Intercepts of the Quadratic

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

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

Case1: $\triangle>0$

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

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

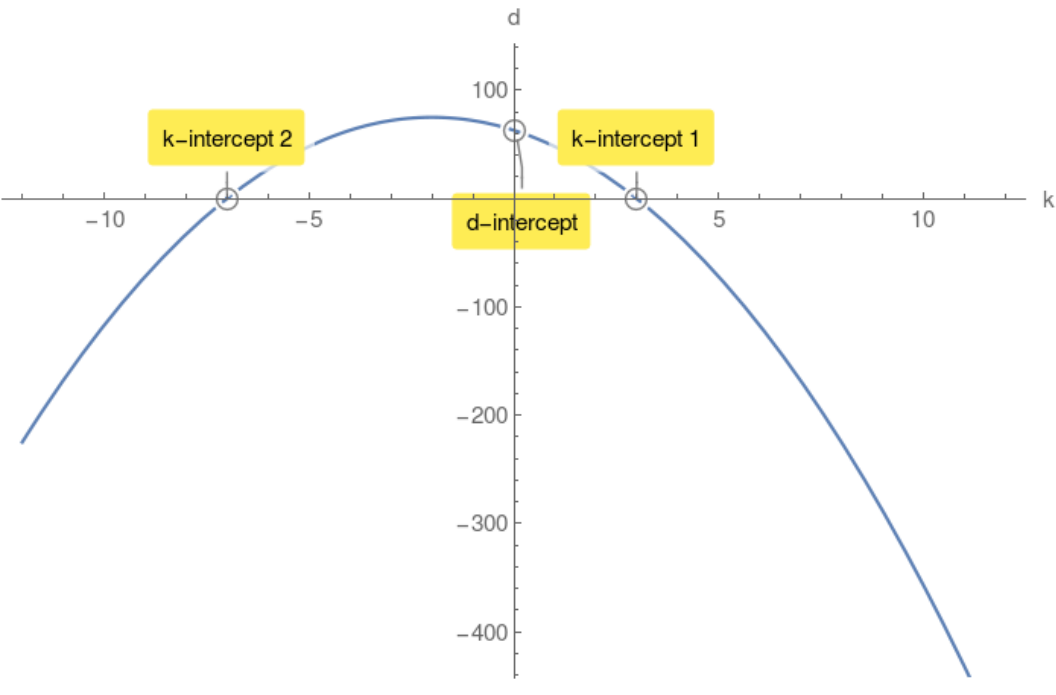
Example 1.

$d(k)=-3\,k^2-12\,k+63$ compute its discriminant $\triangle$:

$\triangle=900>0$

$k_{1,2}=3,-7$

$d(0)=63$ d-intercept.



Case2: $\triangle=0$

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

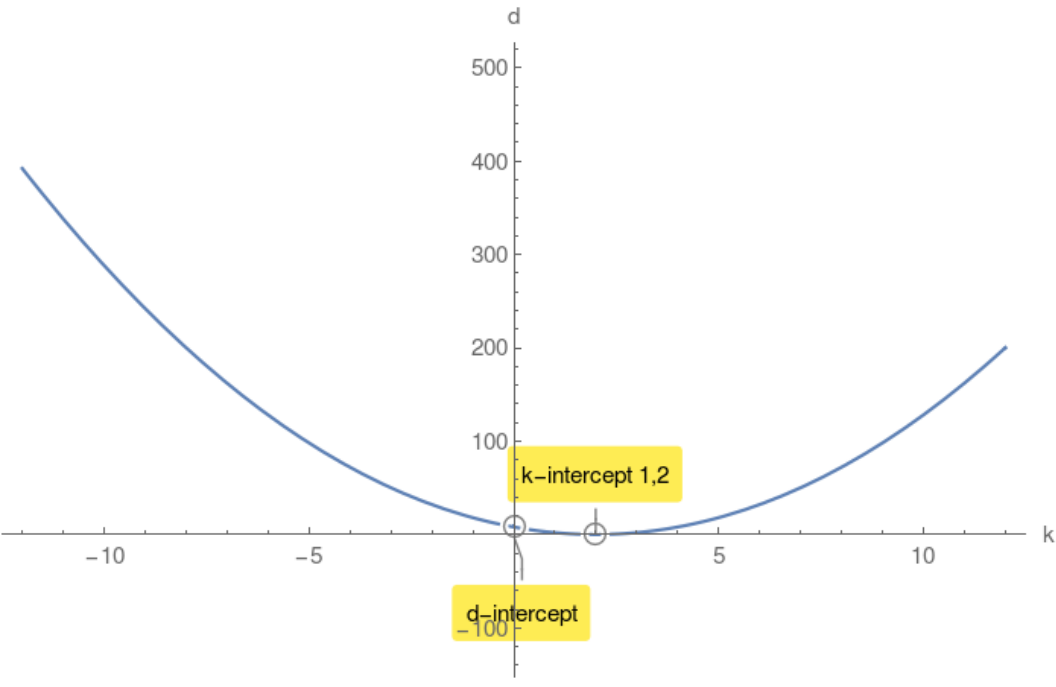
Example 2.

$d(k)=2\,k^2-8\,k+8$ compute its discriminant $\triangle$:

$\triangle=0$

$k_{1,2}=2,2$

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



Case3: $\triangle<0$

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

However there is a d-intercept.

Example 3.

$d(k)=4\,k^2+72\,k+405$ compute its discriminant $\triangle$:

$\triangle=-1296<0$

$d(0)=405$ d-intercept.