854

$$\lim_{x\to 0} \frac{1}{x}\left(e^x\sqrt{x^2+x+1} - \frac{\sqrt{5x^2+2x+1}}{1+x}\right) =$$

$$= \lim_{x\to 0} \frac{e^x(1+x)\sqrt{x^2+x+1} - \sqrt{5x^2+2x+1}}{x(1+x)} =$$

$$= \lim_{x\to 0} \frac{\left[e^x(1+x)\sqrt{x^2+x+1} - \sqrt{5x^2+2x+1}\right]\left[e^x(1+x)\sqrt{x^2+x+1} + \sqrt{5x^2+2x+1}\right]}{\cancel{e}\,x(1+x)\left[e^x(1+x)\sqrt{x^2+x+1} + \sqrt{5x^2+2x+1}\right])} =$$

$$\left\{(1+0)\left[e^0(1+0)\sqrt{0+0+1} - \sqrt{0+0+1}\right] = 1(1+1) = 2\right\}$$

$$= \frac{1}{2}\lim_{x\to 0} \frac{e^{2x}(1+x)^2(x^2+x+1) - 5x^2-2x-1}{x} =$$

G H I JK L M N O

251

$$\lim_{x \to +\infty} \frac{16x^3 + x\sqrt{x} + 1}{2x + \log x + 2}\left(2^{\sqrt{\frac{x^2+1}{4x^2+3}}} - \sqrt{2}\right) =$$

$$= \sqrt{2} \lim_{x \to +\infty} \frac{16x^3 + x\sqrt{x} + 1}{2x + \log x + 2} \cdot \left(\sqrt{\frac{x^2+1}{4x^2+3}} - \frac{1}{2}\right) \cdot \frac{2^{\sqrt{\frac{x^2+1}{4x^2+3}} - \frac{1}{2}} - 1}{\sqrt{\frac{x^2+1}{4x^2+3}} - \frac{1}{2}} =$$

$$= \sqrt{2} \log 2 \lim_{x \to +\infty} \frac{16x^3 + x\sqrt{x} + 1}{2x + \log x + 2}\left(\sqrt{\frac{x^2+1}{4x^2+3}} - \frac{1}{2}\right) =$$

$$= \sqrt{2} \log 2 \lim_{x \to +\infty} \frac{\frac{16x^3 + x\sqrt{x} + 1}{2x + \log x + 2}\left(\frac{x^2+1}{4x^2+3} - \frac{1}{4}\right)}{\sqrt{\frac{x^2+1}{4x^2+3}} + \frac{1}{2}} =$$

$$= \sqrt{2} \log 2 \lim_{x \to +\infty} \ldots$$

$$= \sqrt{2} \log 2 \lim_{x \to +\infty} \ldots$$

$$= \sqrt{2} \log 2 \ldots$$

$$= \sqrt{2} \log 2 \; \frac{1}{2} \ldots$$

$$= \sqrt{2}\log 2 \lim_{x \to +\infty} \frac{\dfrac{16x^3+x\sqrt{x}+1}{2x+\log x+2} \cdot \dfrac{\cancel{4x^2}+4-\cancel{4x^2}-3}{\cancel{4}(4x^2+3)}}{\sqrt{\dfrac{x^2+1}{4x^2+3}}+\dfrac{1}{2}} =$$

$$= \sqrt{2}\log 2 \lim_{x \to +\infty} \frac{\dfrac{\cancel{x^3}\left(16+\dfrac{\sqrt{x}}{x^2}+\dfrac{1}{x^3}\right)}{\cancel{x^3}\left(2+\dfrac{\log x}{x}+\dfrac{3}{x}\right)} \cdot \dfrac{1}{16\cancel{x^2}+\dfrac{3}{x^2}}}{\left(\sqrt{\dfrac{x^2+1}{4x^2+3}}+\dfrac{1}{2}\right)}$$

$$= \sqrt{2}\log 2 \; \frac{\dfrac{\cancel{16}}{2} \cdot \dfrac{1}{\cancel{16}}}{\dfrac{1}{2}+\dfrac{1}{2}} =$$

$$= \sqrt{2}\log 2 \; \frac{1}{2} = \frac{\sqrt{2}}{2}\log 2$$

254

$$\lim_{x\to 0} \frac{1}{x}\left(e^x\sqrt{x^2+x+1} - \frac{\sqrt{5x^2+2x+1}}{1+x}\right) =$$

$$= \lim_{x\to 0} \frac{e^x(1+x)\sqrt{x^2+x+1} - \sqrt{5x^2+2x+1}}{x(1+x)} =$$

$$= \lim_{x\to 0} \frac{\left[e^x(1+x)\sqrt{x^2+x+1} - \sqrt{5x^2+2x+1}\right]\left[e^x(1+x)\sqrt{x^2+x+1} + \sqrt{5x^2+2x+1}\right]}{\cancel{x}(1+x)\left[e^x(1+x)\sqrt{x^2+x+1} + \sqrt{5x^2+2x+1}\right])} =$$

$$\{(1+0)[e^0(1+0)\sqrt{0+0+1} - \sqrt{0+0+1} = 1(1+1) = 2\}$$

$$= \frac{1}{2}\lim_{x\to 0} \frac{e^{2x}(1+x)^2(x^2+x+1) - 5x^2-2x-1}{x} =$$

1- alt. geek / disquisizione su termini generali
2- rec. gambling / gioco d'azzardo
3. rec. music. makers. guitar

$$\frac{1}{2}\lim_{x\to 0} \frac{e^{2x}(1+2x+x^2)(x^2+x+1) - 5x^2 - 2x - 1}{x} =$$

$$= \frac{1}{2}\lim_{x\to 0} \frac{e^{2x}(x^2+x+1+2x^3+2x^2+2x+x^4+x^3+x^2) - 5x^2-2x-1}{x} =$$

$$= \frac{1}{2}\lim_{x\to 0} \frac{e^{2x}(x^4+3x^3+4x^2+3x+1) - 5x^2-2x-1}{x} =$$

$$= \frac{1}{2}\lim_{x\to 0}\left[2\,\frac{e^{2x}-1}{2x} + e^{2x}(x^3+3x^2+4x+3) - 5x - 2\right] =$$

$$= \frac{1}{2}\left[2\cdot 1 + e^0(\cancel{1+3+4+}\ 0+0+0+3) - 0 - 2\right] = \frac{1}{2}\left[2+3-2\right] = \frac{3}{2}$$

