29.10.26

2.3.13 Esquisser le graphe des fonctions données par :

a) $f(x) = E(2x)$

b) $f(x) = E\left(\frac{x}{3}\right)$

c) $f(x) = x \cdot E(x)$

d) $f(x) = \operatorname{sgn}(x^3 - 4x)$

e) $f(x) = (\operatorname{sgn}(x))^2$

f) $f(x) = x \cdot |x|$

g) $f(x) = \frac{|x|}{x}$

h) $f(x) = \sqrt{|x|}$

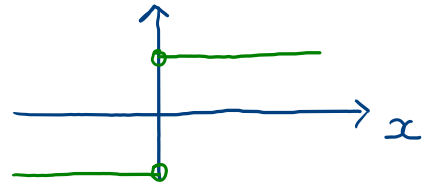
$|7| = 7$
$|-7| = 7$

$$|x| = \begin{cases} x, & x \geq 0 \\ -x, & x < 0 \end{cases}$$

g) $f(x) = \frac{|x|}{x}$, $ED(f) = \mathbb{R}^*$

On écrit f par morceaux :

$$f(x) = \begin{cases} 1 & , x > 0 \\ -1 & , x < 0 \end{cases}$$

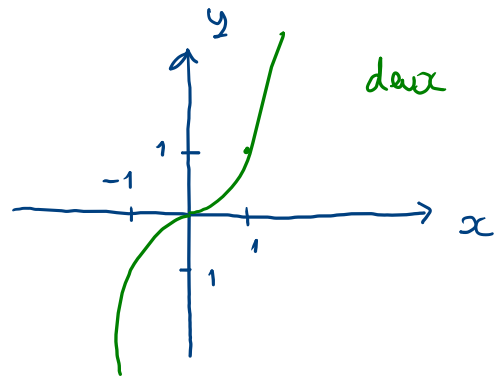


$\lim_{\substack{x \to 0 \\ >}} f(x) = 1$

$\lim_{\substack{x \to 0 \\ <}} f(x) = -1$

f) $f(x) = x \cdot |x|$, $ED(f) = \mathbb{R}$

$$f(x) = \begin{cases} x^2 & , x \geq 0 \\ -x^2 & , x < 0 \end{cases}$$

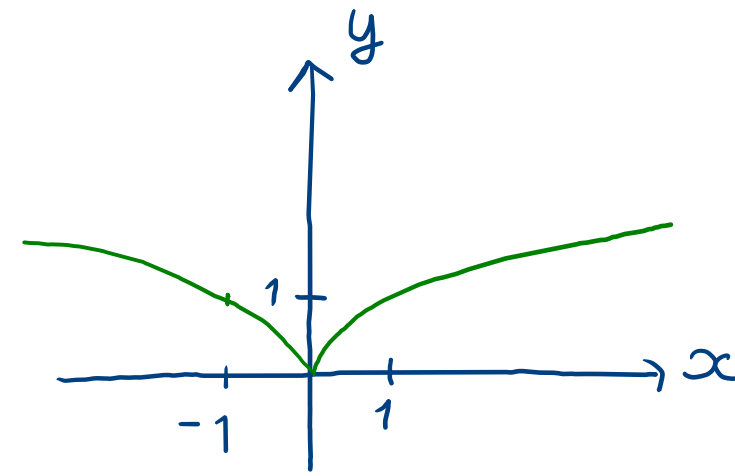


deux demi-paraboles

h) $f(x) = \sqrt{|x|}$

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

$$f(x) = \begin{cases} \sqrt{x} & , x \geq 0 \\ \sqrt{-x} & , x < 0 \end{cases}$$



