26/10/2020

CALCOLO DI LIMITI DI FUNZIONI

PAG. 1521 e seguenti

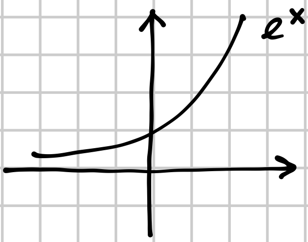
N° 10

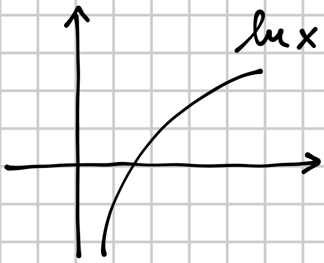
$$\lim_{x \to -1} (x^4 - x^3 - 4) = (-1)^4 - (-1)^3 - 4 =$$

$$= 1 + 1 - 4 = -2$$

11 $\lim_{x \to +\infty} (e^x + \ln x)$ $[+\infty]$

$$\lim_{x \to +\infty} (e^x + \ln x) = \lim_{x \to +\infty} e^x + \lim_{x \to +\infty} \ln x =$$

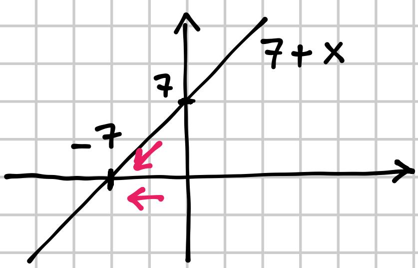




$$= +\infty + \infty = +\infty$$

29 $\lim_{x \to -7^+} \frac{\sqrt{2-x} + x}{7+x}$ $[-\infty]$

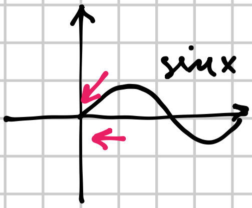
$$\lim_{x \to -7^+} \frac{\sqrt{2-x} + x}{7+x} = \frac{\sqrt{2-(-7)} - 7}{7-7} = \frac{3-7}{0^+} = \frac{-4}{0^+} =$$



$$= -\infty$$

30 $\displaystyle\lim_{x\to 0^+} \frac{\ln(2+\sin x)}{\sin x}$ $[+\infty]$

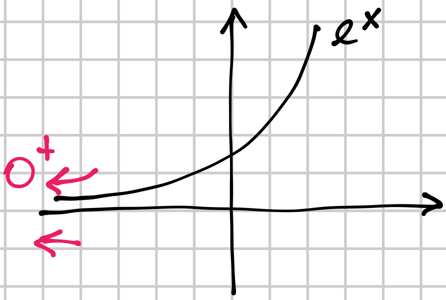
$$\lim_{x\to 0^+} \frac{\ln(2+\sin 0)}{0^+} = \frac{\ln 2}{0^+} = +\infty$$



31 $\displaystyle\lim_{x\to +\infty} \frac{e^{-x}}{x^2+2x}$ $[0^+]$

già calcolato il $\displaystyle\lim_{x\to -\infty} e^x$

$$\lim_{x\to +\infty} \frac{e^{-x}}{x^2+2x} = \frac{e^{-\infty}}{+\infty+\infty} = \frac{0^+}{+\infty} = 0^+$$



$$\frac{0}{\infty} = 0$$

$$\frac{\infty}{0} = \infty$$

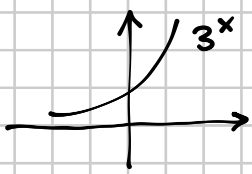
33 $\displaystyle\lim_{x\to 0^+} (x+3)^{\frac{1}{x}}$ $[+\infty]$

$$y = [f(x)]^{g(x)} =$$
$$= e^{\ln f(x)^{g(x)}}$$
$$= e^{g(x)\ln f(x)}$$

DOMINIO: $f(x) > 0$

DOMINIO $\begin{cases} x+3>0 \\ x\neq 0 \end{cases} \Rightarrow D =]-3,0[\,\cup\,]0,+\infty[$

$$\lim_{x\to 0^+} (0+3)^{+\infty} = 3^{+\infty} = +\infty$$



$$\lim_{x\to 0^-} (0+3)^{-\infty} = 3^{-\infty} = 0^+$$

143 $\lim_{x \to +\infty} \left(\sqrt{x^2+1} - \sqrt{x^2-4}\right) =$ [0]

$$= \left(\sqrt{+\infty} - \sqrt{+\infty}\right) = +\infty - \infty \quad \text{F.I.}$$

$$\lim_{x \to +\infty} \left(\sqrt{x^2+1} - \sqrt{x^2-4}\right) \cdot \frac{\sqrt{x^2+1} + \sqrt{x^2-4}}{\sqrt{x^2+1} + \sqrt{x^2-4}} =$$

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

$$= \frac{5}{+\infty+\infty} = \frac{5}{+\infty} = 0^+$$

275 $\lim_{x \to -\infty} \frac{-x+\sqrt{x^2-8}}{6x+7} = \frac{+\infty}{-\infty}$ F.I. $\left[-\frac{1}{3}\right]$

$-x$ perché $x \to -\infty$

$$\lim_{x \to -\infty} \frac{-x+\sqrt{x^2\left(1-\frac{8}{x^2}\right)}}{x\left(6+\frac{7}{x}\right)} = \lim_{x \to -\infty} \frac{-x+|x|\sqrt{1-\frac{8}{x^2}}}{x\left(6+\frac{7}{x}\right)} =$$

$$= \lim_{x \to -\infty} \frac{\cancel{x}\left(-1-\sqrt{1-\frac{8}{x^2}}\right)}{\cancel{x}\left(6+\frac{7}{x}\right)} = \frac{-1-1}{6} = -\frac{2}{6} = -\frac{1}{3}$$

$0 \quad 0$

$$\sqrt{x^2} = |x| = \begin{cases} x & \text{se } x \geq 0 \\ -x & \text{se } x < 0 \end{cases}$$

213 $\lim\limits_{x \to -2} \dfrac{3x^2 + x - 10}{x^2 - 5x - 14} = \dfrac{3(-2)^2 - 2 - 10}{(-2)^2 - 5(-2) - 14} =$ $\left[\dfrac{11}{9}\right]$

$$= \frac{12-12}{4+10-14} = \frac{0}{0} \quad \text{F. I.}$$

$$= \lim_{x \to -2} \frac{\cancel{(x+2)}\overbrace{(3x-5)}^{-11}}{\cancel{(x+2)}\underbrace{(x-7)}_{-9}} = \frac{-11}{-9} = \frac{11}{9}$$

$3x^2 + x - 10$

$$\begin{array}{r|rr|r} & 3 & 1 & -10 \\ -2 & & -6 & 10 \\ \hline & 3 & -5 & // \end{array}$$