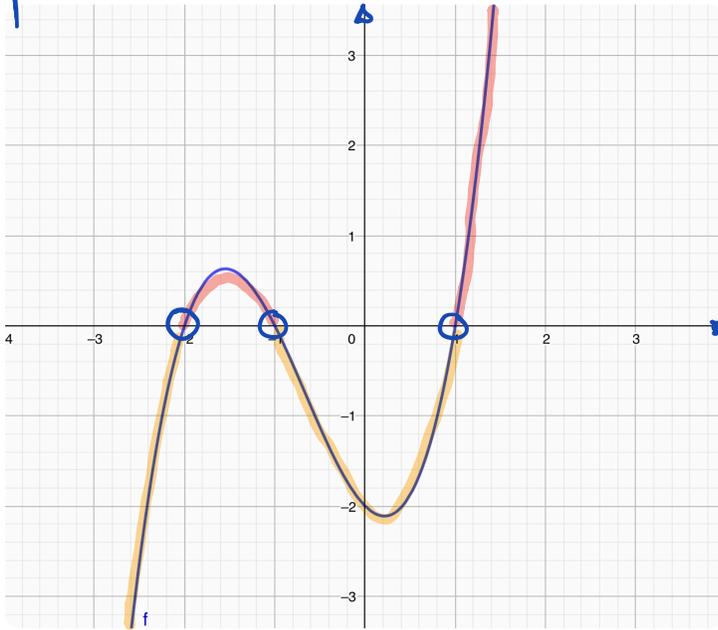


Etude du signe d'une fonction réelle

$f(x) > 0$ le graphe se trouve en-dessus de l'axe Ox
 $f(x) < 0$ " " " en-dessous " "

exple



$f(x) > 0$

zéros : $f(x) = 0 \Leftrightarrow x \in \{-2; -1; 1\}$

$f(x) < 0$

En résumé :

x	-2	-1	1
$f(x)$	-	+	-

exple 2

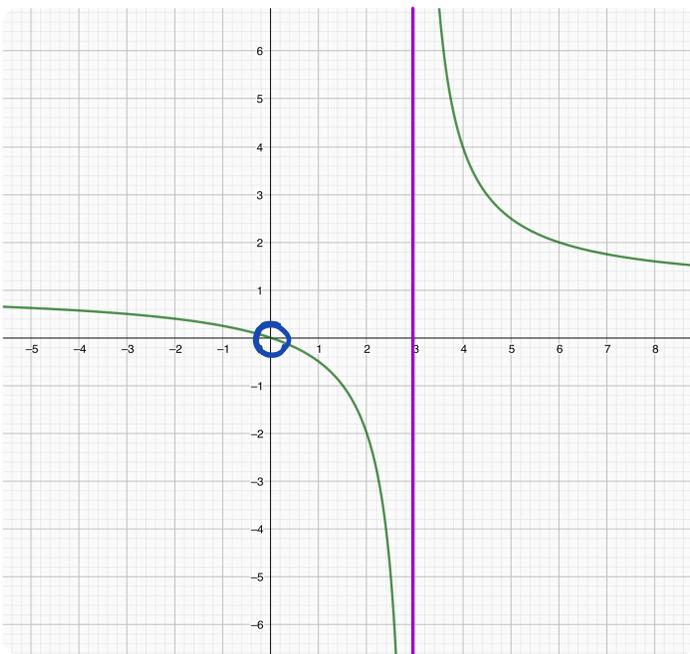
$$f(x) = \frac{x}{x-3}$$

$$ED(f) = \mathbb{R} - \{3\}$$

zéro : 0

v.i. : 3

zéro et v.i.