$|-7| = -(-7) = 7$

x $\quad$ x

a) $f(x) = E(2x)$

b) $f(x) = E\left(\frac{x}{3}\right)$

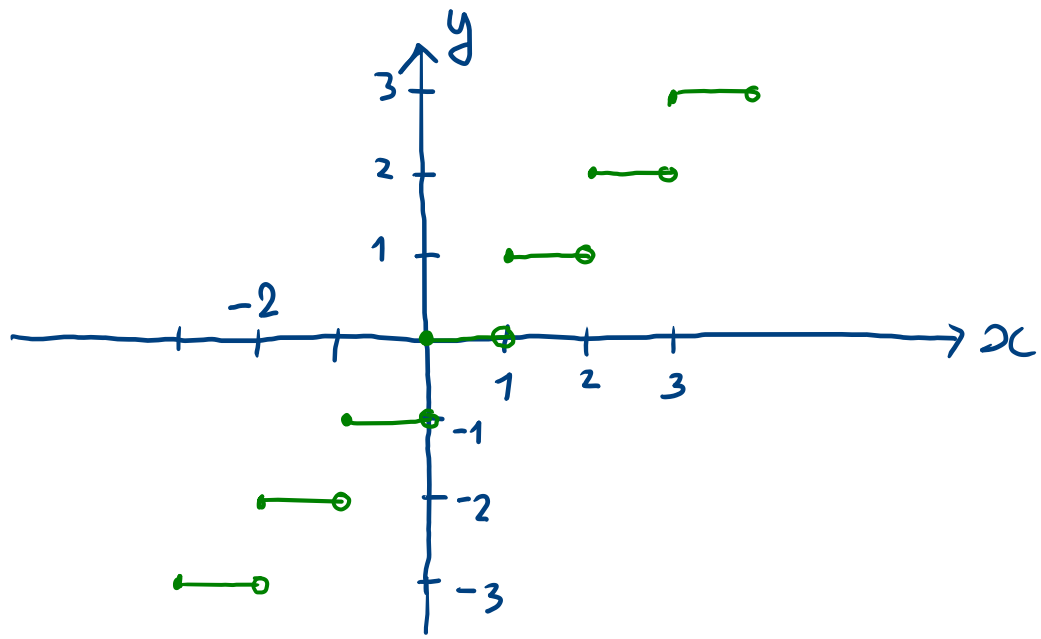
$E : \mathbb{R} \longrightarrow \mathbb{R}$

