$$\lim_{x\to 0} \frac{x^3\,(e^{5x^2}-1)\arctan x^5}{\ln(1+2x^2)\sin x^3\cdot\tan^5 x} = \frac{5}{2}$$

$\arctan f(x) \sim f(x)$
se $f(x)\to 0$

$\tan x \sim x$
per $x\to 0$

$$\frac{x^3\,(e^{5x^2}-1)\arctan x^5}{\ln(1+2x^2)\cdot\sin x^3\cdot\tan^5 x} \sim \frac{\cancel{x^3}\cdot 5\cancel{x^2}\cdot\cancel{x^5}}{2\cancel{x^2}\cdot\cancel{x^3}\cdot\cancel{x^5}} = \frac{5}{2}$$

per $x\to 0$

TENERE PRESENTE:

$\boxed{\text{per } x\to 0}$ $\quad \tan x^\alpha \sim x^\alpha \quad \sin x^\alpha \sim x^\alpha \quad \tan^\alpha x \sim x^\alpha \quad \sin^\alpha x\sim x^\alpha$

$\alpha>0 \quad \arctan x^\alpha \sim x^\alpha \quad \arctan^\alpha x \sim x^\alpha$

$\boxed{\text{per } x\to +\infty}$ $\quad \arctan x \sim \frac{\pi}{2}$ $\qquad \boxed{\text{per } x\to -\infty}$ $\quad \arctan x \sim -\frac{\pi}{2}$

$$\lim_{x\to-\infty}\left(1-\frac{10}{7x}\right)^x\cdot\arctan x = -\frac{\pi e^{-\frac{10}{7}}}{2}$$

$$\left(1-\frac{10}{7x}\right)^x\cdot\arctan x \sim \left(1-\frac{10}{7x}\right)^x\cdot\left(-\frac{\pi}{2}\right) \quad \text{per } x\to-\infty$$

adesso calcolo

$$\lim_{x\to-\infty}\left(1-\frac{10}{7x}\right)^x = \lim_{t\to+\infty}\left(1+\frac{1}{t}\right)^{-\frac{10}{7}t} = \lim_{t\to+\infty}\left[\left(1+\frac{1}{t}\right)^t\right]^{-\frac{10}{7}} = e^{-\frac{10}{7}} = \sqrt[7]{\frac{1}{e^{10}}}$$

$$-\frac{10}{7x} = \frac{1}{t} \qquad t = -\frac{7x}{10} \qquad x = -\frac{10}{7}t$$

$$x\to-\infty \Rightarrow t\to+\infty$$

alternativa

$$\lim_{x\to-\infty}\left(1-\frac{10}{7x}\right)^x = \lim_{x\to-\infty} e^{x\ln\left(1-\frac{10}{7x}\right)} = e^{-\frac{10}{7}}$$

$$x\ln\left(1-\frac{10}{7x}\right) \sim \cancel{x}\cdot\left(-\frac{10}{7\cancel{x}}\right) = -\frac{10}{7}$$

per $x\to-\infty$

VIETATO USARE LE EQUIVALENZE ASINTOTICHE CON LE SOMME!

$$\lim_{x\to 0} \frac{e^x - 1 - \sin x}{x^2}$$

SBAGLIATO!!

$$\frac{e^x-1-\sin x}{x^2} \sim \frac{x-x}{x^2} = \frac{0}{x^2} = 0$$

per $x \to 0$

INFATTI IL LIMITE VALE $\frac{1}{2}$

892 $f(x) = \begin{cases} 100 & x = -1 \\ \dfrac{x^2-x}{x^2-1} & \text{se } x < 1 \text{ e } x \neq -1 \\ \dfrac{1}{x+1} & \text{se } x \geq 1 \end{cases}$ [$x = -1$: II specie]

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

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

$\boxed{x = -1 \text{ DISC. DI } 2^a \text{ SPECIE}}$

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

$f(1) = \frac{1}{1+1} = \frac{1}{2}$ (ovviamente anche $\lim_{x\to 1^+} f(x) = \lim_{x\to 1^+} \frac{1}{x+1} = \frac{1}{2}$)

$\boxed{f \text{ È CONTINUA IN } 1}$