LIMITI NOTEVOLI

$$\lim_{x\to\pm\infty}\left(1+\frac{1}{x}\right)^x = e \qquad \lim_{x\to+\infty}\left(1+\frac{\alpha}{x}\right)^x = e^\alpha, \quad \forall\alpha\in\mathbb{R}$$

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

$$\lim_{x\to 0}\frac{\ln(1+x)}{x} = 1 \qquad \lim_{x\to 0}\frac{\log_a(1+x)}{x} = \frac{1}{\ln a} = \log_a e, \quad \forall a>0,\ a\neq 1$$

$$\lim_{x\to 0}\frac{e^x-1}{x} = 1 \qquad \lim_{x\to 0}\frac{a^x-1}{x} = \ln a = \frac{1}{\log_a e}, \quad \forall a>0$$

$$\lim_{x\to 0}\frac{\sqrt{1+x}-1}{x} = \frac{1}{2} \qquad \lim_{x\to 0}\frac{(1+x)^\alpha-1}{x} = \alpha, \quad \forall\alpha\in\mathbb{R}$$

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

$$\lim_{x\to 0}\frac{\operatorname{sen} x}{x} = 1$$

$$\lim_{x\to 0}\frac{\operatorname{tg} x}{x} = 1$$

$$\lim_{x\to 0}\frac{\operatorname{arcsen} x}{x} = 1$$

$$\lim_{x\to 0}\frac{\operatorname{arctg} x}{x} = 1$$

RELAZIONI ASINTOTICHE
per $x \to 0$

$$\ln(1+x) \sim x \qquad \log_a(1+x) \sim \frac{x}{\ln a} = x\log_a e, \quad \forall a>0,\ a\neq 1$$

$$e^x - 1 \sim x \qquad a^x - 1 \sim x\ln a = \frac{x}{\log_a e}, \quad \forall a>0$$

$$\sqrt{1+x} \sim 1+\frac{1}{2}x \qquad (1+x)^\alpha \sim 1+\alpha x, \quad \forall\alpha\in\mathbb{R}$$

$$1-\cos x \sim \frac{1}{2}x^2$$

$$\operatorname{sen} x \sim x$$

$$\operatorname{tg} x \sim x$$

$$\operatorname{arcsen} x \sim x$$

$$\operatorname{arctg} x \sim x$$