# Intercepts of the Quadratic

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

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

## Case1: $\triangle>0$

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

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

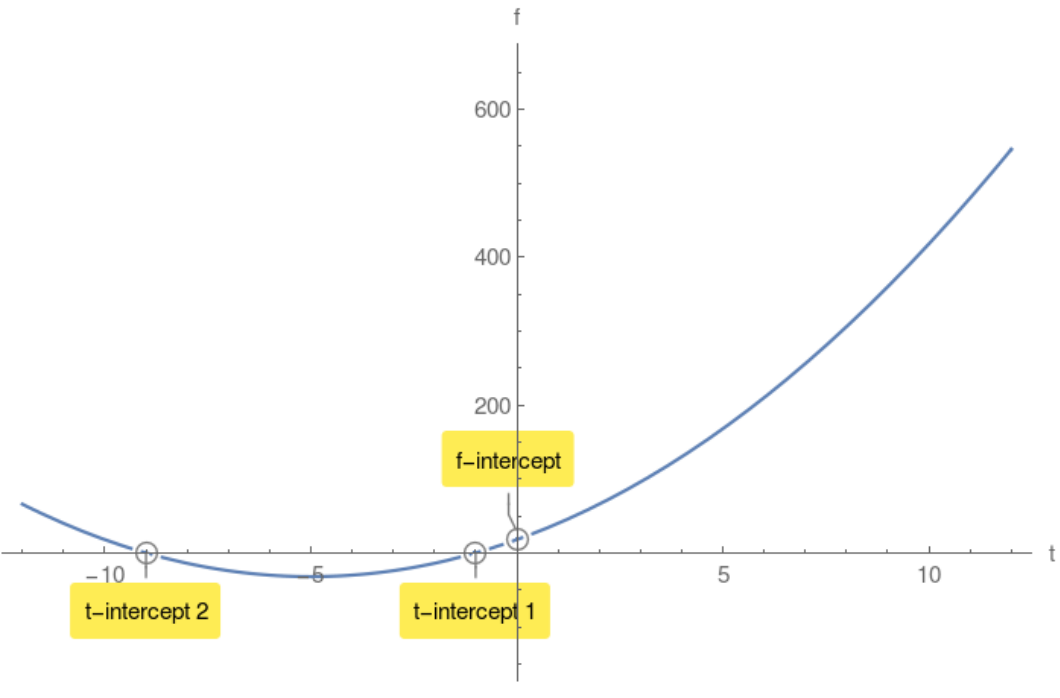
## Example 1.

$f(t)=2\,t^2+20\,t+18$ compute its discriminant $\triangle$:

$\triangle=256>0$

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

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




## Case2: $\triangle=0$

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

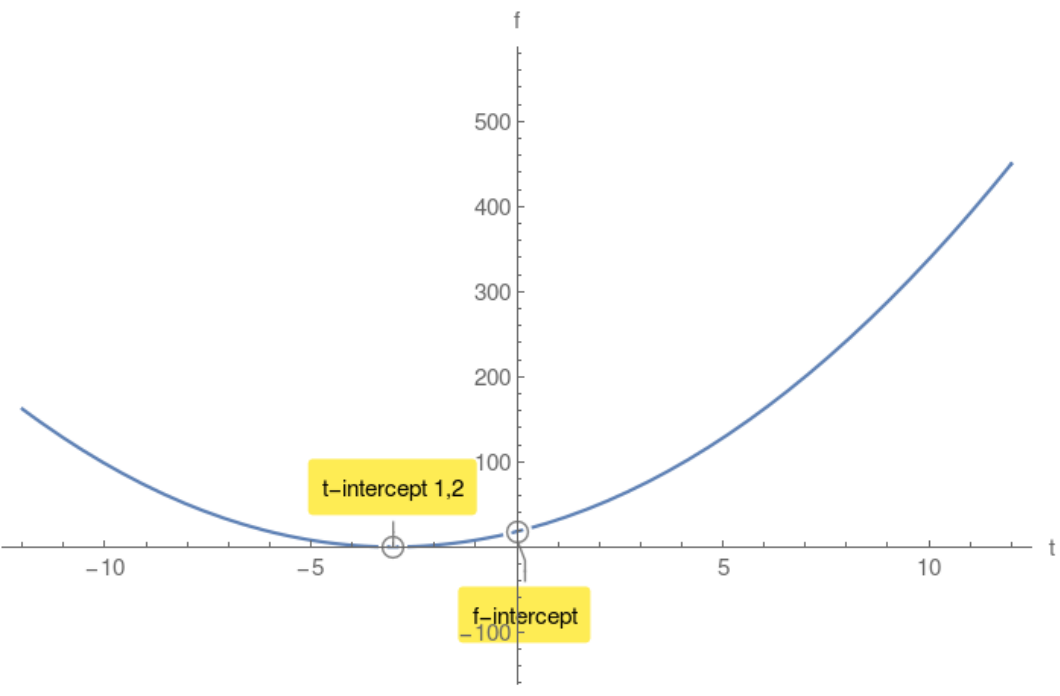
## Example 2.

$f(t)=2\,t^2+12\,t+18$ compute its discriminant $\triangle$:

$\triangle=0$

$t_{1,2}=-3,-3$

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




## Case3: $\triangle<0$

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

However there is a f-intercept.

## Example 3.

$f(t)=-4\,t^2-72\,t-405$ compute its discriminant $\triangle$:

$\triangle=-1296<0$

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