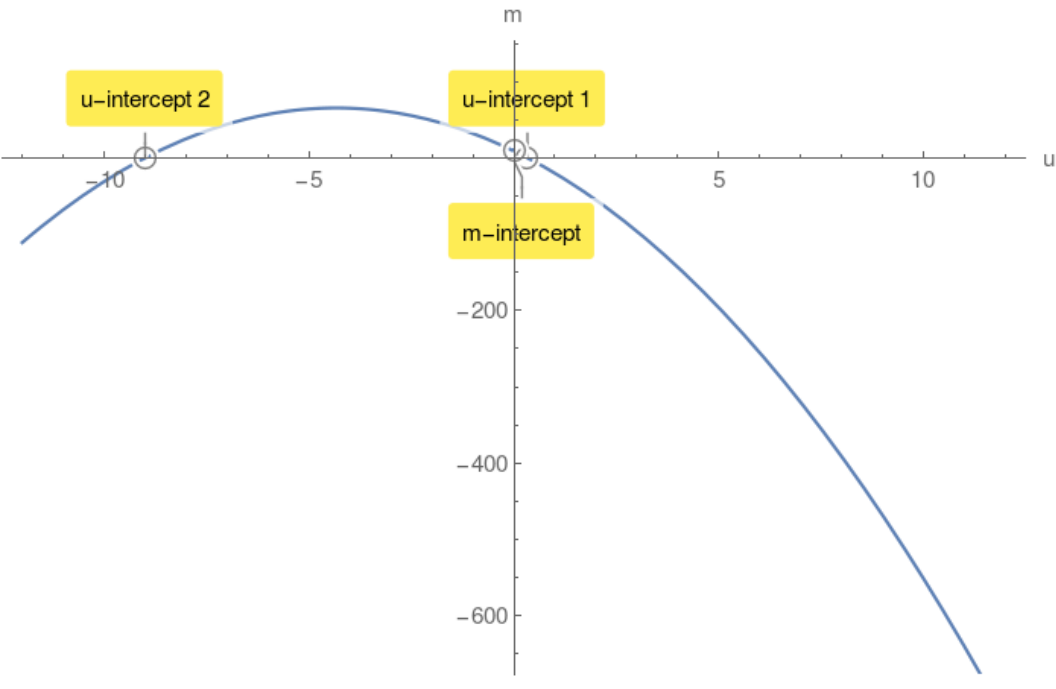
## Example 1.

$m(u) = -3\,u^2 - 26\,u + 9$ compute its discriminant $\triangle$:

$\triangle = 784 > 0$

$u_{1,2} = \frac{1}{3}, -9$

$m(0) = 9$ m-intercept.




## Case2: $\triangle = 0$

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

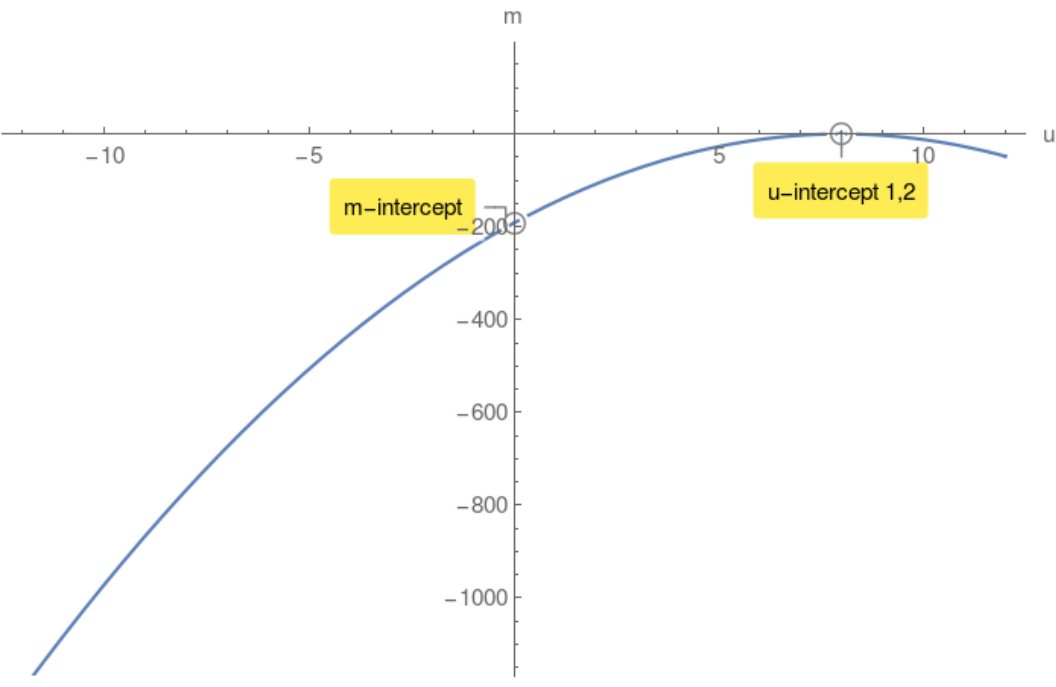
## Example 2.

$m(u) = -3\,u^2 + 48\,u - 192$ compute its discriminant $\triangle$:

$\triangle = 0$

$u_{1,2} = 8, 8$

$m(0) = -192$ m-intercept.




## Case3: $\triangle < 0$

$\sqrt{b^2 - 4\,ac}$ has no value in Real Numbers. Therefore there are no u-intercepts.

However there is a m-intercept.

## Example 3.

$m(u) = 4\,u^2 - 80\,u + 500$ compute its discriminant $\triangle$:

$\triangle = -1600 < 0$

$m(0) = 500$ m-intercept.