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

2) $\lim_{x \to 2} e^x = e^2$

3) $\lim_{x \to \infty} (x^2 - e^{-x^2}) = +\infty$

$y = \frac{3x-7}{2x+1}$ $\quad$ C.E. $= \left(-\infty; -\frac{1}{2}\right) \cup \left(-\frac{1}{2}; +\infty\right)$

$f(x) = \frac{x^2}{|x|}$ $\quad \frac{x^2}{x} = x \quad x > 0$

$\quad \frac{x^2}{-x} = -x \quad x < 0$

$D_f = \mathbb{R} - \{0\}$

$$f(x) = \begin{cases} \frac{x^2}{|x|} & \text{per } x \in \mathbb{R} - \{0\} \\ 0 & \text{per } x = 0 \end{cases}$$

$$\frac{1}{e^0}$$

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

$$D_f=\left\{x\in\mathbb{R} \,/\, \begin{cases}2-x\neq 0\\ e^{\frac{x}{2-x}}-1\neq 0\end{cases}\right\}=$$

$$=\left\{x\in\mathbb{R} \,/\, \begin{cases}x\neq 2\\ \frac{x}{2-x}\neq 0\end{cases}\right\}$$

$$=\left\{x\in\mathbb{R} \,/\, \begin{cases}x\neq 2\\ x\neq 0\end{cases}\right\}=$$

$$=(-\infty;0)\cup(0;2)\cup(2;+\infty)$$

$x=0$

$x=2$

$$\left.\begin{array}{l}\lim_{x\to 0^-} f(x)=+\infty\\ \lim_{x\to 0^+} f(x)=+\infty\end{array}\right\}\text{II SP.}$$

$$\lim_{x\to 2^-} f(x)=0^+ \qquad \lim_{x\to 2^+} f(x)=-1 \qquad \text{I SPECIE}$$

$$\lim_{x\to\infty}\left(x^2-e^{-x^2}\right)=+\infty$$

$\forall M>0\ \exists I_M(+\infty)$ e comp. $\exists I_N(\infty) \mid \forall x\in I_N(\infty)$ si ha

$$f(x)>M$$

$$\begin{cases} x^2-e^{-x^2}>M \\ x<-N \cup x>N\end{cases} \qquad \begin{cases}\dfrac{x^2e^{x^2}-1-Me^{x^2}}{e^{x^2}}>0 \\ x<-N\cup x>N\end{cases}$$

$$(x^2-M)e^{x^2}-1>0 \qquad e^{x^2}>\frac{1}{x^2-M}$$

$$\lim_{x \to 2} e^x = e^2$$

$\forall \varepsilon > 0 \ \exists \, I_\varepsilon(e^2)$ e corrisp. $\exists \, I_\sigma(2) \;/\; \forall x \in I_\sigma(2)$

si ha $\quad |e^x - e^2| < \varepsilon \qquad -\varepsilon < e^x - e^2 < \varepsilon$

$$e^2 - \varepsilon < e^x < e^2 + \varepsilon \qquad \begin{cases} e^x > e^2 - \varepsilon \\ e^x < e^2 + \varepsilon \end{cases} \qquad \begin{cases} x > \ln(e^2 - \varepsilon) \\ x < \ln(e^2 + \varepsilon) \end{cases}$$

$\ln(e^2 - \varepsilon) < x < \ln(e^2 + \varepsilon)$ intorno di 2

$$2 - \underset{\sigma}{\underset{\parallel}{f(\varepsilon)}} < x \quad 2 + \underbrace{f(\varepsilon)}_{\sigma}$$

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$$f(x)=\frac{|4-x^2|}{2+x} \qquad D_f=\{x\in\mathbb{R} \,/\, x\neq -2\}=(-\infty;-2)\cup(-2;+\infty)$$

$4-x^2\geq 0 \qquad -2\leq x\leq 2$

$$f(x)\begin{cases} \text{Se} \quad -2\leq x<2 \quad f(x)=\dfrac{4-x^2}{2+x} \quad f_2(x) \\ \text{Se} \quad x<-2 \cup x\geq 2 \quad f(x)=\dfrac{x^2-4}{2+x} \quad f_1(x) \end{cases}$$

$$\lim_{x\to -2^-} f(x)=\lim_{x\to -2^-} f_1(x)=\lim_{x\to -2^-}\frac{x^2-4}{x+2}=\lim_{x\to -2^-}(x-2)=-4^-$$

$$\lim_{x\to -2^+} f(x)=\lim_{x\to -2^+} f_2(x)=\lim_{x\to -2^+}\frac{4-x^2}{2+x}=\lim_{x\to -2^+}(2-x)=4^-$$