2.4.14

FI "$\frac{0}{0}$" "$\infty - \infty$"

f) $\lim_{x\to 1}\left(\frac{x^2}{x-1}-\frac{1}{x-1}\right)$

$f(x) = x+1 \qquad D(f) = \mathbb{R} - \{1\}$

h) $\lim_{x\to 2}\left(\frac{1}{x-2}-\frac{4}{x^2-4}\right)$

f) $$\lim_{x\to 1}\left(\frac{x^2}{x-1}-\frac{1}{x-1}\right) \underset{\text{"}\infty-\infty\text{"}}{\overset{\text{Ind}}{=}} \lim_{x\to 1}\frac{x^2-1}{x-1} \underset{\text{"}\frac{0}{0}\text{"}}{\overset{\text{Ind}}{=}}$$

$$= \lim_{x\to 1}\frac{\cancel{(x-1)}(x+1)}{\underset{1}{\cancel{x-1}}} = \lim_{x\to 1}\frac{x+1}{1} = 2$$

h) $$\lim_{x\to 2}\left(\frac{1}{x-2}-\frac{4}{\underset{(x-2)(x+2)}{x^2-4}}\right) \underset{\text{"}\infty-\infty\text{"}}{\overset{\text{ind}}{=}} \lim_{x\to 2}\left(\frac{1\cdot(x+2)}{(x-2)(x+2)}-\frac{4}{(x-2)(x+2)}\right)$$

$$= \lim_{x\to 2}\frac{(x+2)-4}{(x-2)(x+2)} = \lim_{x\to 2}\frac{\overset{1}{\cancel{x-2}}}{\cancel{(x-2)}(x+2)}$$

$$= \lim_{x\to 2}\frac{1}{x+2} = \frac{1}{4}$$

$$\left[\lim_{x\to -2}\left(\frac{1}{x-2}-\frac{4}{x^2-4}\right) \underset{\text{"}\frac{1}{-4}-\infty\text{"}}{=} \infty\right]$$

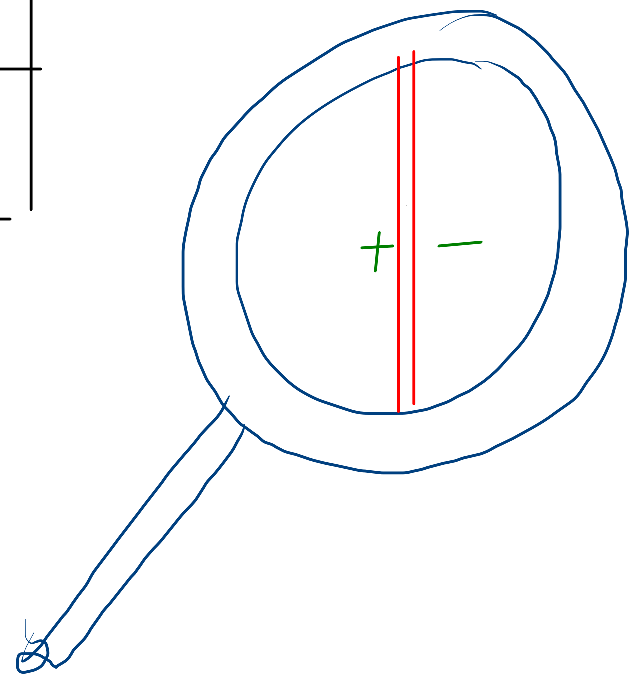
2.4.14

d) $\lim\limits_{\substack{x \to 5 \\ >}} \dfrac{x-3}{5-x} = \infty$ " $\dfrac{2}{0}$ "

$f(x) = \dfrac{x-3}{5-x}$ $ED(f) = \mathbb{R} - \{5\}$

Tableau des signes :

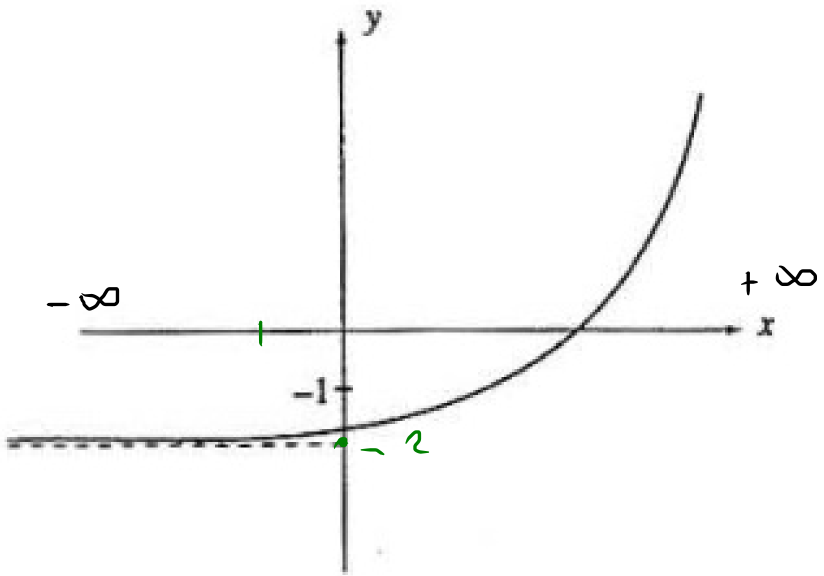
x		3		5	
$x-3$	$-$	0	$+$	||	$+$
$5-x$	$+$		$+$	0	$-$
$f(x)$	$-$	0	$+$	||	$-$



