# Intercepts of the Quadratic

Given a quadratic $p(t)=a\,t^2+b\,t+c$ 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.

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

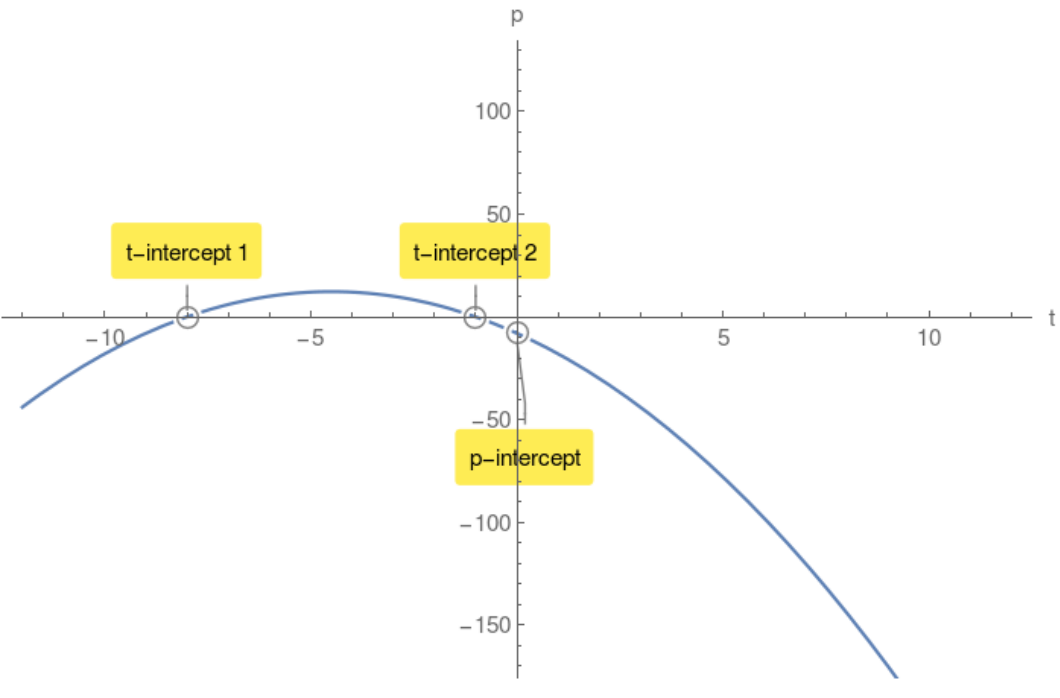
## Example 1.

$p(t)=-t^2-9\,t-8$ compute its discriminant $\triangle$:

$\triangle=49>0$

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

$p(0)=-8$ p-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.

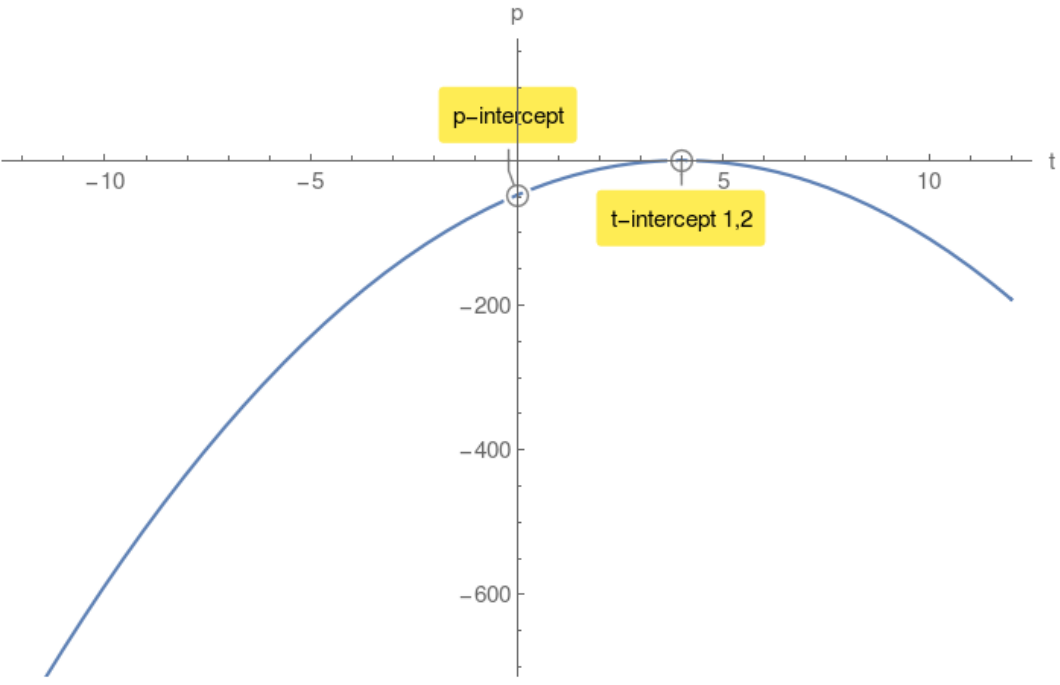
## Example 2.

$p(t)=-3\,t^2+24\,t-48$ compute its discriminant $\triangle$:

$\triangle=0$

$t_{1,2}=4,4$

$p(0)=-48$ p-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 p-intercept.

## Example 3.

$p(t)=-4\,t^2-80\,t-500$ compute its discriminant $\triangle$:

$\triangle=-1600<0$

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