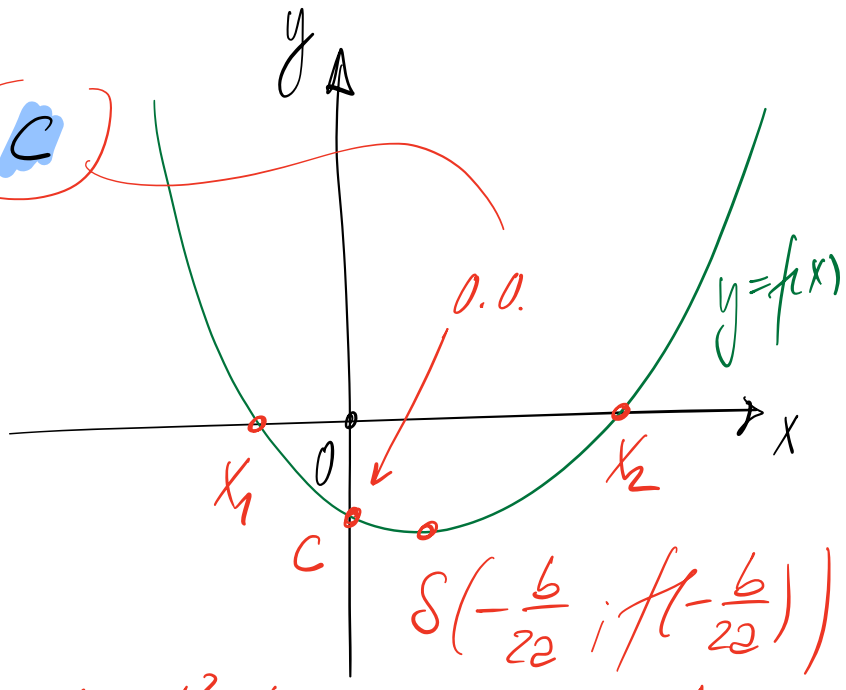
Fonction quadratique

$$f(x) = ax^2 + bx + c$$



Esquisse du graphe

① Zéros

$$x_1 = \frac{-b + \sqrt{\Delta}}{2a}$$

$$x_2 = \frac{-b - \sqrt{\Delta}}{2a}$$

$$\Delta = b^2 - 4ac$$

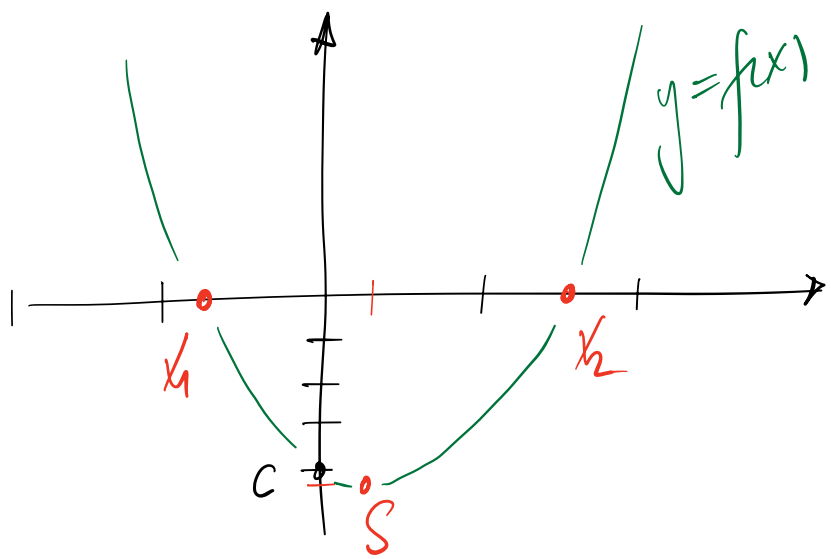
$$S\left(-\frac{b}{2a} ; f\left(-\frac{b}{2a}\right)\right)$$

$$\frac{-\Delta}{4a}$$

Exemple :

$$f(x) = 3x^2 - 2x - 4$$

$$g(x) = x^2 + x - 6 = (x+3)(x-2)$$



f $a=3 \quad b=-2 \quad c=-4$

$3x^2 - 2x - 4 = 0 \quad \Leftrightarrow \quad x = \frac{2 \pm \sqrt{\Delta}}{6}$

