

LIMITS

$$*) (1+x)^p = 1 + px + \frac{p(p-1)}{2!}x^2 + \frac{p(p-1)(p-2)}{3!}x^3 + \dots$$

$$*) e^x = 1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots$$

$$*) a^x = 1 + \frac{x}{1!} \log a + \frac{x^2}{2!} (\log a)^2 + \dots$$

$$*) \log(1+x) = x - \frac{x^2}{2} + \frac{x^3}{3} - \frac{x^4}{4} + \dots$$

$$*) \log(1-x) = -\left(x + \frac{x^2}{2} + \frac{x^3}{3} + \dots\right)$$

$$*) \sin x = x - \frac{x^3}{3!} + \frac{x^5}{5!} - \dots$$

$$*) \cos x = 1 - \frac{x^2}{2!} + \frac{x^4}{4!} - \dots$$

$$*) \tan x = x + \frac{x^3}{3} + \frac{2x^5}{15} + \dots$$

$$*) \tan^{-1} x = x - \frac{x^3}{3} + \frac{x^5}{5} - \dots$$

$$*) f(x) = f(0) + f'(0) \cdot \frac{x}{1!} + f''(0) \cdot \frac{x^2}{2!} + \dots + f^{(n)}(0) \cdot \frac{x^n}{n!}$$

$$\rightarrow \lim_{x \rightarrow a} \frac{x^n - a^n}{x - a} = na^{n-1}$$

$$\rightarrow \lim_{x \rightarrow 0} \frac{e^x - 1}{x} = 1$$

$$\rightarrow \lim_{x \rightarrow 0} \frac{\log(1+x)}{x} = 1$$

$$\rightarrow \lim_{x \rightarrow 0} \frac{a^x - 1}{x} = \ln a$$

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

$$*) \lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$$


$$\lim_{x \rightarrow 0} \frac{\tan x}{x} = 1$$


$$\lim_{x \rightarrow 0} \frac{\sin^{-1} x}{x} = 1$$


$$\lim_{x \rightarrow 0} \frac{\tan^{-1} x}{x} = 1$$


st:

$$*) \lim_{n \rightarrow \infty} \frac{\sum r^a}{n^{a+1}} = \frac{1}{a+1}$$

$$*) \lim_{n \rightarrow \infty} (1+x)^n = 1 + nx$$

CampusLoom