Serie

exercice 1:

- $f_1(x) \quad \dfrac{x}{\sqrt{1+x^2} - \sqrt{1+x}}$

$\sqrt{1+x^2} - \sqrt{1+x} \neq 0$.

$\Longleftrightarrow \sqrt{1+x^2} \neq \sqrt{1+x}$

$1+x^2 \neq 1+x$

$x^2 \neq x$

$x^2 \neq 1$

$[-1 ; +\infty[\setminus (0, 1)$

2) $f_2(x) = \ln(1+x^3) + x - 1$

$1+x^3 > 0$

$]-1 ; +\infty[$

3) $f_3(x) = \dfrac{\ln(x)}{E(x^2) - 4}$

$\Leftrightarrow x > 0$

$\Leftrightarrow E(x^2) - 4 \neq 0$.

$\Leftrightarrow (x^2) \neq 4$

$$\frac{h(x)}{E(x^2) - 4}$$

$E(x^2) - 4 \neq 0$.

$x > 0$.

$\Leftrightarrow 4 \leq E(x^2) < 5$

$2 \leq x < \sqrt{5}$

$\Leftrightarrow]0 ; 2[\cup [\sqrt{5} ; +\infty[$.

2)

On pose que : $y = x^2$:

$y^2 + 2y + 1$

$\Delta = b^2 - 4a.c$

$2^2 - 4 = 0$. $\frac{-b}{2a} = \frac{-2}{2} = -1$.

$= -1^2 + 2 \cdot -1 + 1$

$= 1 - 2 + 1 = 0$,

$D_{f_5} = \mathbb{R}$.

D_{f_6} :

$f_6(x) = \tan_g(\pi x) \cos\left(\frac{1}{x}\right)$.

$x \neq 0$.

$$\tan(x) = \frac{\sin(x)}{\cos(x)}$$

$\cos(x) \neq 0$.

$$\cos\left(2k\frac{\pi}{2}\right) = 0$$

$\Leftrightarrow \forall x \; 2k\pi + \frac{1}{2}$.

2) $$\lim_{0} \frac{x - \ln(1+x)}{x} =$$

$$\lim_{0} \frac{\cancel{x}\left(1 - \frac{\ln(1+x)}{x}\right)}{\cancel{x}}$$

$$= \lim_{0} 1 - \frac{\ln(1+x)}{x} = 1 - 1 = 0.$$

$$\lim_{+\infty} \frac{2x - \sqrt{x^2+1}}{3x+1}$$ plus haut degré.

$$\Leftrightarrow \frac{2x - \sqrt{x^2}}{3x}$$

$$\Leftrightarrow \frac{2x - x}{3x} = \frac{x}{3x} = \frac{1}{3}$$

3) $\lim_{+\infty} \sqrt{x^2 - 3x} - 2x$

$$\lim_{+\infty} \sqrt{x^2} - 2x$$

$$\Leftrightarrow \lim_{+\infty} x - 2x$$

$$\Leftrightarrow \lim_{+\infty} -x = -\infty.$$

4) $\dfrac{e^{3x} + 4x + 1}{4e^{3x} + e^{-x} + e^{x}}$

$\lim\limits_{+\infty} f(x) \Rightarrow$

5) $\lim\limits_{+\infty} \dfrac{-2x^2 + 2}{3x^2 + 2x + 1}$

$\dfrac{-2x^2}{3x^2} = \dfrac{-2}{3}$

6) $\lim\limits_{4} E(x)$

exc 3)

$$\lim_{0} \frac{1-\cos(3x)}{x^2}$$

$$1-\cos(3x) = 3\sin(3x)$$

$$\frac{3\sin(3x)\times 3}{2x \times 3} \Leftrightarrow \frac{9\sin(3x)}{6x}$$

$$\Leftrightarrow \lim_{0} \frac{\sin(\theta)}{\theta} \quad \theta = 6x$$

$$\lim_{0} \frac{\sin(\theta)}{\theta} = 1.$$

$$\lim_{x} \frac{\sin(f(x))}{f(x)}$$

$$\frac{\ln(2+x)+x+1}{x+1}$$

$$\lim_{-1} \quad \frac{0}{0}.$$

$$f' = \frac{1}{2+x} \qquad = \lim_{-1} \frac{1}{1-1} = 1.$$

$$\Leftrightarrow \quad g' = 1$$

$$\frac{(\ln(2+x)+x+1)'}{(x+1)'} = \frac{\frac{1}{2+x}+1}{1}$$

$$\Leftrightarrow \lim_{-1} \frac{1}{2+x}+1 = 2.$$

$$\frac{e^x - e^{-x}}{e^x + e^{-x}} = 0$$

$$3/\ f_3(x) \quad \frac{1}{1-x} - \frac{2}{1-x^2}$$

non définie sur 1 et -1

$$\frac{2(1-x^2)}{(1-x)(1-x^2)}$$

$$(a-b)^2 = a^2 - 2ab + b^2$$

$$1 - 2x + x^2$$

$$a^2 - b^2 = (a-b)(a+b)$$

$$\frac{1}{1-x} - \frac{2}{1-x^2}$$

$$\Rightarrow \frac{1-x}{(1-x)(1+x)} - \frac{1}{1+x^2} = \frac{1-x}{1+x-x-x^2}$$

$$1 \quad \frac{1}{x^2}$$