Intercepts of the Quadratic

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

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

Case1: $\triangle>0$

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

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

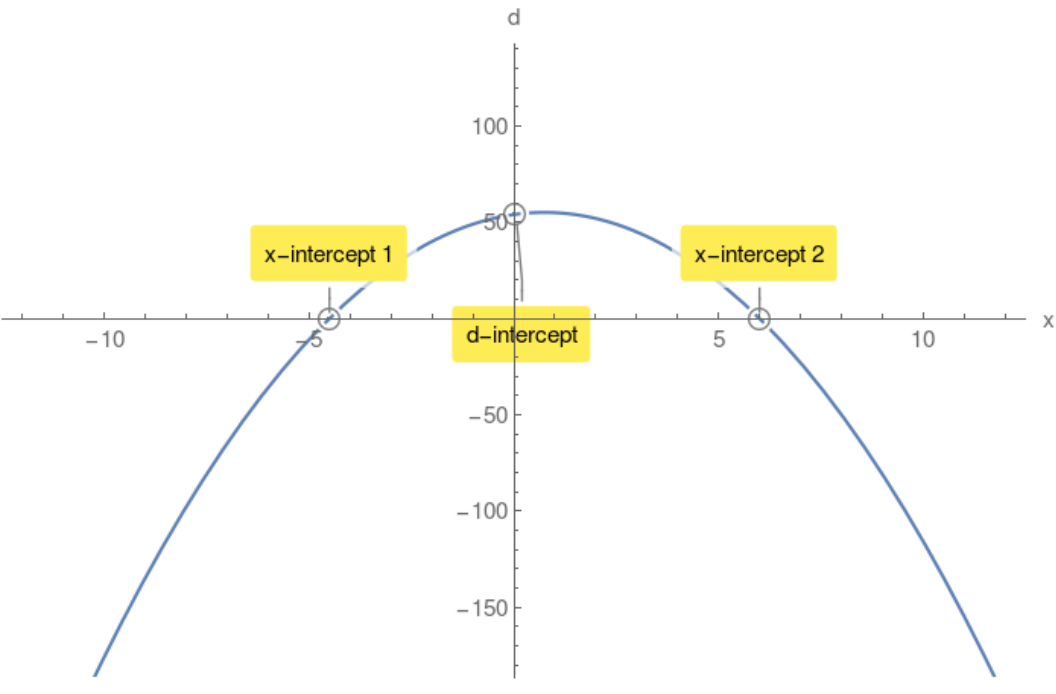
Example 1.

$d(x)=-2\,x^2+3\,x+54$ compute its discriminant $\triangle$:

$\triangle=441>0$

$x_{1,2}=-\frac{9}{2},6$

$d(0)=54$ d-intercept.



Case2: $\triangle=0$

$x_{1,2}=\frac{-b\pm\sqrt{b^2-4\,ac}}{2a}=\frac{-b\pm0}{2a}=\frac{-b}{2a}$ single x-intercept of multiplicity 2.

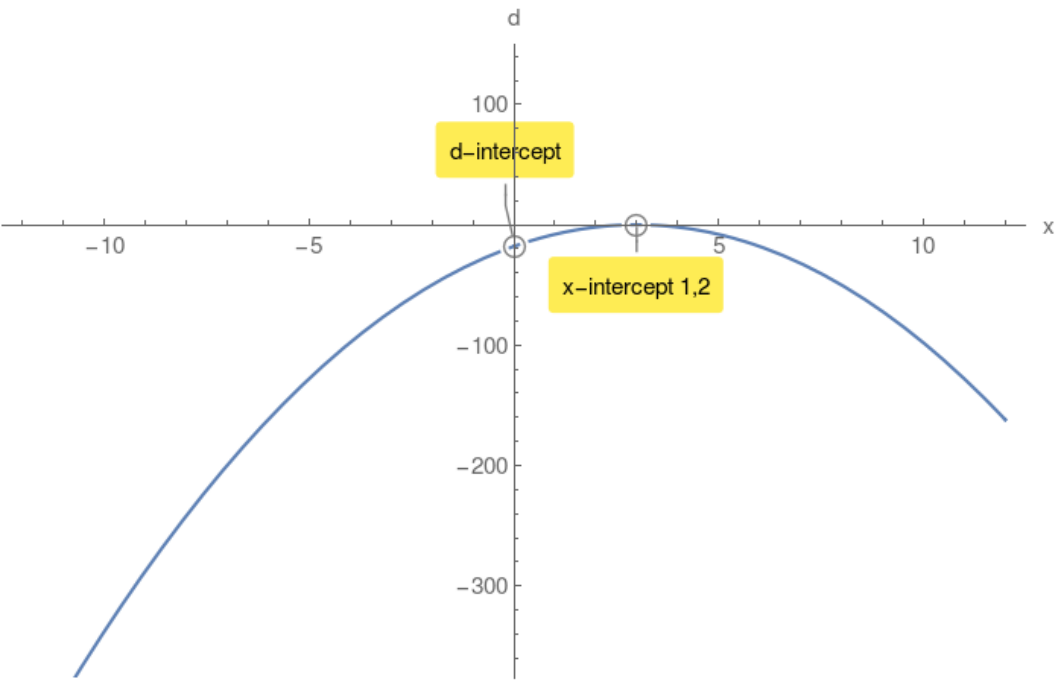
Example 2.

$d(x)=-2\,x^2+12\,x-18$ compute its discriminant $\triangle$:

$\triangle=0$

$x_{1,2}=3,3$

$d(0)=-18$ d-intercept.



Case3: $\triangle<0$

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

However there is a d-intercept.

Example 3.

$d(x)=9\,x^2+180\,x+1000$ compute its discriminant $\triangle$:

$\triangle=-3600<0$

$d(0)=1000$ d-intercept.