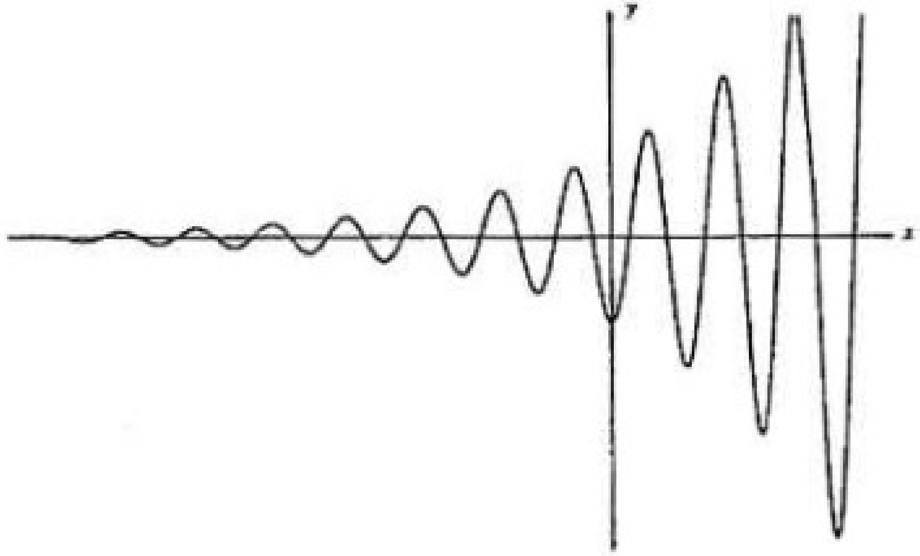
$\lim\limits_{\substack{x \to 5 \\ >}} f(x) = -\infty$

2.4.15 Lire les limites : $\lim\limits_{x\to-\infty} f(x)$, $\lim\limits_{x\to+\infty} f(x)$ et $\lim\limits_{x\to\infty} f(x)$.

a)



b)



$$\lim_{x\to-\infty} f(x) = -2$$

$$\lim_{x\to+\infty} f(x) = +\infty$$

$$\cancel{\lim_{x\to\infty} f(x).}$$

$$\lim_{x\to-\infty} f(x) = 0$$

$$\lim_{x\to+\infty} f(x) = \infty$$

$$\cancel{\lim_{x\to\infty} f(x).}$$

2.4.16 Calculer les limites suivantes :

a) $\displaystyle\lim_{x\to\infty} \frac{2x-4}{-3x+1}$ b) $\displaystyle\lim_{x\to-\infty} \frac{-3x^2+1}{x+2}$

a) $$\lim_{x\to\infty} \frac{2x-4}{-3x+1} \underset{\text{“}\frac{\infty}{\infty}\text{”}}{=} \lim_{x\to\infty} \frac{\cancel{x}\left(2-\frac{4}{x}\right)}{\cancel{x}\left(-3+\frac{1}{x}\right)}$$

$$= \lim_{x\to\infty} \frac{2-\frac{4}{x}}{-3+\frac{1}{x}} = \frac{2}{-3}$$

b) $$\lim_{-\infty} \frac{\overset{x}{\cancel{x^2}}\left(-3+\frac{1}{x^2}\right)}{\underset{1}{\cancel{x}}\left(1+\frac{2}{x}\right)} = \lim_{x\to-\infty} \frac{x\left(-3+\frac{1}{x^2}\right)}{1+\frac{2}{x}}$$

$$= \frac{-\infty\cdot(-3)}{1} = +\infty$$

x	$-\infty$	-2		$-1/\sqrt{3}$		$1/\sqrt{3}$	$+\infty$
$-3x^2+1$	$-$		$-$	0	$+$	0	$-$
$x+2$	$-$		$+$		$+$		$+$
$f(x)$	$+$	‖	$-$	0	$+$	0	$-$