

ಪರಿಚಯ

$$x \xrightarrow{\lim} \infty \frac{1}{x} = 0$$

$$x \xrightarrow{\lim} \infty \frac{1}{x+1} = 0$$

ಪರಿಚಯ ವಿಧಾನದ ಮೂಲಕ a, k, λ ಕೆಳಕಂಡ $f(x), g(x)$ ನಲ್ಲಿ

$$x \xrightarrow{\lim} a k = k$$

$$x \xrightarrow{\lim} a x = a$$

$$x \xrightarrow{\lim} 2 5 = 5$$

$$x \xrightarrow{\lim} 3 x = 3$$

$$x \xrightarrow{\lim} a \lambda f(x) = \lambda x \xrightarrow{\lim} a f(x)$$

$$x \xrightarrow{\lim} a f(x) = f(a)$$

$$\begin{aligned} x \xrightarrow{\lim} 2 5x &= 5x \xrightarrow{\lim} 2 x \\ &= 5 \times 2 \\ &= 10 \end{aligned}$$

$$x \xrightarrow{\lim} a [f(x) \pm g(x)] = x \xrightarrow{\lim} a f(x) \pm x \xrightarrow{\lim} a g(x)$$

$$\begin{aligned} x \xrightarrow{\lim} 2 (5x+3) &= x \xrightarrow{\lim} 2 5x + x \xrightarrow{\lim} 2 3 \\ &= 5x \xrightarrow{\lim} 2 + 3 \\ &= 5 \times 2 + 3 = 13 \end{aligned}$$

$$x \xrightarrow{\lim} a f(x) \cdot g(x) = x \xrightarrow{\lim} a f(x) \times x \xrightarrow{\lim} a g(x)$$

$$x \xrightarrow{\lim} 4 3x(x+1) = x \xrightarrow{\lim} 4 3x \times x \xrightarrow{\lim} 4 (x+1)$$

$$x \xrightarrow{\lim} a \left[\frac{f(x)}{g(x)} \right] = \frac{x \xrightarrow{\lim} a f(x)}{x \xrightarrow{\lim} a g(x)}$$

$$x \xrightarrow{\lim} a \sqrt{f(x)} = \sqrt{x \xrightarrow{\lim} a f(x)}$$

$$x \xrightarrow{\lim} a (f(x))^n = (x \xrightarrow{\lim} a f(x))^n$$

ප්‍රතිරෝධය වන්නේ $\frac{\infty}{\infty}$, $\frac{\infty}{0}$, $\infty - \infty$, $\frac{k}{0}$ ලෙසින් වේ. Date:

ප්‍රතිරෝධය නොවී නිමාව ගැනීම

* පොදු පාඨකයක නොයා ලබා ගැනීම.

$$\begin{aligned}
 & x \xrightarrow{\lim} 2 \frac{x-2}{x^3-8} \\
 & = x \xrightarrow{\lim} 2 \frac{(x-2)}{(x-2)(x^2+2x+4)} \\
 & = x \xrightarrow{\lim} 2 \frac{1}{[x^2+2x+4]} \quad \leftarrow \boxed{x \xrightarrow{\lim} a f(x) = f(a)} \\
 & = \frac{1}{[2^2+2 \cdot 2+4]} = \frac{1}{12}
 \end{aligned}$$

* තරයේ වැඩිම මුත්‍රය අවම වේදය මගින් තරය හා මෙය බෙදීම.

$$\begin{aligned}
 & x \xrightarrow{\lim} \infty \frac{3x^2-2x+4}{5x^3-3x+3} \\
 & = x \xrightarrow{\lim} \infty \frac{3/x - 2/x^2 + 4/x^3}{5 - 3/x^2 + 3/x^3} \\
 & = \frac{x \xrightarrow{\lim} \infty 3/x - x \xrightarrow{\lim} \infty 2/x^2 + x \xrightarrow{\lim} \infty 4/x^3}{x \xrightarrow{\lim} \infty 5 - x \xrightarrow{\lim} \infty 3/x^2 + x \xrightarrow{\lim} \infty 3/x^3} \\
 & = \frac{0-0+0}{5-0+0} = \frac{0}{5} = 0 \quad \because x \xrightarrow{\lim} \infty \frac{1}{x} = 0 \text{ වේ.}
 \end{aligned}$$