$x \longmapsto E(x)$ est le plus petit entier inférieur ou égal à x

$E(10,1) = 10$; $E(\sqrt{2}) = 1$; $E(0,001) = 0$

$E(-10,1) = -11$; $E(-\sqrt{2}) = -2$; $E(-0,001) = -1$

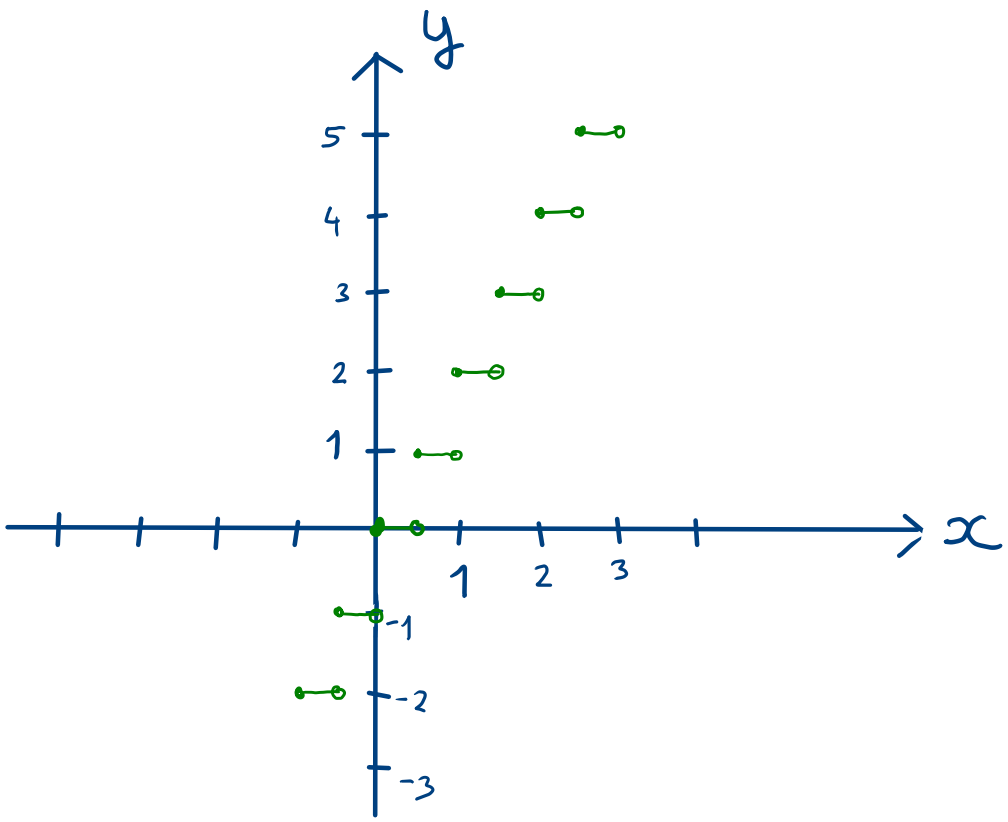
$E(1000) = 1000$



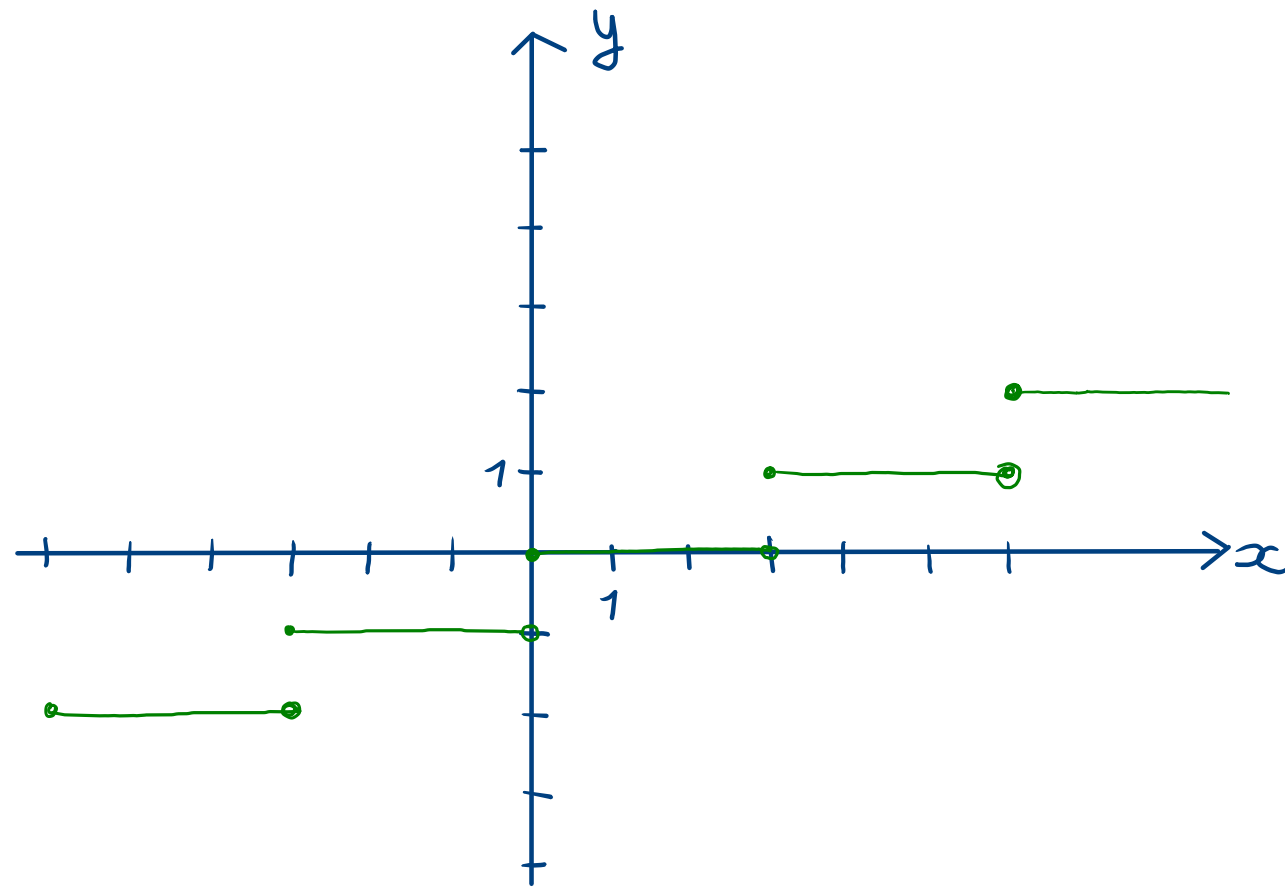
$\lim\limits_{\substack{x \to -2 \\ <}} E(x) = -3$

