Limiti della forma 0/0

1) $\lim_{x\to 0}\dfrac{\log(1+4x)}{5x}=\dfrac{4}{5}$

2) $\lim_{x\to 1}\dfrac{\log(5x-4)}{x-x^2}=-5$

3) $\lim_{x\to 0}\dfrac{e^{4x}-1}{28x}=\dfrac{1}{7}$

4) $\lim_{x\to -1}\dfrac{e^{x+1}-1}{x+x^2}=-1$

5) $\lim_{x\to 3}\dfrac{e^{x^2-9}-1}{x^2+x-12}=\dfrac{6}{7}$

6) $\lim_{x\to 0}\dfrac{4^{5x}-1}{x}=5\log 4$

7) $\lim_{x\to 0}\dfrac{\pi^{-x}-1}{2x}=-\dfrac{1}{2}\cdot\log\pi$

8) $\lim_{x\to 0}\dfrac{\log\left(x^2+3x+1\right)}{x^2+3x}=1$

9) $\lim_{x\to -1}\dfrac{\log\left(2x^2+x\right)}{x^2-1}=\dfrac{3}{2}$

10) $\lim_{x\to -3}\dfrac{\log\left(x^2-8\right)}{x^2+3x}=2$

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

12) $\lim_{x\to \pi}\dfrac{e^{x^2-\pi x}-1}{\sqrt{\pi x}-\pi}=2\pi$

13) $\lim_{x\to -2}\dfrac{x^2-4}{e^{\sqrt{x+2}}-1}=0^-$

14) $\lim_{x\to 1}\dfrac{e^{x-\sqrt{x}}-1}{x-1}=\dfrac{1}{2}$

15) $\lim_{x\to 2}\dfrac{\sqrt{6-x}-2}{e^{x-2}-1}=-\dfrac{1}{4}$

Elaborazioni

1) $\lim_{x\to 0}\frac{\log(1+4x)}{5x}=\frac{4}{5}\cdot\lim_{x\to 0}\frac{\log(1+4x)}{4x}=\frac{4}{5}\cdot 1=\frac{4}{5}$

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

3) $\lim_{x\to 0}\frac{e^{4x}-1}{28x}=\frac{1}{7}\cdot\lim_{x\to 0}\frac{e^{4x}-1}{4x}=\frac{1}{7}\cdot 1=\frac{1}{7}$

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

5) $\lim_{x\to 3}\frac{e^{x^2-9}-1}{x^2+x-12}=\lim_{x\to 3}\frac{e^{(x-3)(x+3)}-1}{(x-3)(x+4)}=\lim_{x\to 3}\frac{e^{(x-3)(x+3)}-1}{(x-3)(x+3)}\cdot\lim_{x\to 3}\frac{x+3}{x+4}=1\cdot\frac{6}{7}=\frac{6}{7}$

6) $\lim_{x\to 0}\frac{4^{5x}-1}{x}=5\cdot\lim_{x\to 0}\frac{4^{5x}-1}{5x}=5\cdot\log 4$

7) $\lim_{x\to 0}\frac{\pi^{-x}-1}{2x}=-\frac{1}{2}\cdot\lim_{x\to 0}\frac{\pi^{-x}-1}{-x}=-\frac{1}{2}\cdot\log\pi$

8) $\lim_{x\to 0}\frac{\log(x^2+3x+1)}{x^2+3x}=\lim_{x\to 0}\frac{\log(1+(x^2+3x))}{x^2+3x}=1$

9) $\lim_{x\to -1}\frac{\log(2x^2+x)}{x^2-1}=\lim_{x\to -1}\frac{\log(1+(2x^2+x-1))}{2x^2+x-1}\cdot\frac{2x^2+x-1}{x^2-1}=1\cdot\lim_{x\to -1}\frac{(x+1)(2x-1)}{(x+1)(x-1)}=$

