# LDDR - Niveau 1 : TE 7 Analyse.

## Exercice 1

$A(?;3)$ $\quad d_{AB}: 3x-2y+4=0$ $\quad B(-2;-1)$

$d_{AC} \parallel \begin{pmatrix} 1 \\ -1 \end{pmatrix}$ $\quad C(x_c, 0)$

1. $A \in d_{AB}: \; 3x-6+4=0 \Leftrightarrow 3x=+2 \Leftrightarrow x=\frac{2}{3}$

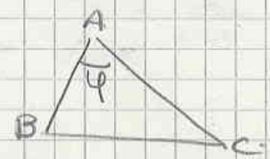
$A\left(\frac{2}{3};3\right)$

2. $\vec{d}_{AC} = \begin{pmatrix} 1 \\ -1 \end{pmatrix} \Rightarrow \vec{n}_{AC} = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$

$AC: \; x+y+d=0$ $\quad A: \; \frac{2}{3}+3+d=0 \Leftrightarrow d=-\frac{11}{3}$

$x+y-\frac{11}{3}=0 \Leftrightarrow 3x+3y-11=0$

3. $C \in d_{AC}: \; 3x-11=0 \Leftrightarrow x=\frac{11}{3}$ $\quad C\left(\frac{11}{3};0\right)$

4) 


$\vec{AB} = \begin{pmatrix} -8/3 \\ -4 \end{pmatrix}$ $\quad \vec{AC} = \begin{pmatrix} 3 \\ -3 \end{pmatrix}$

$$\cos\varphi = \frac{\vec{AB}\cdot\vec{AC}}{\|\vec{AB}\|\cdot\|\vec{AC}\|} = \frac{-\frac{8}{\cancel{3}}\cdot\cancel{3}+4\cdot 3}{\sqrt{\frac{64}{9}+16}\cdot\sqrt{9+9}} \Rightarrow \varphi = 78.7°$$

## Exercice 2

1) $$\lim_{x\to -1} \frac{(x+1)^2}{x^2-3x-4} = \lim_{x\to -1} \frac{(x+1)^2}{(x-4)\cancel{(x+1)}} = 0$$

2) $$\lim_{x\to 0} \frac{2\sin(4x)}{\tan(3x)} = \lim_{x\to 0} \frac{2\cdot 4\sin 4x}{4x}\cdot\frac{3x}{3\tan 3x} = \frac{8}{3}$$

3) $$\lim_{x\to -4^+} \frac{2x^2+7x-4}{|x+4|} = \lim_{x\to -4^+} \frac{2\cancel{(x+4)}(x-\frac{1}{2})}{\cancel{x+4}} = -9$$

$$\lim_{x\to -4^-} \frac{2\cancel{(x+4)}(x-\frac{1}{2})}{-\cancel{(x+4)}} = +9$$

4) $$\lim_{x\to 3} \frac{2x-6}{2-\sqrt{x^2-5}} = \lim_{x\to 3} \frac{2(x-3)(2+\sqrt{x^2-5})}{4-(x^2-5)} =$$

$$= \lim_{x\to 3} \frac{2\cancel{(x-3)}(2+\sqrt{x^2-5})}{-\cancel{(x-3)}(x+3)} = \frac{2(2+2)}{-6} = -\frac{8}{6} = -\frac{4}{3}$$

5) a) $\lim\limits_{x\to -2} \dfrac{5}{3+4^{\frac{1}{x+1}}} = \dfrac{5}{3+4^{-1}} = \dfrac{5}{3+\frac{1}{4}} = \dfrac{5\cdot 4}{13} = \dfrac{20}{13}$

b) $\lim\limits_{x\to -1^+} \dfrac{5}{3+4^{\frac{1}{x+1}}} = 0$

$\lim\limits_{x\to -1^-} \dfrac{5}{3+4^{\frac{1}{x+1}}} = \dfrac{5}{3}$

c) $\lim\limits_{x\to +\infty} \dfrac{5}{3+4^{\frac{1}{x+1}}} = \dfrac{5}{3}$

## EXERCICE 3

1) $f(x) = \dfrac{2(x+1)}{x^2-x-2} =$ $\quad x^2-x-2=0 \Leftrightarrow \begin{matrix} x_1 = 2 \\ x_2 = -1 \end{matrix}$ $\quad D_f = \mathbb{R} \setminus \{-1;2\}$