$\lim\limits_{\substack{x \to -2 \\ >}} E(x) = -2$

a) $f(x) = E(2x)$



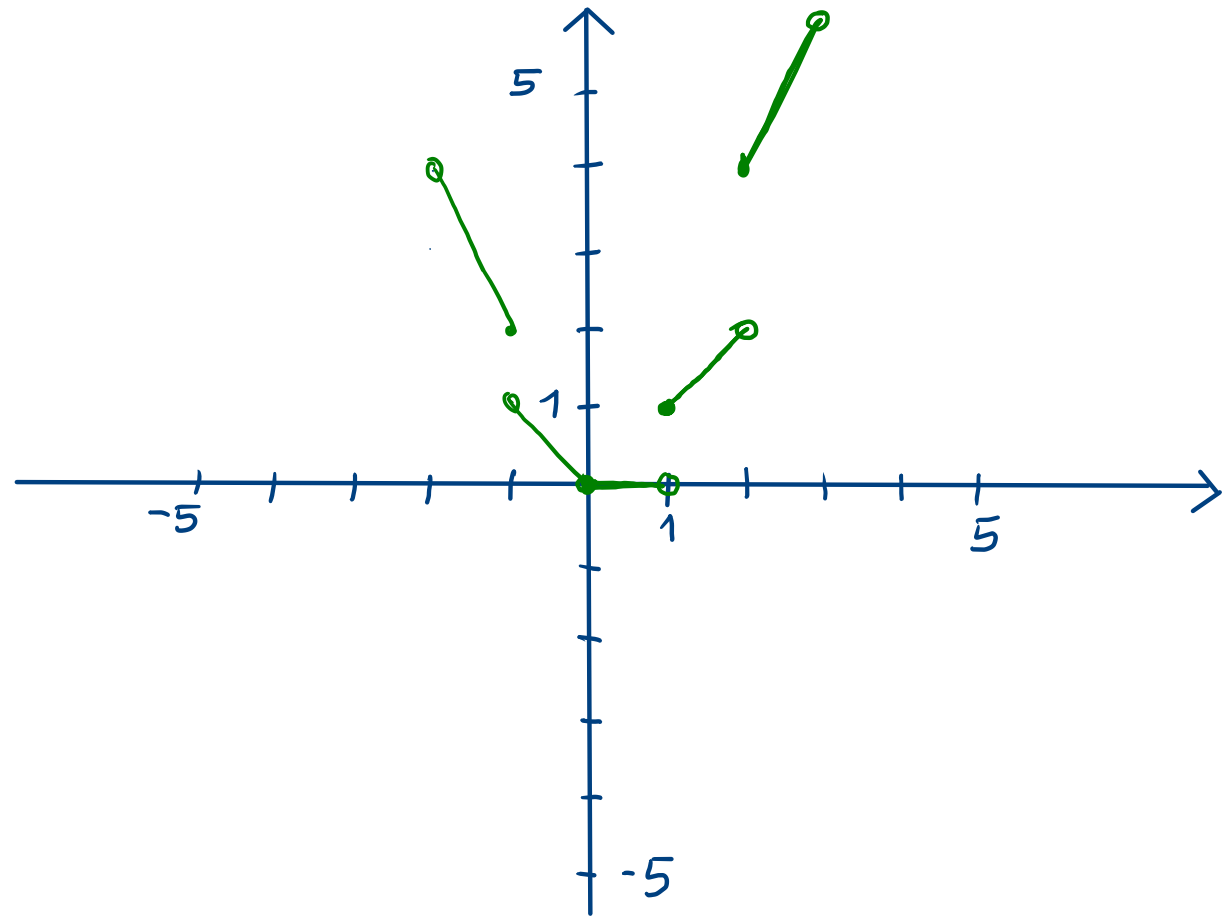
b) $f(x) = E\left(\frac{x}{3}\right)$



c) $f(x) = x \cdot E(x)$

$f(-0,5) = -0,5 \cdot (-1) = 0,5$

$$f(x) = \begin{cases} \dots \\ -2x & , \text{si } -2 \leq x < -1 \\ -x & , \text{si } -1 \leq x < 0 \\ 0 & , \text{si } 0 \leq x < 1 \\ x & , \text{si } 1 \leq x < 2 \\ 2x & , \text{si } 2 \leq x < 3 \\ 3x & \text{si } 3 \leq x < 4 \end{cases}$$