G H I JK L M N O

255

$$\lim_{x \to -\infty} x \log 4 + \sqrt{x^2 - 2x + 6} \log_{\sqrt{e}} \left(1 + \cos \frac{1}{3x} \right) =$$

$$= \lim_{x \to -\infty} 2x \log 2 + \sqrt{x^2 - 2x + 6} \log \left(1 + \cos \frac{1}{3x} \right) \frac{1}{\log \sqrt{e}} =$$

$$= \lim_{x \to -\infty} 2x \log 2 + \sqrt{x^2 - 2x + 6} \log \left(1 + \cos \frac{1}{3x} \right) \frac{1}{\frac{1}{2} \log e} =$$

$$= \lim_{x \to -\infty} 2 \left[x \log 2 + \sqrt{x^2 - 2x + 6} \log \left(1 + \cos \frac{1}{3x} \right) \right] =$$

$$= 2 \lim_{x \to -\infty} \left[x \log 2 + \sqrt{x^2 + 2x + 6} \log 2 - \sqrt{x^2 - 2x + 6} \log 2 + \sqrt{x^2 - 2x + 6} \log \left(1 + \cos \frac{1}{3x} \right) \right] =$$

$$= 2\lim_{x\to-\infty} \log 2\left(x+\sqrt{x^2-2x+6}\right) + 2\lim_{x\to-\infty} \sqrt{x^2-2x+6}\left[\log\left(1+\cos\frac{1}{3x}\right)-\log 2\right] =$$

$$= 2\log 2\lim_{x\to-\infty} \frac{\left(\sqrt{x^2-2x+6}+x\right)\left(\sqrt{x^2-2x+6}-x\right)}{\sqrt{x^2-2x+6}-x} + 2\lim_{x\to-\infty} \sqrt{x^2-2x+6}\,\log\frac{1+\cos\frac{1}{3x}}{2} =$$

$$= 2\log 2\lim_{x\to-\infty} \frac{x^2-2x+6-x^2}{\sqrt{x^2-2x+6}-x} + 2\lim_{x\to-\infty} \sqrt{x^2-2x+6}\,\log\left[\frac{1+\cos\frac{1}{3x}}{2}+1-1\right]$$

$$= 2\log 2\lim_{x\to-\infty} \frac{-2x+6}{\sqrt{x^2-2x+6}-x} + 2\lim_{x\to-\infty} \sqrt{x^2-2x+6}\,\log\left\{\left[\left(\frac{1+\cos\frac{1}{3x}}{2}\right)-1\right]+1\right\} \cdot \frac{\frac{1+\cos\frac{1}{3x}}{2}-1}{\frac{1+\cos\frac{1}{3x}}{2}-1}$$

$$\to 1$$

$$= 2\log 2\,\frac{-2}{-2} + 2\lim_{x\to-\infty}\sqrt{x^2-2x+6}\left(-1+\frac{1+\cos\frac{1}{3x}}{2}\right) =$$

$$= 2\log 2 + \lim_{x \to -\infty} \sqrt{x^2 - 2x + 6} \cdot \left(-\frac{1}{2} + \frac{1}{2} \frac{1 - \cos\frac{1}{3x}}{\frac{1}{9x^2}} \cdot 9x^2 \right)$$

~~1 - rec. audio. high-end hi-fi.~~

~~2 - elt. fen. heinlein eut. di feute. R. A. Heinlein~~

~~3 - comp. os. linux. hardware linux~~

$$= 2\log 2 + 2 \lim_{x \to -\infty} \sqrt{x^2 - 2x + 6} \cdot \frac{1 + \cos\frac{1}{3x} - 2}{2} =$$

$$= 2\log 2 + 2 \lim_{x \to -\infty} \sqrt{x^2 - 2x + 6} \cdot \frac{\cos\frac{1}{3x} - 1}{2} =$$

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

~~1 rec. music. info~~ ~~puppi rock~~

$$2\log 2 - \lim_{x\to-\infty} \sqrt{x^2-2x+6}\ \frac{1-\cos\frac{1}{3x}}{\frac{1}{9x^2}}$$

$$\frac{1}{9x^2} =$$

$$\cancel{= 2\log 2 - \infty\cdot\frac{1}{2}\infty = -\infty}$$

$$\sqrt{\frac{x^2-2x+6}{81x^4}} =$$

$$= 2\log 2 - \lim_{x\to\infty} \frac{1-\cos\frac{1}{3x}}{\frac{1}{9x^2}}$$

$$= 2\log 2 - 0 = 2\log 2$$

256

$$\lim_{x\to 0} \frac{\log\left[1+\operatorname{senh}(tg^2x - sen^2x)\right]}{(\sqrt{1+x}-1)\,arctg^3x} =$$

