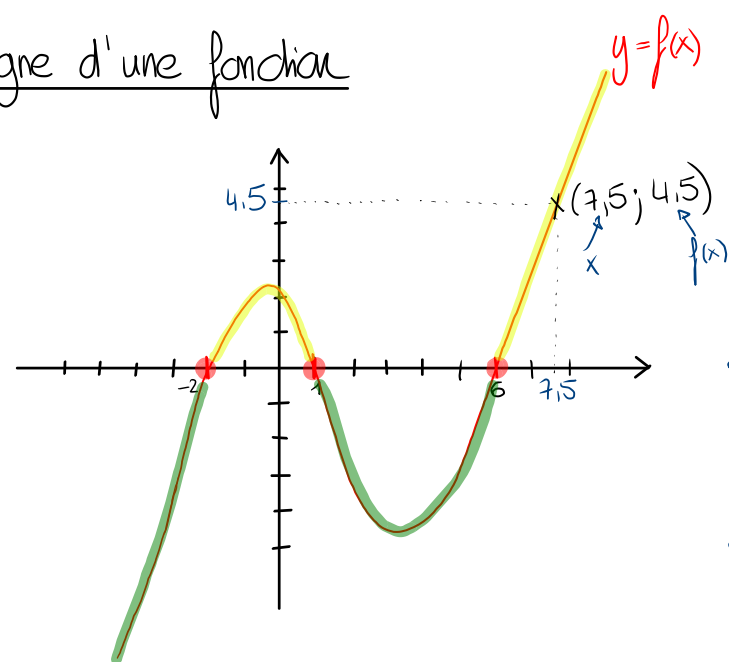


4. Signe d'une fonction



• $f(x) > 0$, f est positive, f est au-dessus de Ox
si $x \in]-2; 1[\cup]6; +\infty[$

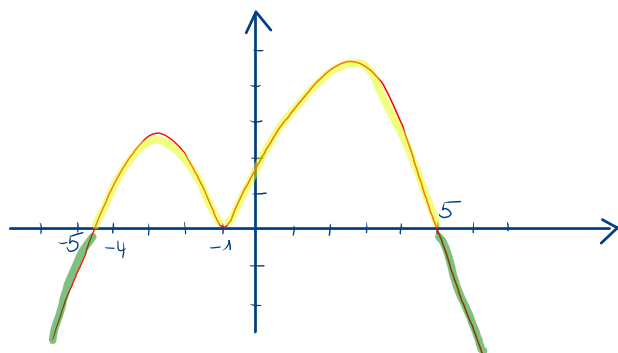
• zéros de f : $f(x) = 0 \Leftrightarrow$
 $x = -2$
 $x = 1$
 $x = 6$

• $f(x) < 0$, f est négative, f est au-dessous de Ox
si $x \in]-\infty; -2[\cup]1; 6[$

On résume dans un tableau, appelé tableau de signe :

x	-2	1	6
$\text{sgn}(f)$	-	+	-

2)

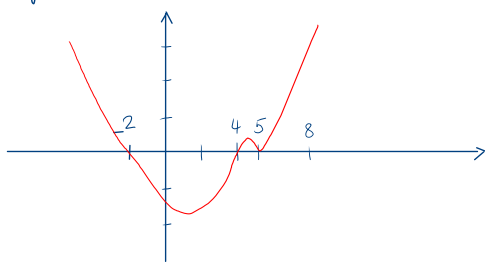


x	-4.5	-1	5
$\text{sgn}(f)$	-	+	-

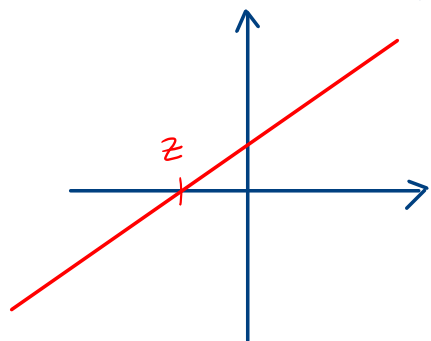
Faire un tableau de signe
c'est étudier le signe de
la fonction.

