CALCOLO DI LIMITI

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1) $$\lim_{x\to 1} \frac{\sqrt{x}-1}{x-1} = \frac{0}{0} \text{ F.I} = (\text{razionalizzare}) = \lim_{x\to 1} \frac{\sqrt{x}-1}{x-1}\cdot\frac{\sqrt{x}+1}{\sqrt{x}+1} =$$

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

2) $$\lim_{x\to 2} \frac{\sqrt{2}-\sqrt{x}}{2-x} = \frac{0}{0} = \lim_{x\to 2} \frac{(\sqrt{2}-\sqrt{x})\cdot(\sqrt{2}+\sqrt{x})}{(2-x)(\sqrt{2}+\sqrt{x})} = \frac{\cancel{(2-x)}}{\cancel{(2-x)}(\sqrt{2}+\sqrt{x})} =$$

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

3) $$\lim_{x\to +\infty} \frac{x^3-2x+1}{2x^4-x+5} = \left(\frac{\infty}{\infty} \text{ f.i}\right) = \lim_{x\to +\infty} \frac{\cancel{x^3}(1-\overbrace{2/x}^{\to 0}+\overbrace{1/x^3}^{\to 0})}{x\cancel{^4}(2-\underbrace{\frac{1}{x^3}}_{\to 0}+\underbrace{5/x^4}_{\to 0})} = \frac{1}{+\infty} = 0$$

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

5) $$\lim_{x\to +\infty} \frac{x^4+1}{x-3} = \left(\frac{\infty}{\infty} \text{ f.i}\right) = +\infty$$

6) $$\lim_{x\to +\infty} \frac{2\log^2 x+3}{3\log^2 x+\log x} = \left(\frac{\infty}{\infty} \text{ f.i}\right) = \frac{2}{3}$$ [N.B. $\log^2 x = t \Rightarrow \frac{2t^2+3}{3t^2+t}$ stesso grado]

7) $$\lim_{x\to 0} \frac{\sqrt{x+4}-2}{x} = \left(\frac{0}{0} \text{ f.i}\right) = \lim_{x\to 0} \frac{(\sqrt{x+4}-2)(\sqrt{x+4}+2)}{x(\sqrt{x+4}+2)} = \frac{x+\cancel{4}-\cancel{4}}{x(\sqrt{x+4}+2)}$$

$$= \lim_{x\to 0} \frac{\cancel{x}}{\cancel{x}(\sqrt{x+4}+2)} = \frac{1}{4}$$

8) $$\lim_{x\to 1} \frac{e^{x-1}-1}{1-\cos(1-x)} = \left(\frac{0}{1-1} = \frac{0}{0} \text{ f.i}\right)$$ divido N e D $(x-1)^2$ =

$$= \lim_{x\to 1} \frac{\frac{e^{x-1}-1}{(x-1)^2}}{\underbrace{\frac{1-\cos(1-x)}{(1-x)^2}}_{\to \frac{1}{2}}} = (\text{LIMITI NOTEVOLI}) = \lim_{x\to 1} \frac{1}{x-1}\cdot 2 = \frac{2}{x-1} = \frac{2}{0} = \infty$$