$$= \lim_{x\to 0} \frac{\log\left[1+\operatorname{senh}(tg^2x - sen^2x)\right]}{\operatorname{senh}(tg^2x - sen^2x)} \cdot \frac{\operatorname{senh}(tg^2x - sen^2x)}{tg^2x - sen^2x} \cdot \frac{tg^2x - sen^2x}{(\sqrt{1+x}-1)\,arctg^3x} =$$

$$\left\{ \lim_{x\to 0} tg^2x - sen^2x = 0 \Rightarrow \lim_{y\to 0} \frac{\operatorname{senh} y}{y} = 1 \right\}$$

$$= 1 \cdot 1 \cdot \lim_{x\to 0} \frac{tg^2x - sen^2x}{(\sqrt{1+x}-1)\,arctg^3x} = \lim_{x\to 0} \frac{1}{x^4} \frac{tg^2x - sin^2x}{\frac{\sqrt{1+x}-1}{x} \cdot \frac{arctg^3x}{x^3}} =$$

$$= \lim_{x \to 0} \frac{\frac{tg^2 x - \sin^2 x}{x^4}}{\frac{1}{2} \cdot 1} =$$

$$= 2 \lim_{x \to 0} \frac{1}{x^4} \left(\frac{\sin^2 x}{\cos^2 x} - \sin^2 x \right) =$$

$$= 2 \lim_{x \to 0} \frac{\sin^2 x}{x^4} \left(\frac{1 - \cos^2 x}{\cos^2 x} \right) =$$

$$= 2 \lim_{x \to 0} \frac{\sin^2 x}{x^2} \cdot \frac{\sin^2 x}{x^2} \frac{1}{\cos^2 x} = 2$$

$$\lim_{x \to +\infty} \left[\frac{x^2+x+3}{x-1} \right.$$

$$= \lim_{x \to +\infty} \frac{x^2+x+3}{x-1}$$

$$= \lim_{x \to +\infty} \frac{5x^2}{}$$

$$= \lim_{x \to +\infty} \frac{(x^2+x+3}{(}$$

$$= \lim_{x \to +\infty} \frac{5x^2}{5}$$

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$$\lim_{x\to+\infty}\left[\frac{x^2+x+3}{x-1}-\frac{5x^2+3x+1}{5x+4}\,e^{\operatorname{arcsen}\frac{1}{x}}\right]=$$

$$=\lim_{x\to+\infty}\frac{x^2+x+3}{x-1}-\frac{5x^2+3x+1}{5x+4}+$$

$$+\lim_{x\to+\infty}\frac{5x^2+3x+1}{5x+4}\left(e^{\operatorname{arcsen}\frac{1}{x}}-1\right)=$$

$$=\lim_{x\to+\infty}\frac{(x^2+x+3)(5x+4)-(5x^2+3x+1)(x-1)}{(5x+4)(x-1)}+$$

$$-\lim_{x\to+\infty}\frac{5x^2+3x+1}{5x+4}\;\frac{e^{\operatorname{arcsen}\frac{1}{x}}-1}{\operatorname{arcsen}\frac{1}{x}}\;\frac{\operatorname{arcsen}\frac{1}{x}}{\frac{1}{x}}\cdot\frac{1}{x}$$

1 - rec.toys.lego lego user group

$$= \lim_{x\to+\infty} \frac{\cancel{5x^3} + 5x^2 + 15x + 4x^2 + 4x + 12 - \cancel{5x^3} - 3x^2 - x + 5x^2 + 7x + 1}{5x^2 - x - 4} +$$

$$+ \lim_{x\to+\infty} \frac{5x^2+3x+1}{5x^2+4x} \cdot \frac{e^{\arcsin\frac{1}{x}} - 1}{\arcsin\frac{1}{x}} \cdot \frac{\arcsin\frac{1}{x}}{\frac{1}{x}} =$$

$$= \lim_{x\to+\infty} \frac{11x^2 + 71x + 13}{5x^2 - x - 4} + 1 \cdot 1 \cdot 1 =$$

$$= \frac{11}{5} + 1 = \frac{16}{5}$$

es8

$$\lim_{x\to 0^+}\left(\operatorname{tg} e^{\frac{6x^3-\pi}{x+5x^3}}\right)^{\frac{x-50x^2}{3+10x^2}} =$$

$$= e^{\lim_{x\to 0^+}\frac{x-50x^2}{3+10x^2}\log \operatorname{tg} e^{\frac{6x^3-\pi}{x+5x^3}}} =$$

$$= e^{\lim_{x\to 0^+}\cancel{\frac{x-50x^2}{3+10x^2}\,\frac{\log \operatorname{tg} e^{\frac{6x^3-\pi}{x+5x^3}}}{\operatorname{tg} e^{\frac{6x^3-\pi}{x+5x^3}}}}}$$

$$= e^{\cancel{\frac{0}{3}\cdot 0\cdot 1\cdot e}}$$

$$= e^{\lim_{x\to 0^+}\frac{x-50x^2}{3+10x^2}\log\frac{\operatorname{tg} e^{\frac{6x^3-\pi}{x+5x^3}}}{e^{\frac{6x^3-\pi}{x+5x^3}}}}$$

$$= e$$

$$\cancel{\frac{\operatorname{Tg} e^{\frac{6x^3-\pi}{x+5x^3}}}{e^{\frac{6x^3-\pi}{x-5x^3}}}} \qquad e^{\frac{6x^3-\pi}{x-5x^3}} =$$

$$e^{\frac{6x^3-\pi}{x+5x^3}}$$

$=$

$$\lim_{x\to 0^+}\left\{\frac{x-50x^2}{3+10x^2}\log\frac{\operatorname{tg} e^{\frac{6x^3-\pi}{x+5x^3}}}{e^{\frac{6x^3-\pi}{x+5x^3}}}+\frac{x-50x^2}{3+10x^2}\log e^{\frac{6x^3-\pi}{x+5x^3}}\right\}=$$