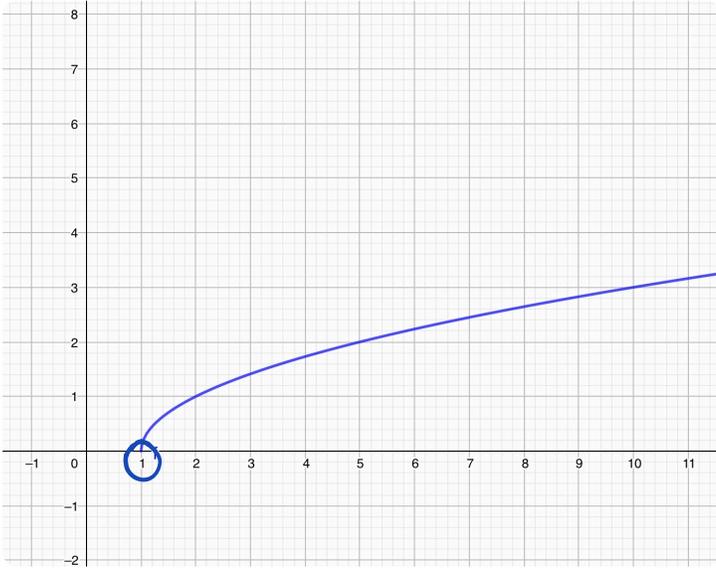
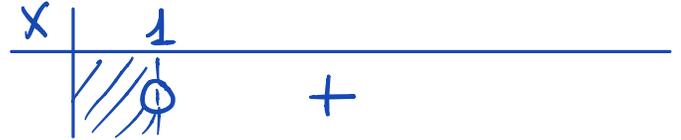


x	0	3
$f(x)$	+	-

exple 3 $f(x) = \sqrt{x-1}$

$$ED(f) = [1; +\infty[$$

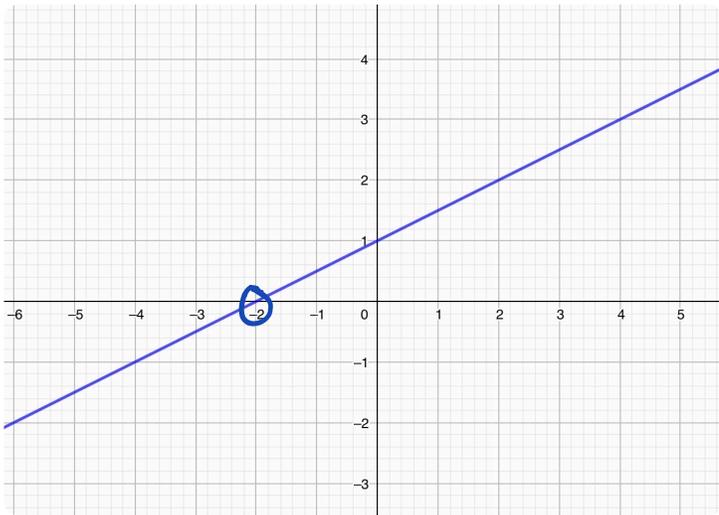
zéro : 1



ex 1 (ex supp. III)

Signe d'une fonction affine

$f(x) = mx + h$ le signe dépend de m



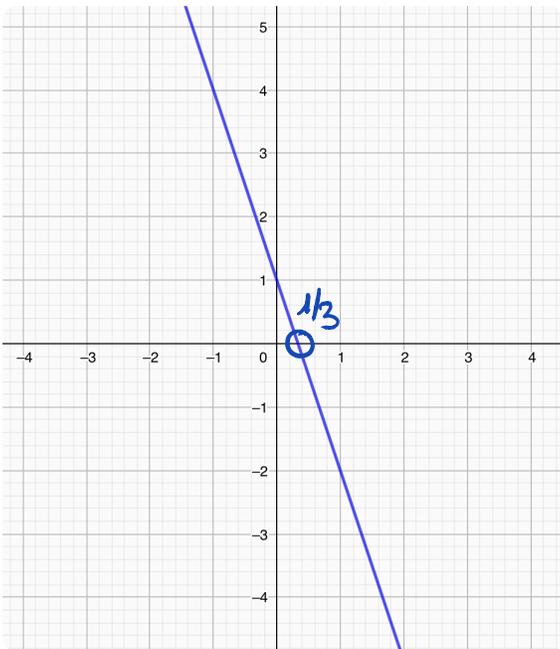
$m > 0$ $f(x) = \frac{1}{2}x + 1$

zéro : $\frac{1}{2}x + 1 = 0$
 $x = -2$

signe :

