# Intercepts of the Quadratic

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

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

## Case1: $\Delta > 0$

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

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

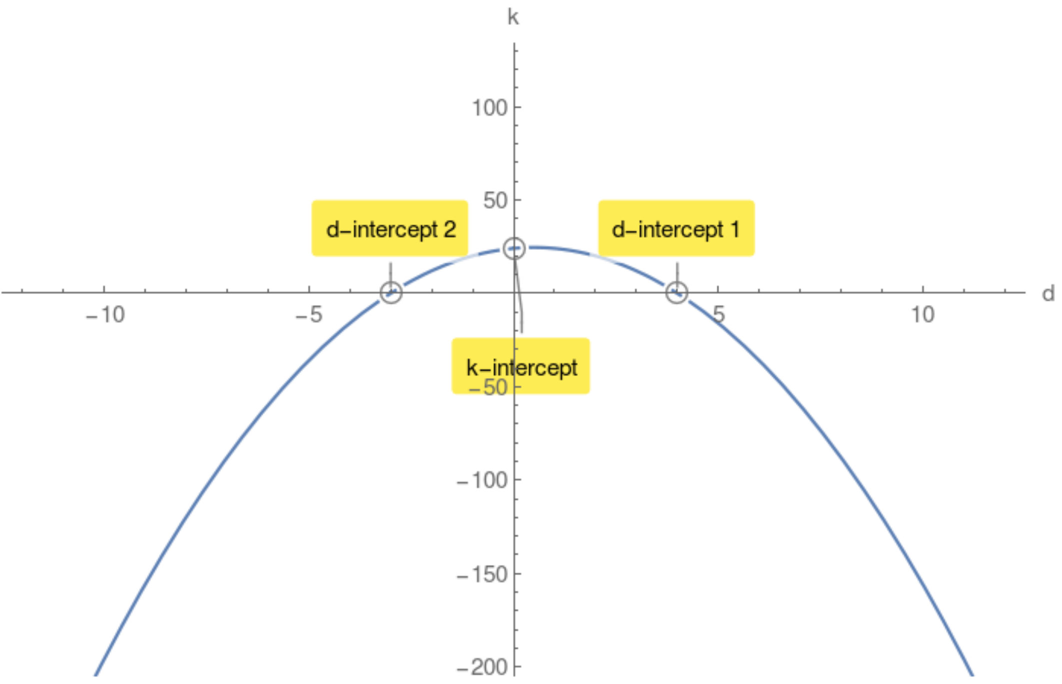
## Example 1.

$k(d) = -2\,d^2 + 2\,d + 24$ compute its discriminant $\Delta$:

$\Delta = 196 > 0$

$d_{1,2} = 4, -3$

$k(0) = 24$ k-intercept.




## Case2: $\Delta = 0$

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

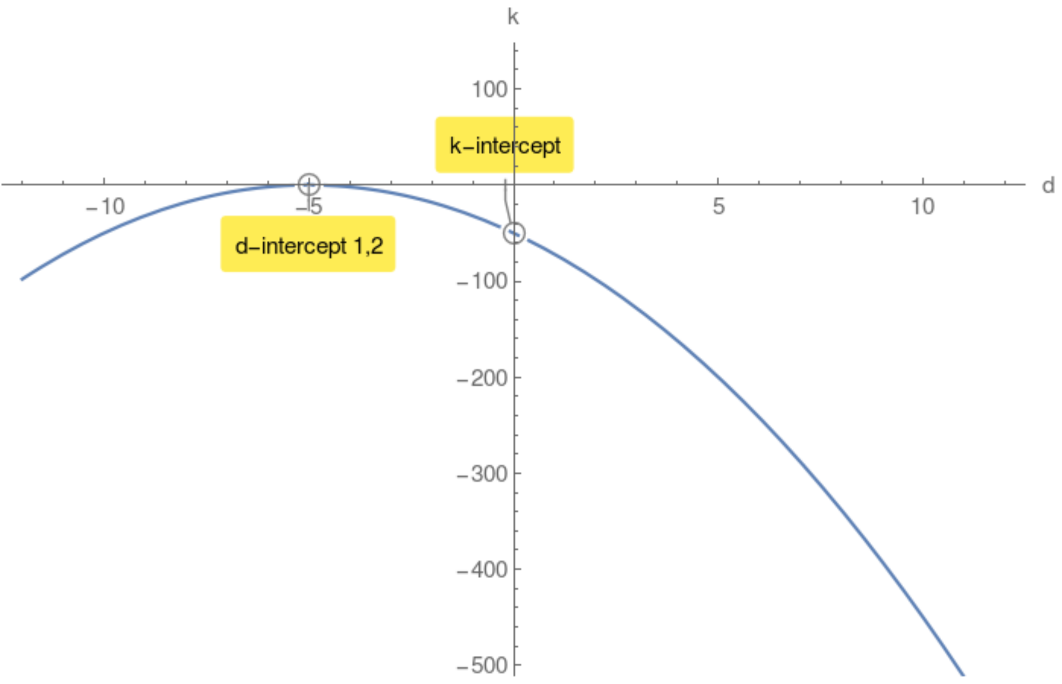
## Example 2.

$k(d) = -2\,d^2 - 20\,d - 50$ compute its discriminant $\Delta$:

$\Delta = 0$

$d_{1,2} = -5, -5$

$k(0) = -50$ k-intercept.




## Case3: $\Delta < 0$

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

However there is a k-intercept.

## Example 3.

$k(d) = 9\,d^2 + 162\,d + 810$ compute its discriminant $\Delta$:

$\Delta = -2916 < 0$

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