

Intercepts of the Quadratic

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

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

Case1: $\Delta > 0$

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

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

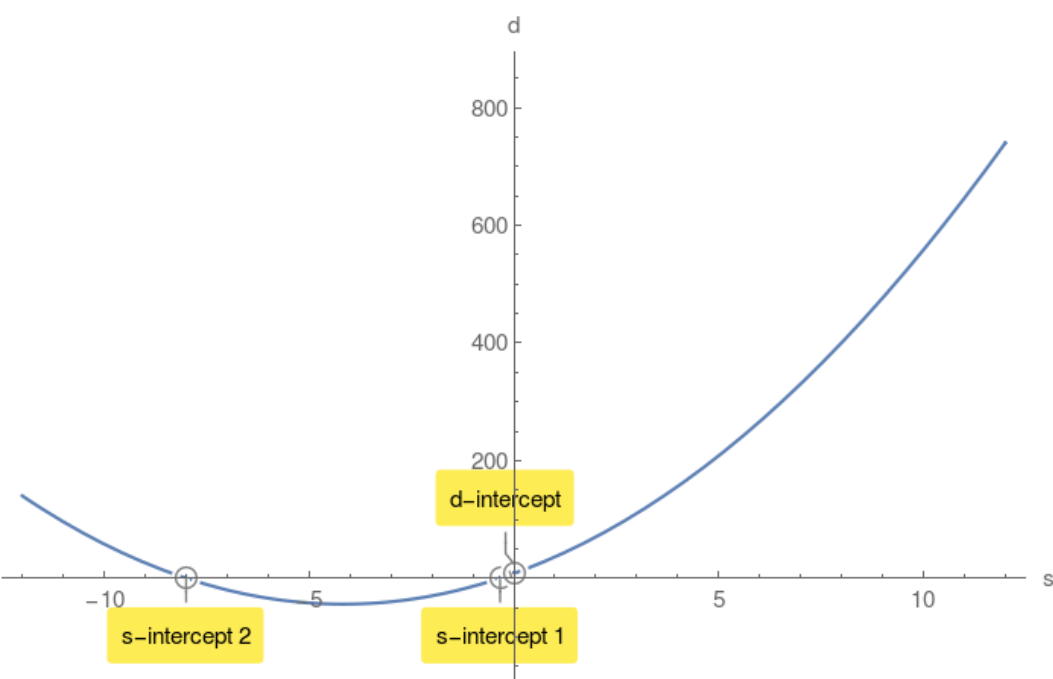
Example 1.

$d(s) = 3s^2 + 25s + 8$ compute its discriminant Δ :

$$\Delta = 529 > 0$$

$$s_{1,2} = -\frac{1}{3}, -8$$

$d(0) = 8$ d-intercept.



Case2: $\Delta = 0$

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

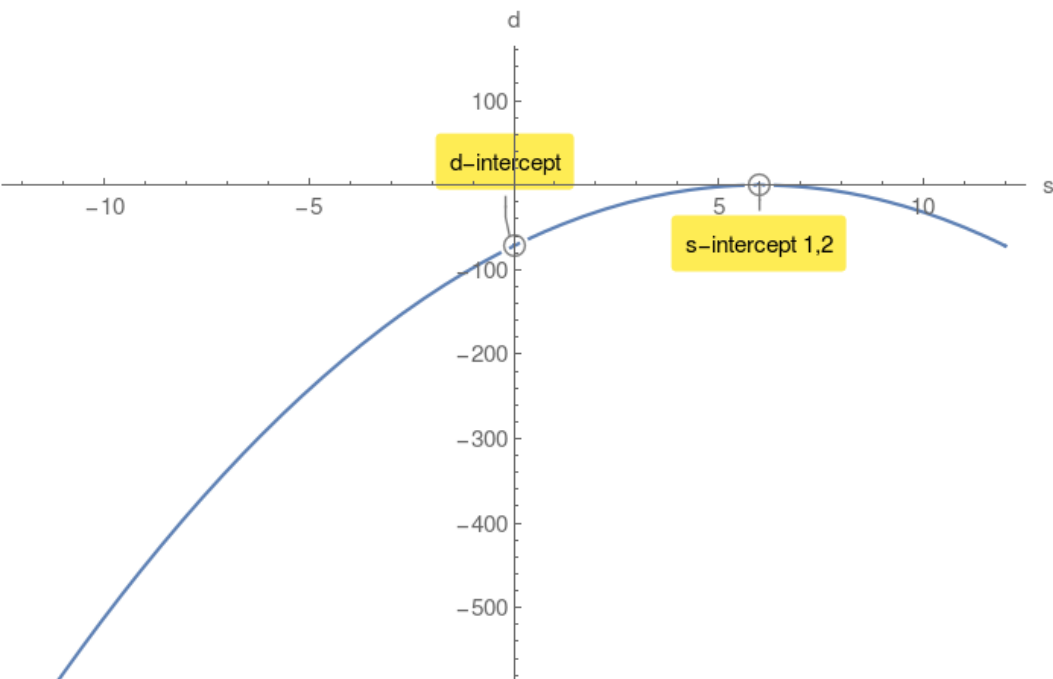
Example 2.

$d(s) = -2s^2 + 24s - 72$ compute its discriminant Δ :

$$\Delta = 0$$

$$s_{1,2} = 6, 6$$

$d(0) = -72$ d-intercept.



Case3: $\Delta < 0$

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

However there is a d-intercept.

Example 3.

$d(s) = 4s^2 + 80s + 500$ compute its discriminant Δ :

$$\Delta = -1600 < 0$$

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