x	-2		
$f(x)$	-	ϕ	+

↑ signe de m



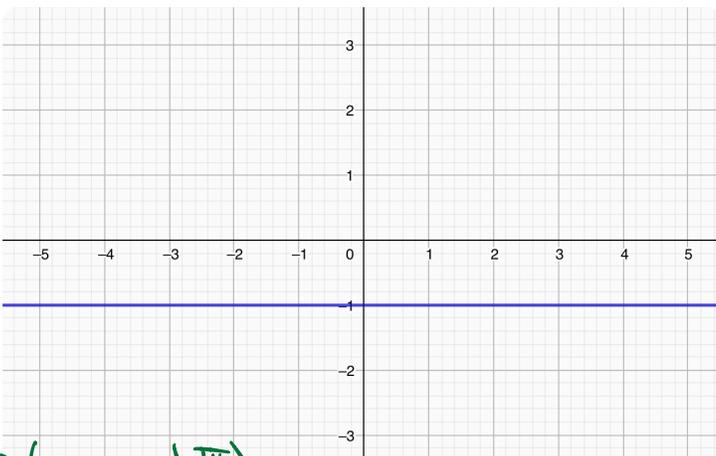
$m < 0$ $f(x) = -3x + 1$

zéro : $f(x) = -3x + 1 = 0$
 $x = \frac{1}{3}$

signe :

x	1/3		
$f(x)$	+	ϕ	-

↑ signe de m



$m = 0$ $f(x) = -1$

la fonction valant -1 elle est clairement tjs négative.

signe :

x			
$f(x)$	-		

ex2 (ex suppl III)

Signe d'une fonction quadratique

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

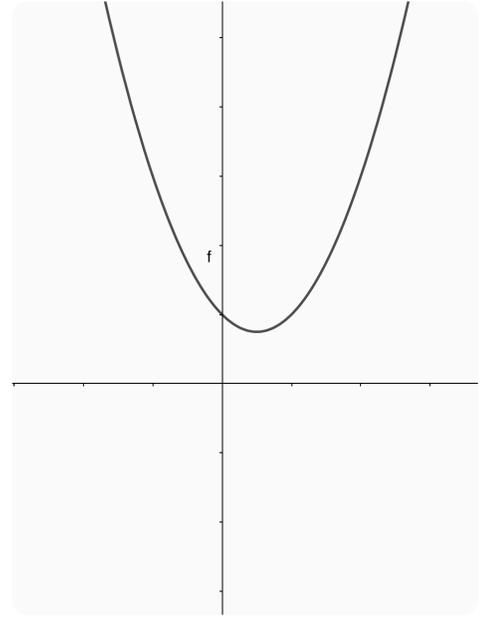
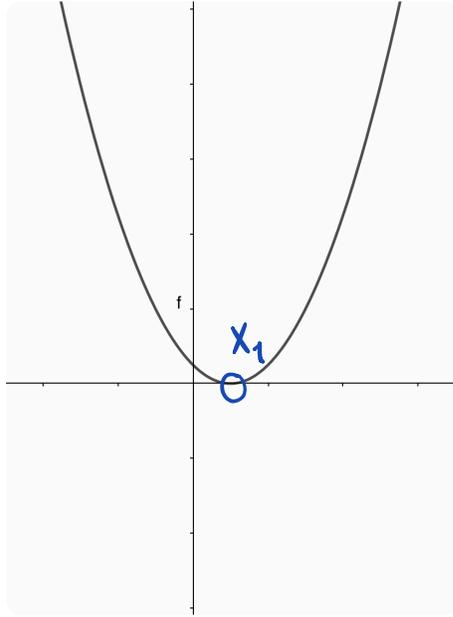
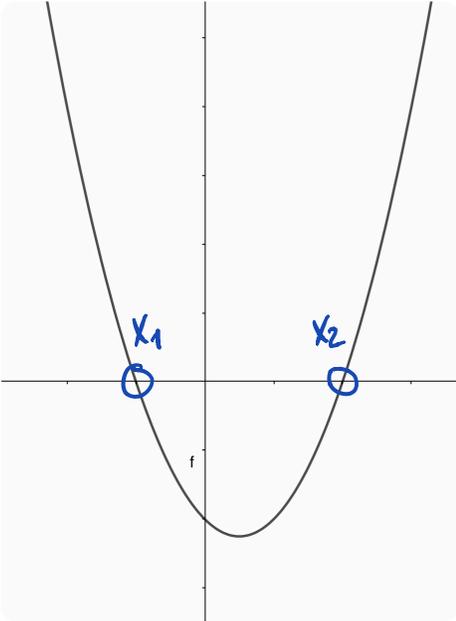
1^e : chercher les zéro(s)