$$e^{\lim_{x\to 0^+}\left\{\frac{x-50x^2}{3+10x^2}\log\frac{\operatorname{tg} e^{\frac{6x^3-\pi}{x+5x^3}}}{e^{\frac{6x^3-\pi}{x+5x^3}}}+\frac{\cancel{x}(1-50x)}{3+10x^2}\cdot\frac{6x^3-\pi}{\cancel{x}(1+5x^2)}\right\}}=$$

$$= e^{0+\frac{1}{3}(-\pi)} = e^{-\frac{\pi}{3}}$$

$$\cancel{= e^{0+\frac{0}{3}\cdot\frac{-\pi}{0}}} \quad \cancel{= e^{0+\infty}} \quad \cancel{e^{0+\frac{0}{3}\cdot\frac{-\pi}{0^+}}} \quad \cancel{= e^{0}}$$

$\cancel{x-50x^2 \geq 0 \Rightarrow x(1-50x)\geq 0}$ $\cancel{\begin{cases} x\geq 0 \\ x\leq \frac{1}{50}\end{cases}}$

$\cancel{0 \qquad \frac{1}{50}}$

$\cancel{- \quad + \quad -}$

~~$\frac{x-50x^2}{3+10x^2}$ è positivo per $x\to 0^+$ così come $x+5x^3$~~

~~per cui si ha~~

$$\cancel{= e^{0+\frac{0^+-\pi}{3\cdot 0^+}}} = \quad \cancel{e^{0-\infty}} = \cancel{0}$$

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$$\lim_{x \to 0} \frac{\sqrt[4]{1+x^4} - 2 + \cos x^2}{x(\operatorname{sen} x - \operatorname{tg} x)} =$$

$$= \lim_{x \to 0} \frac{\dfrac{(1+x^4)^{\frac{1}{4}} - 1}{x^4} - \dfrac{1-\cos x^2}{x^4}}{x\,\dfrac{(\operatorname{sen} x - \operatorname{tg} x)}{x^4}} =$$

$$= \frac{\dfrac{1}{4} - \dfrac{1}{2}}{\lim\limits_{x \to 0} \dfrac{\operatorname{sen} x}{x^3}\left(1 - \dfrac{1}{\cos x}\right)} =$$

1- alt. cult - mov

2- tec. arts. mo

3- alt. persona

4- sci. militar

5- tec. music.

$= \dfrac{-\frac{1}{4}}{\lim\limits_{x \to 0} \ldots}$

$=$

1

$= -\dfrac{1}{4}$

1- ~~alt. cult-movies~~ (cinema)
2- ~~rec. arts. movies~~ (cinema)
3- ~~alt. personals. misc~~ (personals)
4- ~~sci. military~~ ~~military science newsgroup~~
5- rec. music. misc musica pop

$$= \frac{-\frac{1}{4}}{\lim\limits_{x\to 0} \frac{\sin x}{x} \cdot \frac{\cos x - 1}{x^2 \cos x}} =$$

$$= \frac{-\frac{1}{4}}{1 \cdot \left(-\frac{1}{2}\right) \cdot 1} =$$

$$= -\frac{1}{4} \cdot 2 = \frac{1}{2}$$

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260

$$\cancel{e^{\lim_{x\to 0^+} \frac{x-50x^2}{3+10x^2}}}$$

$$\lim_{x\to 0^+}\left(\log\cosh\frac{1}{x}-\log\operatorname{senh}\frac{1}{x}\right)^{\operatorname{sen}x} =$$

$$=\lim_{x\to 0^+} e^{\operatorname{sen}x\log\left(\log\cosh\frac{1}{x}-\log\operatorname{senh}\frac{1}{x}\right)} =$$

$$=e^{\lim_{x\to 0^+}\frac{\operatorname{sen}x}{x}\times\log\log\frac{\cosh\frac{1}{x}}{\operatorname{sen}\frac{1}{x}}} =$$

$$=e^{\lim_{x\to 0^+} x\log\log\frac{e^{\frac{1}{x}}+e^{-\frac{1}{x}}}{e^{\frac{1}{x}}-e^{-\frac{1}{x}}}} =$$

$$= e^{\lim_{x\to 0^+} x\,\log}$$

$$=e^{\lim_{x\to 0^+} x\log[}$$

$$=e^{\lim_{x\to 0^+} x}$$

$$=e^{\lim_{x\to 0^+}}$$

$$=e^{-2} =$$

$$= e^{\lim\limits_{x\to 0^+} x \log \log \frac{1+e^{-\frac{2}{x}}}{1-e^{-\frac{2}{x}}}} =$$

$$= e^{\lim\limits_{x\to 0^+} x \log\left[\log \frac{1+e^{-\frac{2}{x}}}{e^{-\frac{2}{x}}}\, e^{-\frac{2}{x}} - \log \frac{1-e^{-\frac{2}{x}}}{-e^{-\frac{2}{x}}}\left(-e^{-\frac{2}{x}}\right)\right]}$$

$$= e^{\lim\limits_{x\to 0^+} x \log\left[e^{-\frac{2}{x}} + x \log\left[\frac{\log\left(1+e^{-\frac{2}{x}}\right)}{e^{-\frac{2}{x}}} + \frac{\log\left(1-e^{-\frac{2}{x}}\right)}{e^{-\frac{2}{x}}}\right]\right]}$$

