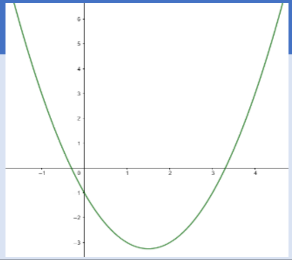
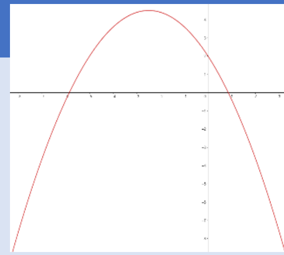
Polynômes du Second Degré

*Fonction définie sur $\mathbb{R}$ par sa **forme développée :** $P(x) = ax^2 + bx + c$, $a \in \mathbb{R}^*$, $b, c \in \mathbb{R}$*

Si $a > 0$



Si $a < 0$



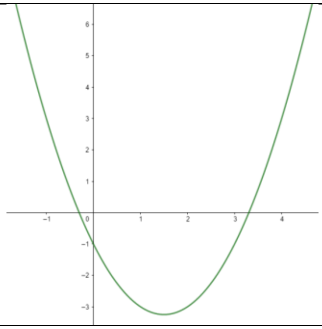
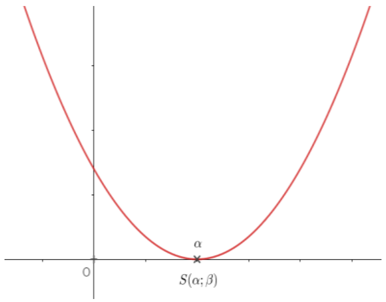
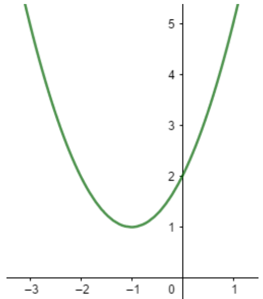
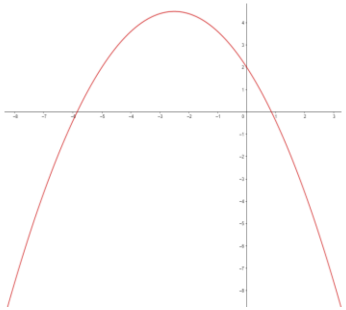
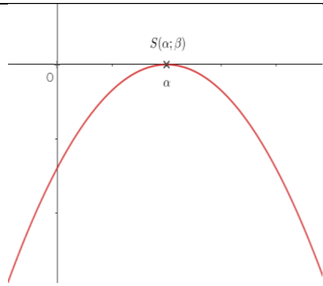
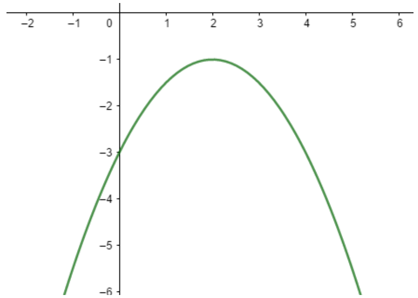
Généralités

Courbe représentative : Parabole de sommet $S(\alpha;\beta)$, avec $\alpha = -\frac{b}{2a}$, $\beta = f(\alpha)$

Discriminant du polynôme P de degré 2 : $\Delta = b^2 - 4ac$

Forme canonique : $P(x) = a(x-\alpha)^2 + \beta$

Signe de Δ	$\Delta > 0$	$\Delta = 0$	$\Delta < 0$
Racines de P	$x_1 = \frac{-b-\sqrt{\Delta}}{2a}$ *et* $x_2 = \frac{-b+\sqrt{\Delta}}{2a}$	$x_0 = -\frac{b}{2a} = \alpha$	$\emptyset$
Forme factorisée de P	$P(x) = a(x-x_1)(x-x_2)$	$P(x) = a(x-x_0)^2$	$\emptyset$

$a > 0$			
Signe de $P(x)$	$\begin{array}{cccccccc} x & -\infty & & x_1 & & x_2 & & +\infty \\ \hline a(x-x_1)(x-x_2) & & + & 0 & - & 0 & + & \end{array}$	$\begin{array}{cccccc} x & -\infty & & \alpha & & +\infty \\ \hline P(x) & & + & 0 & + & \end{array}$	$\begin{array}{cccc} x & -\infty & & +\infty \\ \hline P(x) & & + & \end{array}$
$a < 0$			
Signe de $P(x)$	$\begin{array}{cccccccc} x & -\infty & & x_1 & & x_2 & & +\infty \\ \hline a(x-x_1)(x-x_2) & & - & 0 & + & 0 & - & \end{array}$	$\begin{array}{cccccc} x & -\infty & & \alpha & & +\infty \\ \hline P(x) & & - & 0 & - & \end{array}$	$\begin{array}{cccc} x & -\infty & & +\infty \\ \hline P(x) & & - & \end{array}$