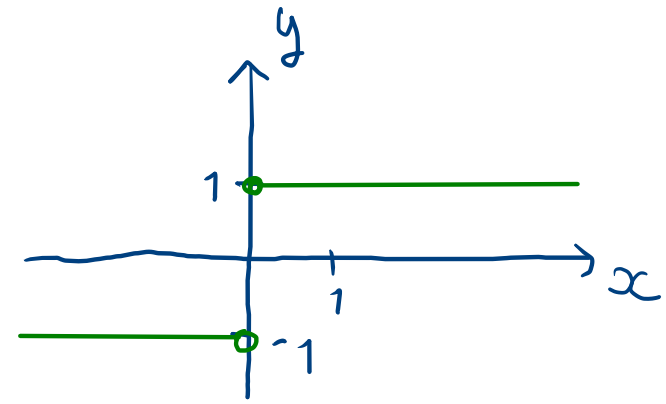


d) $f(x) = \operatorname{sgn}(x^3 - 4x)$

signe

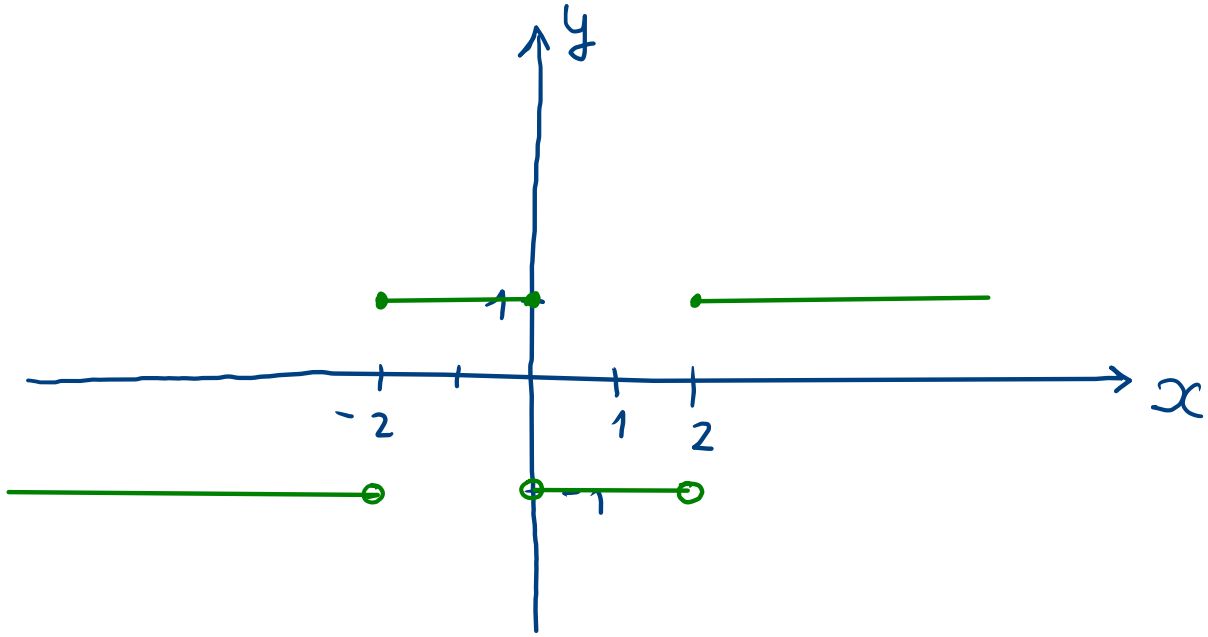
$g(x)$

$$\operatorname{sgn}(x) = \begin{cases} 1 & , \text{ si } x \geq 0 \\ -1 & , \text{ si } x < 0 \end{cases}$$



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

x		-2		0		2	
$g(x)$	$-$	0	$+$	0	$-$	0	$+$



2.3.16 Tracer le graphe des fonctions suivantes :

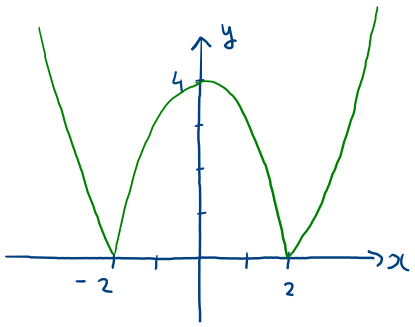
a) $f(x) = |4 - x^2| = |x^2 - 4|$

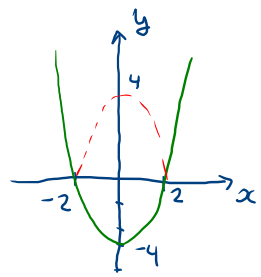
b) $f(x) = ||x + 4| - 2| + 1$

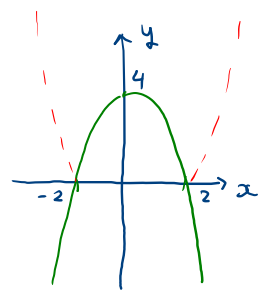
c) $f(x) = |x^2 - 2x| - 1$

d) $f(x) = |x - 1| + |x + 2|$

a)







b) But : écrire la fonction sans les valeurs absolues.

① $|x+4| = \begin{cases} x+4 & , \quad x \geq -4 \\ -(x+4) = -x-4 & , \quad x < -4 \end{cases}$

$|-x| = |x|$

② $|x+4| - 2 = \begin{cases} x+2 & , \quad x \geq -4 \\ -x-6 & , \quad x < -4 \end{cases}$

$$\Big||x+4| - 2\Big| = \begin{cases} |x+2| = \begin{cases} x+2 & \text{si} \quad x \geq -2 \\ -x-2 & \text{si} \quad -4 \leq x < -2 \end{cases} \\ |-x-6| = \begin{cases} x+6 & \text{si} \quad -6 \leq x < -4 \\ -x-6 & \text{si} \quad x < -6 \end{cases} \end{cases}$$

$$f(x) = \begin{cases} x+3 & , \quad x \geq -2 \\ -x-1 & , \quad -4 \leq x < -2 \\ x+7 & , \quad -6 \leq x < -4 \\ -x-5 & , \quad x < -6 \end{cases}$$