$$= e^{\lim\limits_{x\to 0^+} x\left(-\frac{2}{x}\right) + 0\cdot\log 2} =$$

$$= e^{-2} = \frac{1}{e^2}$$

261 Fedele luglio 1991

$$\lim_{x\to 1^-} (1-x^2)^{\frac{\pi}{4}-\operatorname{arctg}x} =$$

$$= \lim_{x\to 1^-} e^{\left(\frac{\pi}{4}-\operatorname{arctg}x\right)\log(1-x^2)} =$$

$$= \lim_{x\to 1^-} e^{\left(\frac{\pi}{4}-\operatorname{arctg}x\right)\frac{1}{1-x^2}\cdot(1-x^2)\log(1-x^2)}$$

$$\lim_{x\to 1^-} (1-x^2)\log(1-x^2) =$$

$$= \lim_{y\to 0} y \log y = 0$$

$$\lim_{x\to 1^-} \frac{\left(\frac{\pi}{4}-\operatorname{arctg}x\right)}{1-x^2}$$

$$y = \frac{\pi}{4} - \operatorname{arctg} x$$

$\operatorname{arctg}x =$

$x = \operatorname{tg}$

$\lim_{y\to 0}$ ___ $1-$

$= \lim_{y\to 0}$

$= \lim_{y\to 0}$

$= \frac{1}{4}$

luglio 1991

$2)$

$=$

$-x^2) \log(1 - x^2)$

$$\operatorname{arctg} x = \frac{\pi}{4} - y$$

$$x = \operatorname{tg}\left(\frac{\pi}{4} - y\right) = \frac{\operatorname{tg}\frac{\pi}{4} - \operatorname{tg} y}{1 + \operatorname{tg}\frac{\pi}{4}\operatorname{tg} y} = \frac{1 - \operatorname{tg} y}{1 + \operatorname{tg} y}$$

$$\lim_{y \to 0} \frac{y}{1 - \frac{(1-\operatorname{tg} y)^2}{(1+\operatorname{tg} y)^2}} = \lim_{y \to 0} \frac{y\,(1+\operatorname{tg} y)^2}{(1+\operatorname{tg} y)^2 - (1-\operatorname{tg} y)^2} =$$

$$= \lim_{y \to 0} \frac{y\,(1+\operatorname{tg} y)^2}{1+\operatorname{tg}^2 y + 2\operatorname{tg} y - 1 + \operatorname{tg}^2 y + 2\operatorname{tg} y} =$$

$$= \lim_{y \to 0} \frac{y\,(1+\operatorname{tg} y)^2}{4\operatorname{tg} y} =$$

$$= \frac{1}{4} \cdot 1 = \frac{1}{4}$$

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O

261 Fedele luglio 1991

$$\lim_{x\to 1^-} (1-x^2)^{\frac{\pi}{4}-\operatorname{arctg}x} =$$

$$= \lim_{x\to 1^-} e^{\left(\frac{\pi}{4}-\operatorname{arctg}x\right)\log(1-x^2)} =$$

$$= \lim_{x\to 1^-} e^{\left(\frac{\pi}{4}-\operatorname{arctg}x\right)\frac{1}{1-x^2}\cdot(1-x^2)\log(1-x^2)}$$

$$\lim_{x\to 1^-} (1-x^2)\log(1-x^2) =$$

$$= \lim_{y\to 0} y \log y = 0$$

$$\lim_{x\to 1^-} \frac{\left(\frac{\pi}{4}-\operatorname{arctg}x\right)}{1-x^2}$$

$$y = \frac{\pi}{4} - \operatorname{arctg} x$$

$\operatorname{arctg}x =$

$x = \operatorname{tg}$

$\lim_{y\to 0}$ $\frac{\;}{1-}$

$= \lim_{y\to 0}$

$= \lim_{y\to 0}$

$= \frac{1}{4}$

luglio 1991

2)

=

$-x^2)\log(1-x^2)$

$\operatorname{arctg} x = \frac{\pi}{4} - y$

$x = \operatorname{tg}\left(\frac{\pi}{4} - y\right) = \dfrac{\operatorname{tg}\frac{\pi}{4} - \operatorname{tg} y}{1 + \operatorname{tg}\frac{\pi}{4}\operatorname{tg} y} = \dfrac{1 - \operatorname{tg} y}{1 + \operatorname{tg} y}$

$$\lim_{y \to 0} \frac{y}{1 - \frac{(1-\operatorname{tg} y)^2}{(1+\operatorname{tg} y)^2}} = \lim_{y\to 0} \frac{y\,(1+\operatorname{tg} y)^2}{(1+\operatorname{tg} y)^2 - (1-\operatorname{tg} y)^2} =$$

$$= \lim_{y \to 0} \frac{y\,(1+\operatorname{tg} y)^2}{1+\operatorname{tg}^2 y + 2\operatorname{tg} y - 1 + \operatorname{tg}^2 y + 2\operatorname{tg} y} =$$

N

O

$$= \lim_{y\to 0} \frac{y\,(1+\operatorname{tg} y)^2}{4\operatorname{tg} y} =$$

$$= \frac{1}{4}\cdot 1 = \frac{1}{4}$$

quindi

$$\lim_{x\to 1^-} e^{\left(\frac{\pi}{4}-\operatorname{arctg}\right)\log\left(1-x^2\right)} =$$

$$= e^{\frac{1}{4}\cdot 0} = 1$$

262   5.1991 - Fedele

$$\lim_{x\to 0} \frac{\operatorname{sen} 3x + x^2}{1-\cos x + 5x} =$$

$$= \lim_{x\to 0} \frac{3x\,\frac{\operatorname{sen} 3x}{3x} + x^2}{x\,\frac{1-\cos x}{x} + 5x} =$$

$$= \lim_{x\to 0} \frac{\cancel{x}\left[3\cdot\frac{\operatorname{sen} 3x}{3x} + x\right]}{\cancel{x}\left[\frac{1-\cos x}{x} + 5\right]} =$$

