

Formula (Limits)

$$\textcircled{1} \lim_{n \rightarrow \infty} x^n = \begin{cases} 0, & x < 1 \\ \infty, & x > 1 \end{cases}$$

$$\textcircled{2} \lim_{n \rightarrow \infty} \frac{x^n}{n!} = 0 \text{ for all values of } x$$

$$\textcircled{3} \lim_{n \rightarrow \infty} \frac{\log n}{n} = 0$$

$$\textcircled{4} \lim_{n \rightarrow \infty} \left(1 + \frac{1}{n}\right)^n = e$$

$$\textcircled{5} \lim_{n \rightarrow \infty} (n)^{1/n} = 1$$

$$\textcircled{6} \lim_{n \rightarrow \infty} (n!)^{1/n} = \infty$$

$$\textcircled{7} \lim_{n \rightarrow \infty} \left(\frac{n!}{n}\right)^{1/n} = \frac{1}{e}$$

$$\textcircled{8} \lim_{n \rightarrow \infty} n x^n = 0 \text{ if } x < 1$$

$$\textcircled{9} \lim_{n \rightarrow \infty} n^p = \infty$$

$$\textcircled{10} \lim_{n \rightarrow \infty} \frac{1}{n^p} = 0$$

$$\textcircled{11} \lim_{x \rightarrow 0} \left(\frac{a^x - 1}{x}\right) = \log a \quad \textcircled{12} \lim_{n \rightarrow \infty} \left(\frac{a^{1/n} - 1}{1/n}\right) = \log a$$

$$\textcircled{12} \lim_{x \rightarrow 0} \frac{\sin x}{x} = 1, \quad \lim_{x \rightarrow 0} \frac{\tan x}{x} = 1$$