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

10) $\lim_{x\to -3}\frac{\log(x^2-8)}{x^2+3x}=\lim_{x\to -3}\frac{\log(1+x^2-9)}{(x+3)(x-3)}\cdot\frac{x-3}{x}=1\cdot\lim_{x\to -3}\frac{x-3}{x}=\frac{-6}{-3}=2$

11) $\lim_{x\to \frac{1}{2}}\frac{\log(4x^2+2x-1)}{4x^2-1}=\lim_{x\to \frac{1}{2}}\frac{\log(1+(4x^2+2x-2))}{4x^2+2x-2}\cdot\frac{4x^2+2x-2}{4x^2-1}=1\cdot\lim_{x\to \frac{1}{2}}\frac{4x^2+2x-2}{4x^2-1}=$

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

12) $\lim_{x\to \pi}\frac{e^{x^2-\pi x}-1}{\sqrt{\pi x}-\pi}=\lim_{x\to \pi}\frac{e^{x^2-\pi x}-1}{x^2-\pi x}\cdot\frac{x^2-\pi x}{\sqrt{\pi x}-\pi}=1\cdot\lim_{x\to \pi}\frac{x^2-\pi x}{\sqrt{\pi x}-\pi}\cdot\frac{\sqrt{\pi x}+\pi}{\sqrt{\pi x}+\pi}=$

$\lim_{x\to \pi}\frac{x(x-\pi)}{\pi(x-\pi)}\cdot(\sqrt{\pi x}+\pi)=\lim_{x\to \pi}\frac{x(\sqrt{\pi x}+\pi)}{\pi}=2\pi$

13) $\lim_{x\to -2}\frac{x^2-4}{e^{\sqrt{x+2}}-1}=\lim_{x\to -2}\frac{\sqrt{x+2}}{e^{\sqrt{x+2}}-1}\cdot\frac{x^2-4}{\sqrt{x+2}}=1\cdot\lim_{x\to -2^+}\frac{(x-2)(x+2)}{\sqrt{x+2}}=\lim_{x\to -2^+}(x-2)\sqrt{x+2}=$

$-4\cdot 0^+=0^-$

14) $\lim_{x\to 1}\dfrac{e^{x-\sqrt{x}}-1}{x-1}=\lim_{x\to 1}\dfrac{e^{x-\sqrt{x}}-1}{x-\sqrt{x}}\cdot\dfrac{x-\sqrt{x}}{x-1}=1\cdot\lim_{x\to 1}\dfrac{x-\sqrt{x}}{x-1}\cdot\dfrac{x+\sqrt{x}}{x+\sqrt{x}}=\lim_{x\to 1}\dfrac{x^2-\left(\sqrt{x}\right)^2}{\left(x-1\right)\left(x+\sqrt{x}\right)}=$

$\lim_{x\to 1}\dfrac{x\left(x-1\right)}{\left(x-1\right)\left(x+\sqrt{x}\right)}=\lim_{x\to 1}\dfrac{x}{\left(x+\sqrt{x}\right)}=\dfrac{1}{2}$

15) $\lim_{x\to 2}\dfrac{\sqrt{6-x}-2}{e^{x-2}-1}=\lim_{x\to 2}\dfrac{x-2}{e^{x-2}-1}\cdot\dfrac{\sqrt{6-x}-2}{x-2}=1\cdot\lim_{x\to 2}\dfrac{\sqrt{6-x}-2}{x-2}=\lim_{x\to 2}\dfrac{\sqrt{6-x}-2}{x-2}\cdot\dfrac{\sqrt{6-x}+2}{\sqrt{6-x}+2}=$

$\lim_{x\to 2}\dfrac{\left(\sqrt{6-x}\right)^2-4}{\left(x-2\right)\left(\sqrt{6-x}+2\right)}=\lim_{x\to 2}\dfrac{-\left(x-2\right)}{\left(x-2\right)\left(\sqrt{6-x}+2\right)}=\lim_{x\to 2}\dfrac{-1}{\sqrt{6-x}+2}=-\dfrac{1}{4}$