quindi

$$\lim_{x\to 1^-} e^{\left(\frac{\pi}{4}-\mathrm{arctg}\right)\log\left(1-x^2\right)} =$$

$$= e^{\frac{1}{4}\cdot 0} = 1$$

262 5 . 1991 - Fedele

$$\lim_{x\to 0}\frac{\mathrm{sen}\,3x + x^2}{1-\cos x + 5x} =$$

$$= \lim_{x\to 0}\frac{3x\,\frac{\mathrm{sen}\,3x}{3x} + x^2}{x\,\frac{1-\cos x}{x} + 5x} =$$

$$= \lim_{x\to 0}\frac{\cancel{x}\left[3\cdot\frac{\mathrm{sen}\,3x}{3x} + x\right]}{\cancel{x}\left[\frac{1-\cos x}{x} + 5\right]} =$$

~~1- comp. interne [illegible] su www. [illegible]~~
~~2- comp. o.s. lin [illegible]~~

$= \frac{3(1 \ldots}{(0+ \ldots}$

~~1- comp. internet. net-happenings~~
~~su www.~~
~~2- comp.os.linux.networking~~   ~~linux~~

$$= \frac{3(1+0)}{(0+5)} = \frac{3}{5}$$

263 Del Prete 6/94

$$\lim_{x \to +\infty} \left(3^x + x^2 \operatorname{arctg} x\right)^{\frac{x}{x^2-3}} =$$

$$= \lim_{x \to +\infty} e^{\frac{x}{x^2+3} \log\left(3^x + x^2 \operatorname{arctg} x\right)}$$

$$= \lim_{x \to +\infty} e^{\cancel{\frac{x}{x^2+3}\left(3^x + x^2 \operatorname{arctg} x\right) \frac{\log\left(3^x + x^2 \operatorname{arctg} x\right)}{3^x + x^2 \operatorname{arctg} x}}}$$

$$= \lim_{x \to +\infty} e^{\frac{x}{x^2+3} \log\left[3^x \left(1 + \frac{x^2}{3^x} \operatorname{arctg} x\right)\right]}$$

$$= \lim_{x \to +\infty} e^{\frac{x}{x^2+3} \log 3^x + \frac{x}{x^2+3} \log\left(1 + \frac{x^2}{3^x} \operatorname{arctg} x\right)} =$$

$\frac{x}{x^2+3}$

$= \lim_{x \to +\infty} e$

$\frac{x}{x^2+3}$

$\times\ e$

$= \lim_{x \to +\infty} e$

$\frac{1}{1 \cdot \log 3}$

$= e \quad e$

$\frac{1}{\log_3 e}$

$= e \quad e$

$\frac{1}{\log_3}$

$= e$

6/94

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

$3^x + x^2 \operatorname{arctg} x)$

$x) \frac{\log(3^x + x^2 \operatorname{arctg} x)}{3^x + x^2 \operatorname{arctg} x}$

$1 + \frac{x^2}{3^x} \operatorname{arctg} x)]]$

$\log\left(1 + \frac{x^2}{3^x} \operatorname{arctg} x\right)$

$=$

$$= \lim_{x \to +\infty} e^{\frac{x}{x^2+3} \log_3 3^x \frac{1}{\log 3}} \times$$

$$\times\, e^{\frac{x}{x^2+3} \frac{x^2}{3^x} \operatorname{arctg} x \frac{\log\left(1 + \frac{x^2}{3^x} \operatorname{arctg} x\right)}{\frac{x^2}{3^x} \operatorname{arctg} x}}$$

$$= \lim_{x \to +\infty} e^{\frac{x^2}{x^2+3} \cdot \frac{1}{\log_3 e}}\, e^{\frac{x^2}{x^2+3} \cdot \frac{x}{3^x} \operatorname{arctg} x \frac{\log\left(1 + \frac{x^2}{3^x} \operatorname{arctg} x\right)}{\frac{x^2}{3^x} \operatorname{arctg} x}} =$$

$$\lim_{y \to 0} \frac{\log(1+y)}{y}$$

$$= e^{\frac{1}{1 \cdot \log_3 e}}\, e^{1 \cdot 0 \cdot \frac{\pi}{2} \cdot 0}$$

$$= e^{\frac{1}{\log_3 e}}\, e^{0} =$$

$$= e^{\frac{1}{\log_3 e}}$$

0

264 Del Prete 7-94

$$\lim_{x\to+\infty}\left(\frac{1}{3^x+x}\right)^{\frac{x}{x^2+3}} =$$

$$= \lim_{x\to+\infty} e^{\frac{x}{x^2+3}\log\left(\frac{1}{3^x+x}\right)}$$

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

$$= \lim_{x\to+\infty} e^{-\frac{x}{x^2+3}\log\left[3^x\left(1+\frac{x}{3^x}\right)\right]} =$$

$$= \lim_{x\to+\infty} e^{-\frac{x}{x^2+3}\log 3^x}\; e^{-\frac{x}{x^2+3}\log\left(1+\frac{x}{3^x}\right)}$$

$$= \lim_{x\to+\infty} e \qquad e$$

$$= \lim_{x\to+\infty} e$$

$$= \lim_{x\to+\infty} e$$

$$\frac{1}{-\log 3}$$

$$= e$$

94

$\frac{1}{\ldots+x})$

$^x+x)$

$=$

$x(1+\frac{x}{3^x})]$

$=$

$\frac{x}{\ldots+3}\log(1+\frac{x}{3^x})$

$$= \lim_{x\to+\infty} e^{-\frac{x}{x^2+3}\log_3 3^x \frac{1}{\log_3 e}}\, e^{-\frac{x}{x^2+3}\frac{x}{3^x}\frac{\log\left(1+\frac{x}{3^x}\right)}{\frac{x}{3^x}}}$$