3)

x	-2	4	5
$\text{sgn}(f)$	+	-	+

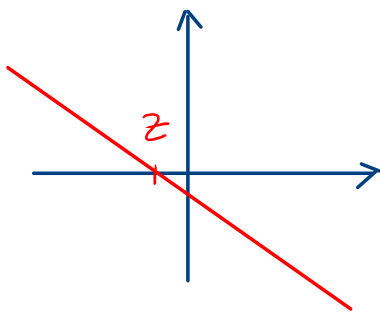


Signe d'une fonction affine : $f(x) = mx + h$
 dépend de la pente m



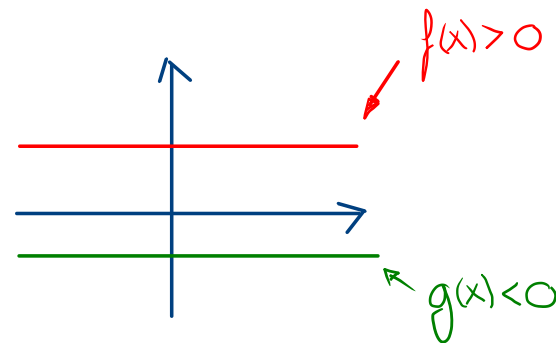
$m > 0$

x	z
$\text{sgn}(f)$	$- \quad 0 \quad +$



$m < 0$

x	z
$\text{sgn}(f)$	$+ \quad 0 \quad -$



$m = 0$

x	
$\text{sgn}(f)$	$+$
x	
$\text{sgn}(g)$	$-$

Exple : Etudier le signe de f .

a) $f(x) = 3x - 1 \Rightarrow m = 3$
 zéro : $3x - 1 = 0 \Leftrightarrow x = \frac{1}{3}$

signe :

x	$\frac{1}{3}$
$\text{sgn}(f)$	$- \quad 0 \quad +$

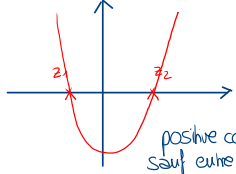
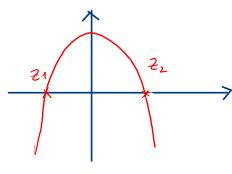
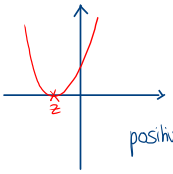
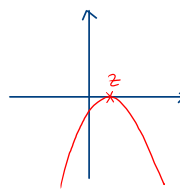
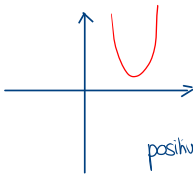
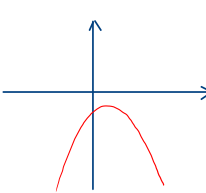
b) $f(x) = -\frac{1}{2}x - 5 \Rightarrow m = -\frac{1}{2}$

zéro : $-\frac{1}{2}x - 5 = 0 \Leftrightarrow -\frac{1}{2}x = 5 \Leftrightarrow x = -10$

signe :

x	-10
$\text{sgn}(f)$	$+ \quad 0 \quad -$

Signe d'une fonction quadratique $f(x) = ax^2 + bx + c$

	$a > 0$	$a < 0$
$\Delta > 0$ 2 zéros	 positive comme a sauf entre les zéros	 négative comme a sauf entre les zéros
$\Delta = 0$ 1 zéro	 positive comme a	 négative comme a
$\Delta < 0$ 0 zéro	 positive comme a	 négative comme a

Exemple : Etudier le signe de f :

a) $f(x) = -x^2 + 4x - 4$ $a = -1 < 0$

zéros de f : $-x^2 + 4x - 4 = 0$

$$-(x^2 - 4x + 4) = 0$$

$$-(x-2)^2 = 0 \quad \Leftrightarrow \quad x = 2$$

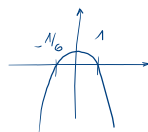
signe : $\begin{array}{c|ccc} x & & 2 & \\ \hline \text{sgn}(f) & - & 0 & - \end{array}$

b) $f(x) = -6x^2 + 5x + 1$ $a = -6 < 0$

zéros : $-6x^2 + 5x + 1 = 0$ $\Delta = 25 + 4(6) \cdot 1 = 49$

$$x_{1,2} = \frac{-5 \pm 7}{-12} = \begin{cases} \frac{-12}{-12} = 1 \\ \frac{2}{-12} = -\frac{1}{6} \end{cases}$$

$\begin{array}{c|ccc} x & & -1/6 & 1 \\ \hline \text{sgn}(f) & - & 0 & + & 0 & - \end{array}$



c) $f(x) = 2x^2 + x + 3$ $a = 2 > 0$

zéro : $\Delta = 1 - 4 \cdot 2 \cdot 3 < 0 \Rightarrow$ pas de zéro

$\begin{array}{c|c} x & \\ \hline \text{sgn}(f) & + \end{array}$