Ex 9 :

$$\lim_{x \to -\infty} f(x) = \frac{0-1}{0+1} = -1$$

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

$$f(x) = \frac{e^x - 1}{2e^x + 1} = \frac{e^x \left(1 - \frac{1}{e^x} \right)}{e^x \left(2 + \frac{1}{e^x} \right)}$$

$$\lim_{x \to +\infty} f(x) = \lim_{x \to +\infty} \frac{1 - 1/e^x}{2 + 1/e^x} = \frac{1 - 1/+\infty}{2 + 1/+\infty} = \frac{1}{2}$$

Ex 10 :

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

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

$$f(x) = e^x - x = e^x \left(1 - \frac{x}{e^x} \right)$$

$$\lim_{x \to +\infty} f(x) = \lim_{x \to +\infty} e^x \left(1 - \frac{x}{e^x} \right)$$

Rappel : $\lim_{x \to +\infty} \frac{x}{e^x} = 0 \Rightarrow \lim_{x \to +\infty} f(x) = +\infty \times 1 = +\infty$

$\underline{\text{Ex 11}}:\ \lim\limits_{x \to +\infty} (x - \ln x) = \lim\limits_{x \to +\infty} x\left(1 - \dfrac{\ln x}{x}\right)$

$\text{Rappel}:\ \lim\limits_{x \to +\infty} \dfrac{\ln x}{x} = 0$

$\Rightarrow \lim\limits_{x \to +\infty} (x - \ln x) = +\infty \times 1 = +\infty$

$\underline{\text{Ex 12}}:\ \lim\limits_{x \to +\infty} \dfrac{e^x + 1}{x^2 + 1} = \lim\limits_{x \to +\infty} \dfrac{e^x\left(1 + \frac{1}{e^x}\right)}{x^2\left(1 + \frac{1}{x^2}\right)} =$

$= \lim\limits_{x \to +\infty} \dfrac{e^x}{x^2} = +\infty$