$$= \lim_{x\to+\infty} e^{-\frac{x^2}{x^2+3}\frac{1}{\log_3 e}}\, e^{-\frac{x^2}{x^2+3}\frac{1}{3^x}\frac{\log\left(1+\frac{x}{3^x}\right)}{\frac{x}{3^x}}} =$$

$$= e^{-\frac{1}{\log_3 e}}\, e^{-1\cdot 0\cdot 0} = e^{-\log 3}$$

265 - Del Prete 5-1991 Compito 3

$$\lim_{x\to 0^+}\left(\operatorname{sen} 3x\right)^{1-\cos x} =$$

$$= \lim_{x\to 0^+} e^{(1-\cos x)\log \operatorname{sen} 3x} =$$

$$= \lim_{x\to 0^+} e^{(1-\cos x)\log 3x \cdot \frac{\operatorname{sen} 3x}{3x}}$$

$$= \lim_{x\to 0^+} e^{(1-\cos x)\log 3x}\, e^{(1-\cos x)\log \frac{\operatorname{sen} 3x}{3x}} =$$

$$= \lim_{x\to 0^+} e^{\frac{1}{3}\frac{1-\cos x}{x}\cdot 3x \log 3x}\, e^{(1-\cos x)\log \frac{\operatorname{sen} 3x}{3x}} =$$

$$= e^{\frac{1}{3}\cdot 0\cdot 0}\, e^{\cancel{(1-\cos x)}\, 0\cdot 0} = e^{0} = 1$$

266 -

$$\lim_{x\to+\infty}$$

$$= \lim_{x\to+\infty}$$

$$= \lim_{x\to\infty}$$

$$= \lim_{x\to+\infty} e$$

$$= \lim_{x\to+\infty} e$$

$$= \lim_{x\to+\infty} e$$

$$= e$$

...1 Compito 3

$3x$

$=$

$\frac{\operatorname{sen} 3x}{3x}$

$\ldots x)\log \frac{\operatorname{sen} 3x}{3x}$

$=$

$(1-\cos x)\log \frac{\operatorname{sen} 3x}{3x} =$

$=$

$e^{0} = 1$

266 - Del Prete 7-1994

$$\lim_{x\to+\infty} \left(3^x + \operatorname{arctg} x\right)^{\frac{x}{x^2-3}} =$$

$$= \lim_{x\to+\infty} e^{\frac{x}{x^2-3}\log\left(3^x + \operatorname{arctg} x\right)} =$$

$$= \lim_{x\to\infty} e^{\frac{x}{x^2-3}\log\left[3^x\left(1+\frac{\operatorname{arctg} x}{3^x}\right)\right]}$$

$$= \lim_{x\to+\infty} e^{\frac{x}{x^2-3}\log 3^x}\, e^{\frac{x}{x^2-3}\log\left(1+\frac{\operatorname{arctg} x}{3^x}\right)} = \quad 0$$

$$= \lim_{x\to+\infty} e^{\frac{x}{x^2-3}\log_3 \cancel{x} \frac{1}{\log_3 e}}\, e^{\frac{x}{x^2-3}\frac{\operatorname{arctg} x}{3^x}\frac{\log\left(1+\frac{\operatorname{arctg} x}{3^x}\right)}{\frac{\operatorname{arctg} x}{3^x}}} =$$

$$= \lim_{x\to+\infty} e^{\frac{x^2}{x^2-3}\frac{1}{\log_3 e}}\, e^{\frac{x}{x^2-3}\frac{\operatorname{arctg} x}{3^x}\frac{\log\left(1+\frac{\operatorname{arctg} x}{3^x}\right)}{\frac{\operatorname{arctg} x}{3^x}}} =$$

$$= e^{\frac{1}{\log_3 e}}\, e^{0\cdot 0\cdot 0} = e^{\frac{1}{\log_3 e}}$$

267 Del Prete

$$\lim_{x\to 0^+}\left(\frac{1}{\sqrt{\operatorname{sen}x}}+\log x\right)=$$

$$=\lim_{x\to 0^+}\log x\left(\frac{1}{\log x\sqrt{\operatorname{sen}x}}+1\right)=$$

$$=\lim_{x\to 0^+}\log x\left(\frac{1}{\sqrt{x}\,\log x}\,\frac{\sqrt{x}}{\sqrt{\operatorname{sen}x}}+1\right)=$$

$$=\lim_{x\to 0^+}\log x\left(\frac{1}{\sqrt{x}\,\log x}\cdot\sqrt{\frac{x}{\operatorname{sen}x}}+1\right)=$$

$$=-\infty\left(\infty\cdot 1+1\right)=$$

$$=-\infty$$

268

$$\lim_{x\to 0^+}\frac{\operatorname{sen}x}{\log(1\ldots}$$

$$=\lim_{x\to 0^+}\frac{\frac{\operatorname{sen}x}{x}}{\log(1\ldots}$$

$$=\frac{1+1}{1+\log 3\ldots}$$

268 Del Prete

$$\lim_{x\to 0^+}\frac{\operatorname{sen}x+\operatorname{arctg}x}{\log(1+x)+3^x-1}=$$

$$=\lim_{x\to 0^+}\frac{\dfrac{\operatorname{sen}x}{x}+\dfrac{\operatorname{arctg}x}{x}}{\dfrac{\log(1+x)}{x}+\dfrac{3^x-1}{x}}=$$

