OPERAZIONI SUI LIMITI

Siano $\lim_{x \to x_0} f(x) = \ell$ e $\lim_{x \to x_0} g(x) = \ell_1$

1) $\lim_{x \to x_0} [f(x) + g(x)] = \ell + \ell_1$

2) $\lim_{x \to x_0} f(x)\, g(x) = \ell \cdot \ell_1$

3) sia $k \in \mathbb{R}$ $\quad \lim_{x \to x_0} k f(x) = k \lim_{x \to x_0} f(x) = k\ell$

4) $\lambda, \mu \in \mathbb{R}$ $\quad \lim_{x \to x_0} [\lambda f(x) + \mu g(x)] = \lambda \ell + \mu \ell_1$

5) $n \in \mathbb{N}$ $\quad \lim_{x \to x_0} [f(x)]^n = \ell^n$

6) • se $\lim_{x \to x_0} f(x) = \ell \neq 0$ allora $\lim_{x \to x_0} \frac{1}{f(x)} = \frac{1}{\ell}$

• se $\lim_{x \to x_0} f(x) = \pm\infty$ allora $\lim_{x \to x_0} \frac{1}{f(x)} = 0$

7) - se $\lim_{x \to \infty} f(x) = 0$ e $\exists\, I(x_0) \,/\, \forall x \in I(x_0)$ si ha $f(x) > 0$ (opp. si ha $f(x) < 0$) allora $\lim_{x \to x_0} \frac{1}{f(x)} = +\infty$ (allora $\lim_{x \to x_0} \frac{1}{f(x)} = -\infty$)

8) Siano $y = f(x)$ e $y = g(x)$ due funzioni aventi rispettivamente limiti ℓ ed $\ell_1 \neq 0$ per $x \to x_0$.
Allora $\lim_{x \to x_0} \frac{f(x)}{g(x)} = \frac{\ell}{\ell_1}$

9) Se $\lim_{x \to x_0} f(x) = \ell$ si ha che $\lim_{x \to x_0} |f(x)| = |\ell|$

10) Se $\lim_{x \to x_0} f(x) = \ell$ e $\ell > 0$ e $f(x) > 0$ si ha

$$\lim_{x \to x_0} \log_a f(x) = \log_a \ell \qquad a \in \mathbb{R}_0^+ - 1$$

11) se $a \in \mathbb{R}_0^+$ e $\lim_{x \to x_0} f(x) = \ell$ si ha $\lim_{x \to x_0} a^{f(x)} = a^{\ell}$

$$\boxed{y = f(x)^{g(x)} \iff y = e^{g(x) \ln f(x)}}$$

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