$\frac{2}{6} = \frac{1}{3}$

$c = -4 \qquad -\frac{b}{2a} = \frac{-(-2)}{2 \cdot 3} \qquad \Delta = 4 - 4 \cdot 3 \cdot (-4) = 52$

$S = \left(\frac{1}{3}; -\frac{52}{12} \right) \qquad -\frac{\Delta}{4a} = \frac{-52}{12}$

$x = \frac{2 \pm \sqrt{52}}{6} \begin{cases} 1{,}53 \\ -0{,}86 \end{cases}$

$= \left(\frac{1}{3}; -\frac{13}{3} \right) \simeq (0{,}33; -4{,}33)$

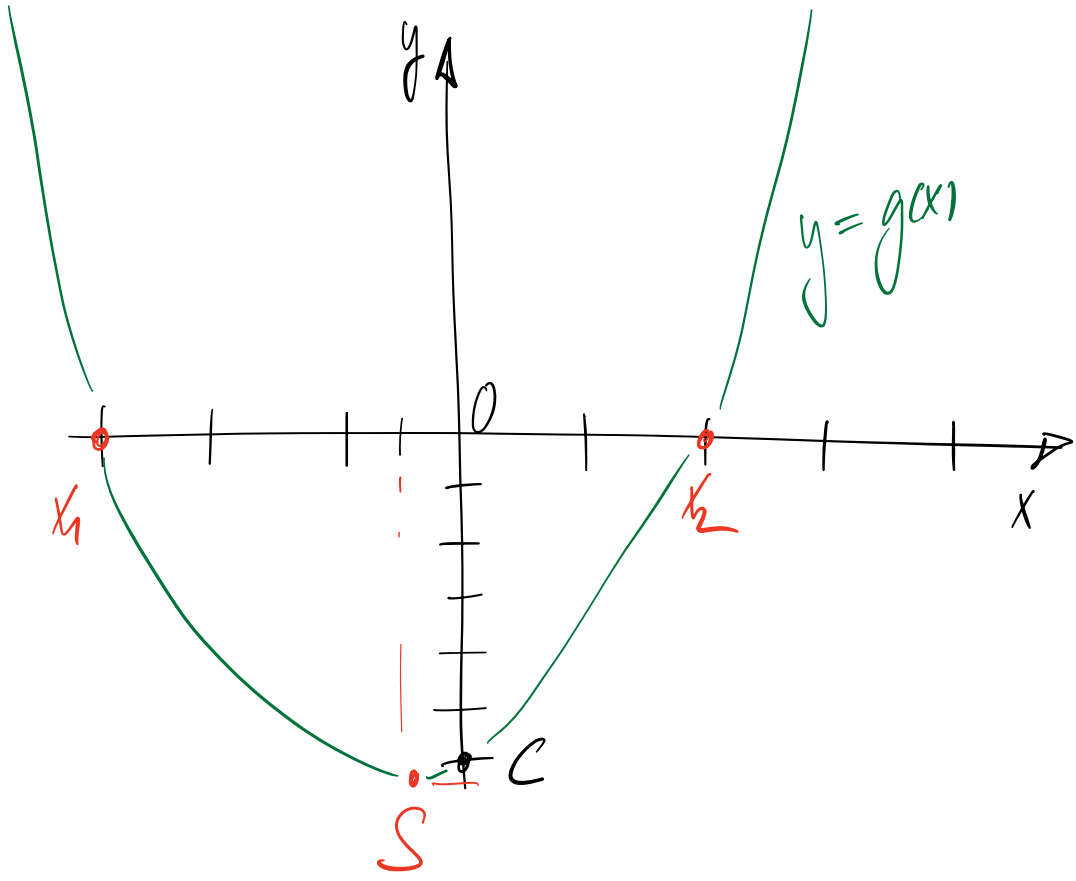
$\sqrt{52} \simeq 7{,}2$

$\frac{2 - 7{,}2}{6} = \frac{-5{,}2}{6}$

g $x_1 = -3 \qquad x_2 = 2 \qquad c = -6$

$S(-0{,}5; -6{,}25)$

$x^2 + x - 6$



