

Intercepts of the Quadratic

Given a quadratic $k(x) = ax^2 + bx + c$ compute its discriminant Δ :

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

Case1: $\Delta > 0$

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

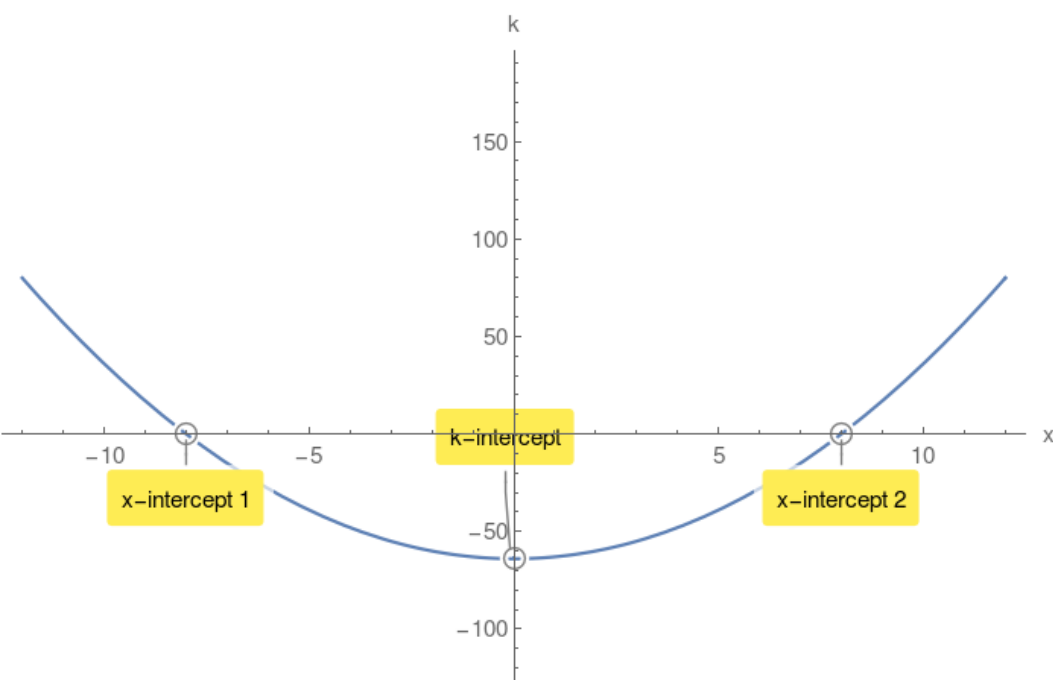
Example 1.

$k(x) = x^2 - 64$ compute its discriminant Δ :

$$\Delta = 256 > 0$$

$$x_{1,2} = -8, 8$$

$k(0) = -64$ k-intercept.



Case2: $\Delta = 0$

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

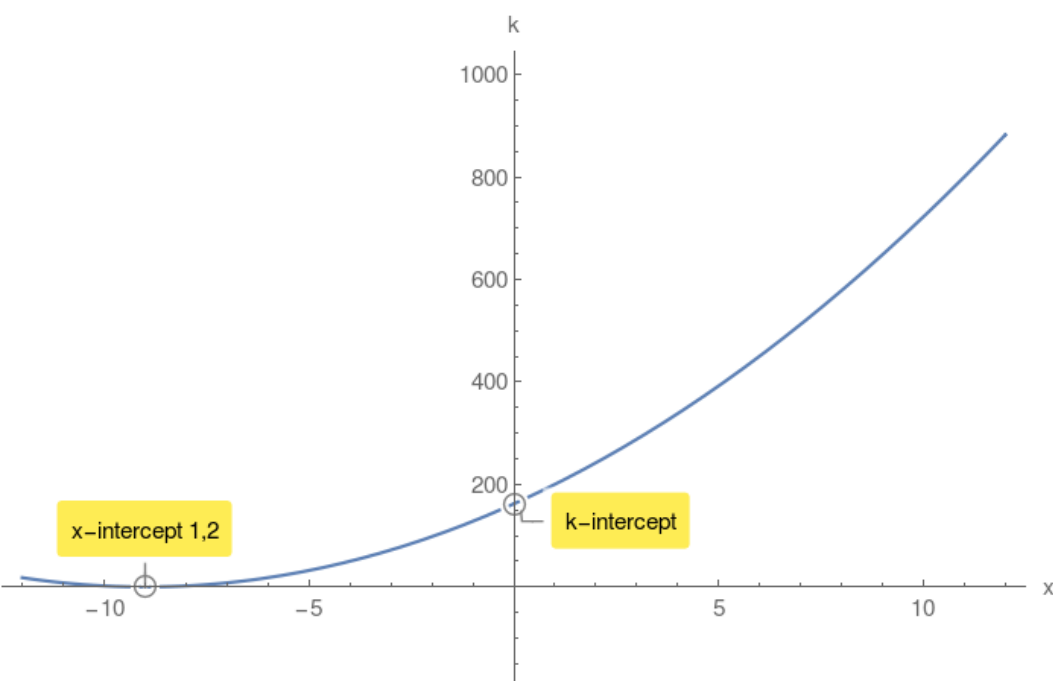
Example 2.

$k(x) = 2x^2 + 36x + 162$ compute its discriminant Δ :

$$\Delta = 0$$

$$x_{1,2} = -9, -9$$

$k(0) = 162$ k-intercept.



Case3: $\Delta < 0$

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

However there is a k-intercept.

Example 3.

$k(x) = -4x^2 + 64x - 320$ compute its discriminant Δ :

$$\Delta = -1024 < 0$$

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

