

Intercepts of the Quadratic

Given a quadratic $e(f) = a f^2 + b f + c$ compute its discriminant Δ :

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

Case1: $\Delta > 0$

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

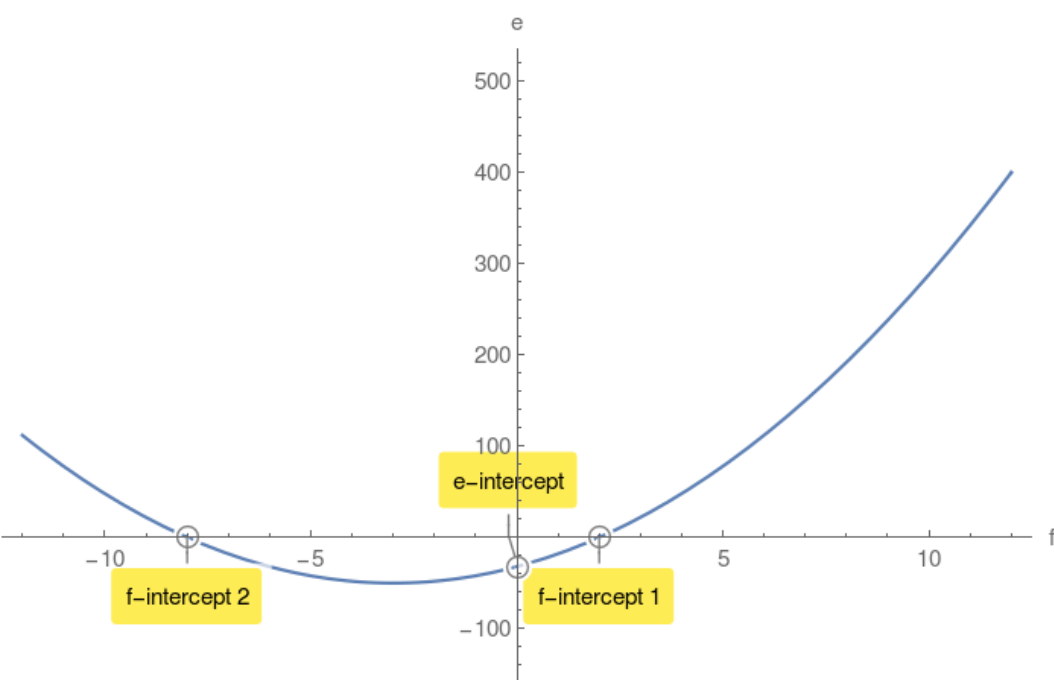
Example 1.

$e(f) = 2 f^2 + 12 f - 32$ compute its discriminant Δ :

$$\Delta = 400 > 0$$

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

$e(0) = -32$ e-intercept.



Case2: $\Delta = 0$

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

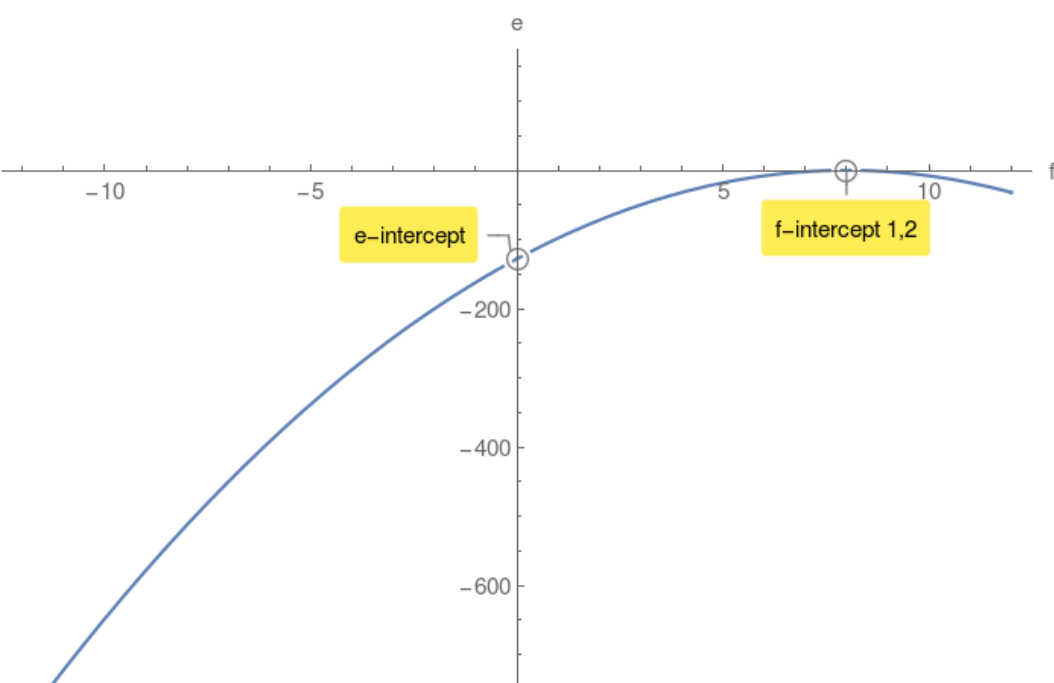
Example 2.

$e(f) = -2 f^2 + 32 f - 128$ compute its discriminant Δ :

$$\Delta = 0$$

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

$e(0) = -128$ e-intercept.



Case3: $\Delta < 0$

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

However there is a e-intercept.

Example 3.

$e(f) = 9 f^2 - 144 f + 640$ compute its discriminant Δ :

$$\Delta = -2304 < 0$$

$e(0) = 640$ e-intercept.