$a=1 \quad b=1 \quad c=12$

Example: $-x^2 - x + 12$

$-1 < 0$

$$\Delta = (-1)^2 - 4 \cdot (-1) \cdot 12 = 1 + 48 = 49$$

$$x_1 = \frac{-(-1) + 7}{-2} = \frac{8}{-2} = -4$$

$$x_2 = \frac{-(-1) - 7}{-2} = \frac{-6}{-2} = 3$$

$c = 12$

$$S = \left(-\frac{b}{2a} ; -\frac{\Delta}{4a} \right) = \left(-\frac{(-1)}{2 \cdot (-1)} ; -\frac{49}{4 \cdot (-1)} \right)$$

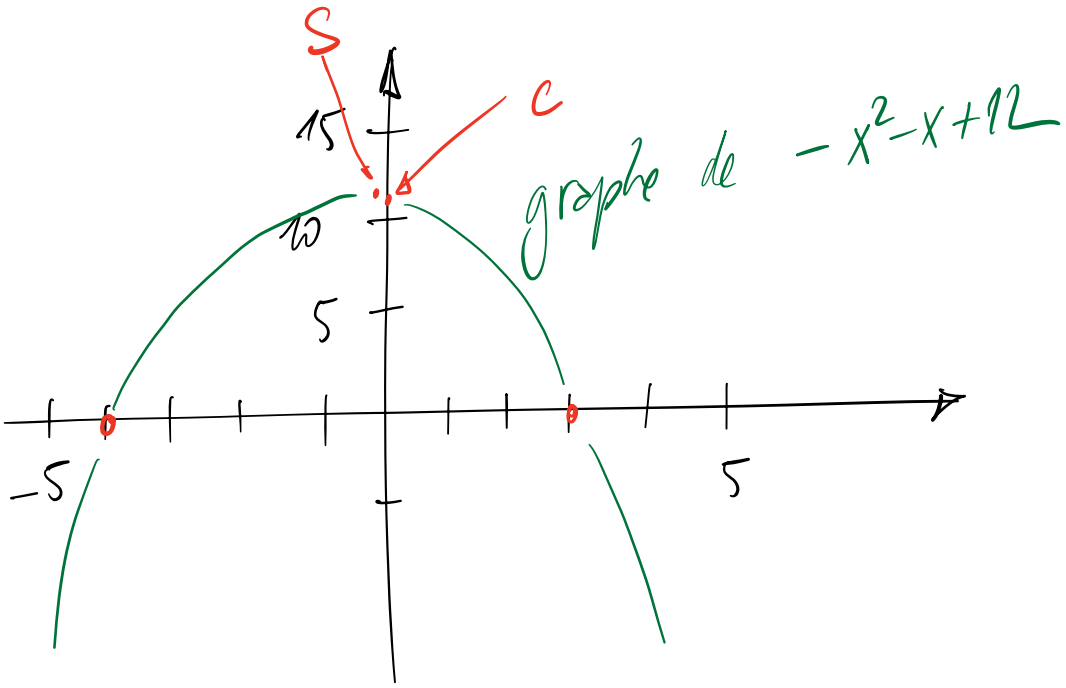
$$= (-0{,}5 ; 12{,}25)$$

$(-4|0)$ $(3;0)$

$x_1 = -4 \quad x_2 = 3$

$c = 12 \quad S(-0{,}5 ; 12{,}25)$

$(0;12)$


S
C
graphe de $-x^2-x+12$
15
10
5
-5
5