$$=\frac{1+1}{1+\log 3}=\frac{2}{1+\log 3}$$

250

$$\lim_{x\to 0} \frac{1-\cos x\cos 2x\cos 3x}{x^2} =$$

$$= \lim_{x\to 0} \frac{1-\cos x+\cos x-\cos x\cos 2x+\cos x\cos 2x-\cos x\cos 2x\cos 3x}{x^2}$$

$$= \lim_{x\to 0} \frac{1-\cos x}{x^2} + \cos x\,\frac{1-\cos 2x}{x^2} +$$

$$+ \lim_{x\to 0} \cos x\cos 2x\,\frac{1-\cos 3x}{x^2} =$$

$$= \lim_{x\to 0} \frac{1-\cos x}{x^2} + 4\cos x\,\frac{1-\cos 2x}{4x^2} +$$

$$+ \lim_{x\to 0} 9\cos x\cos 2x\,\frac{1-\cos 3x}{9x^2} =$$

$$= \frac{1}{2} + \frac{4}{2} + \frac{9}{2} = \frac{14}{2} = 7$$

252

$$\lim_{x\to+\infty} e^{\frac{3x^2+x+1}{x^3}} \cdot \sqrt[4]{x^4+x^3+5} - x =$$

$$= \lim_{x\to+\infty} e^{\frac{3x^2+x+1}{x^3}} \sqrt[4]{x^4+x^3+5} - e^{\frac{3x^2+x+1}{x^3}} \cdot x$$

$$= \lim_{x\to+\infty} e^{\frac{3x^2+x+1}{x^3}} \left(\sqrt[4]{x^4+x^3+5} - x\right) +$$

$$= \lim_{x\to+\infty} e^{\frac{3x^2+x+1}{x^3}} \left[x \sqrt[4]{1+\frac{1}{x}+\frac{5}{x^4}} - x\right] +$$

$$= \lim_{x\to+\infty} e^{\frac{3x^2+x+1}{x^3}} \cancel{x} \frac{\left(1+\frac{1}{x}+\frac{5}{x^4}\right)^{\frac{1}{4}} - 1}{\left(\cancel{0}+\frac{1}{x}+\frac{5}{x^4}\right)} x\left(\cancel{0}+\frac{1}{x}+\frac{5}{x^4}\right)$$

$$= e^0 \cdot \frac{1}{4} \cdot 1 + 1 \cdot 3 = \frac{1}{4} + 3 = \frac{13}{4}$$

~~1- alt. sex - fetish~~

~~2- rec. outdoor. fishing. fly~~ PESCA

F G H I JK L M N O

$$+ e^{\frac{3x^2+x+1}{x^3}} \cdot x - x =$$

$$\cancel{x}\left(e^{\frac{3x^2+x+1}{x^3}} - 1\right) =$$

$$x\left(e^{\frac{3x^2+x+1}{x^3}} - 1\right)$$

$$+ \cancel{x} \frac{e^{\frac{3x^2+x+1}{x^3}} - 1}{\frac{3x^2+x+1}{x^3}} \cdot \frac{3x^2+x+1}{x^3} \cdot x =$$

253

$$\lim_{x\to+\infty} \sqrt{\frac{x^2+1}{x^2+3}} - \sqrt[3]{\frac{2x^2+3x}{2x^2-4}} =$$

$$= \lim_{x\to+\infty} \sqrt{1+\frac{x^2+1}{x^2+3}-1} - \sqrt[3]{1+\frac{2x^2+3x}{2x^2-4}-1} =$$

$$= \lim_{x\to+\infty} \sqrt{1+\frac{x^2+1-x^2-3}{x^2+3}} - \sqrt[3]{1+\frac{2x^2+3x-2x^2+4}{2x^2-4}}$$

$$= \lim_{x\to+\infty} \sqrt{1-\frac{2}{x^2+3}} - \sqrt[3]{1+\frac{3x+4}{2x^2-4}} =$$

$$= \lim_{x\to+\infty} \left(1-\frac{2}{x^2+3}\right)^{\frac{1}{2}} - 1 - \left[\left(1+\frac{3x+4}{2x^2-4}\right)^{\frac{1}{3}} - 1\right] =$$

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

$$+ \lim_{x\to+\infty} \frac{\left(1+\frac{3x+4}{2x^2-4}\right)^{\frac{1}{3}}-1}{\frac{3x+4}{2x^2-4}} \cdot \frac{3x+4}{2x^2-4} =$$

$$= \frac{1}{2}\cdot 0 - \frac{1}{3}\cdot 0 = 0$$

1- ~~alt. geek~~ disquisizione su termini gergali
2- ~~rec. gambling~~ gioco d'azzardo
3. ~~rec. music. makers. guitar~~

$$\frac{1}{2}\lim_{x\to 0} \frac{e^{2x}(1+2x+x^2)(x^2+x+1)-5x^2-2x-1}{x} =$$

$$= \frac{1}{2}\lim_{x\to 0} \frac{e^{2x}(x^2+x+1+2x^3+2x^2+2x+x^4+x^3+x^2)-5x^2-2x-1}{x} =$$

$$= \frac{1}{2}\lim_{x\to 0} \frac{e^{2x}(x^4+3x^3+4x^2+3x+1)-5x^2-2x-1}{x} =$$

$$= \frac{1}{2}\lim_{x\to 0}\left[2\,\frac{e^{2x}-1}{2x} + e^{2x}(x^3+3x^2+4x+3) -5x-2\right] =$$

$$= \frac{1}{2}\left[2\cdot 1 + e^0(\cancel{1+3+4+}\ 0+0+0+3) - 0 - 2\right] = \frac{1}{2}\left[2+3-2\right] = \frac{3}{2}$$

G H I JK L M N O