$$\Delta > 0$$

$$\Delta = 0$$

$$\Delta < 0$$

$a > 0$



x	x_1	x_2	
$f(x)$	$+$	$-$	$+$

x	x_1
$f(x)$	$+$

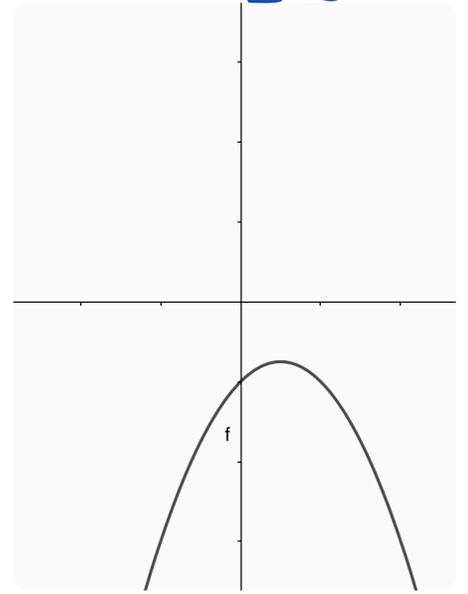
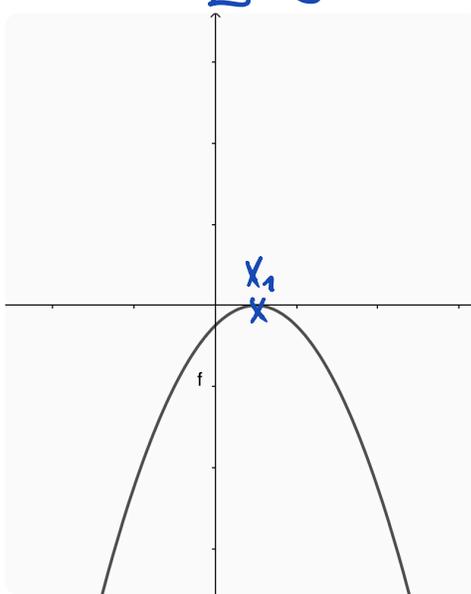
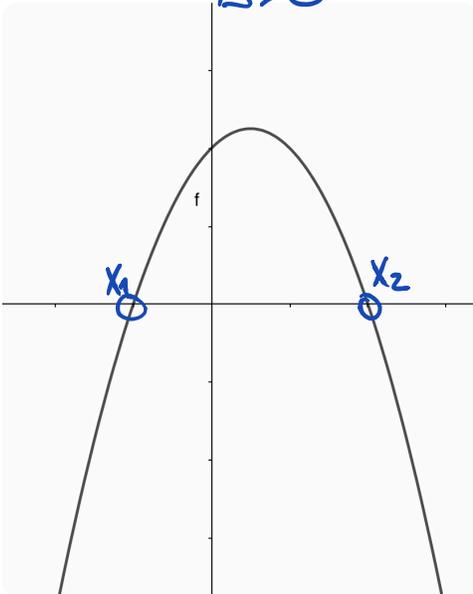
x	
$f(x)$	$+$

$$\Delta > 0$$

$$\Delta = 0$$

$$\Delta < 0$$

$a < 0$



x	x_1	x_2	
$f(x)$	$-$	$+$	$-$

x	x_1
$f(x)$	$-$

x	
$f(x)$	$-$

le signe de $f(x) = ax^2 + bx + c$ est le même que le signe de a sauf entre les deux zéros s'ils existent.

Exemples

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

zéro(s) : $-x^2 + 4x - 4 = 0$ $\Delta = 4^2 - 4 \cdot (-1) \cdot (-4) = 0$

$$x_1 = \frac{-4}{-2} = 2$$

signe :

x		2	
$f(x)$		-	ϕ

↖ ↗ signe de a

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

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

$$x_{1,2} = \frac{-5 \pm 7}{-12} = \begin{matrix} < -1/6 \\ > 1 \end{matrix}$$

signe :

x		$-1/6$	1	
$f(x)$		-	+	ϕ

↖ ↗ signe de a (sauf entre les zéros)

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

zéro(s) : $2x^2 + x + 3 = 0$ $\Delta = 1^2 - 4 \cdot 2 \cdot 3 < 0$

pas de zéro

signe :

x		
$f(x)$		+

← signe de a