AV $\lim\limits_{x\to 2} f(x) = \lim\limits_{x\to 2} \dfrac{2(x+1)}{(x-2)(x+1)} = \text{"}\dfrac{2}{0}\text{"} = \begin{cases} x\to 2^+ & +\infty \\ x\to 2^- & -\infty \end{cases}$

AV $x=2$

$\lim\limits_{x\to -1} f(x) = \lim\limits_{x\to -1} \dfrac{2(x+1)}{(x-2)(x+1)} = \dfrac{2}{-3} = -\dfrac{2}{3}$

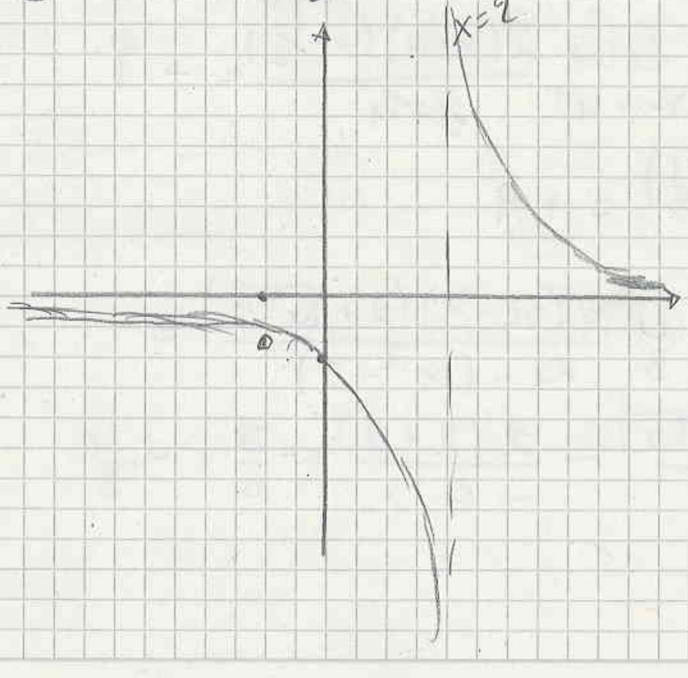
Trou $(-1;-\frac{2}{3})$

AH/AO: $\lim\limits_{x\to \pm\infty} f(x) = 0$ $\quad$ AH: $y=0$

$x \to \pm\infty \quad f(x) \overset{>}{\underset{<}{\to}} 0$

$\cap Ox$ $f(x)=0 \Leftrightarrow (x+1)=0 \Leftrightarrow x=-1$ $\quad (-1;0)$ Impossible

$\cap Oy$ $f(0) = \dfrac{2}{-2} = -1$ $\quad (0;-1)$



2) $f(x) = \frac{-x^3+4x}{2(x^2-1)} = \frac{x(-x^2+4)}{2(x-1)(x+1)} = \frac{-x(x-2)(x+2)}{2(x-1)(x+1)}$

· $D_f = \mathbb{R} \setminus \{\pm 1\}$

· $\lim_{x \to 1} f(x) = \text{"}\frac{3}{0}\text{"}$ $\begin{cases} x \to 1^+ & +\infty \\ x \to 1^- & -\infty \end{cases}$ AV $x = 1$

· $\lim_{x \to -1} f(x) = \text{"}\frac{-3}{0}\text{"} = \begin{cases} x \to -1^+ & +\infty \\ x \to -1^- & -\infty \end{cases}$ AV $x = -1$

· $\begin{array}{r|l} -x^3+4x & 2x^2-2 \\ \underline{x^3 \quad -x} & -\frac{1}{2}x \\ +3x & \end{array}$ $f(x) = -\frac{1}{2}x + \frac{3x}{2x^2-2}$

AO : $y = -\frac{1}{2}x$

$x \to \pm\infty$ $f(x) \overset{>}{\underset{<}{\to}} -\frac{1}{2}x$

· $\cap Ox$: $f(x) = 0 \Leftrightarrow -x^3+4x = 0 \Leftrightarrow x(-x^2+4) = 0 \Rightarrow$

$x = 0$ $x = 2$ $x = -2$

$(0,0)$ $(2,0)$ $(-2;0)$

· $\cap Oy$ $f(0) = 0$ $(0;0)$