* බහුපද ග්‍රිහයාදී විභේදයේ වැඩිම බෙදය ලබා ගැනීම.

$$\begin{aligned}
 & x \xrightarrow{\lim} -\infty (x^2+x^3) \\
 & = x \xrightarrow{\lim} -\infty x^3 (1/x + 1) \\
 & = (x \xrightarrow{\lim} -\infty x)^3 (x \xrightarrow{\lim} -\infty 1/x + x \xrightarrow{\lim} -\infty 1) = (-\infty)^3 + (0+1) \\
 & = -\infty
 \end{aligned}$$



No.
Date

* $\lim_{x \rightarrow 0} \frac{\sqrt{x+a^2} - a}{\sqrt{x+b^2} - b}$ ඉකුත් වන තරමට නම් කළ
 ඉතිරි කළ තරම නම් කළ ද්විතීය නිසැකය.

$$\lim_{x \rightarrow 0} \frac{\sqrt{x+4} - 2}{\sqrt{x+16} - 4}$$

$$= \lim_{x \rightarrow 0} \frac{(\sqrt{x+4} + 2)(\sqrt{x+4} - 2)(\sqrt{x+16} + 4)}{(\sqrt{x+16} - 4)(\sqrt{x+16} + 4)(\sqrt{x+4} + 2)}$$

$$= \lim_{x \rightarrow 0} \frac{x+4-4}{x+16-16} \times \frac{\sqrt{x+16} + 4}{\sqrt{x+4} + 2} = \lim_{x \rightarrow 0} \frac{x\sqrt{x+16} + 4}{x\sqrt{x+4} + 2}$$

$$= \lim_{x \rightarrow 0} \frac{\sqrt{x+16} + 4}{\sqrt{x+4} + 2} = \frac{\sqrt{0+16} + 4}{\sqrt{0+4} + 2} = \frac{8}{4} = \underline{\underline{2}}$$

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

• $\lim_{x \rightarrow a} \frac{x^6 - a^6}{x - a} = \underline{\underline{6a^5}}$

• $\lim_{x \rightarrow 3} \frac{x^3 - 3^3}{x^{21} - 3^{21}} = \lim_{x \rightarrow 3} \frac{x^3 - 3^3}{x - 3} \times \frac{x - 3}{x^{21} - 3^{21}}$

$$= \lim_{x \rightarrow 3} \frac{x^3 - 3^3}{x - 3} \times \lim_{x \rightarrow 3} \frac{1}{\frac{x^{21} - 3^{21}}{x - 3}}$$

$$= 3 \times 3^{6-1} \times \frac{1}{2^1 (3)^{21-1}} = \frac{27 \times 2 \times 3^{21}}{54 \sqrt{3}}$$

$$* \quad x \xrightarrow{\lim} 0 \quad \frac{\sin x}{x} = 1 \quad \text{or}.$$

$$\begin{aligned} \bullet \quad x \xrightarrow{\lim} 0 \quad \frac{\sin 5x}{3x} &= x \xrightarrow{\lim} 0 \quad \frac{5 \times \sin 5x}{5 \times 3x} \\ &= \frac{5}{3} \times 5x \xrightarrow{\lim} 0 \quad \frac{\sin 5x}{5x} = \frac{5}{3} \times 1 = \frac{5}{3} \end{aligned}$$

$$\bullet \quad x \xrightarrow{\lim} 0 \quad \frac{\sin x^\circ}{x} \quad \begin{aligned} 180^\circ &= \pi \\ x^\circ &= \frac{\pi \times x^\circ}{180^\circ} \end{aligned}$$

$$= x \xrightarrow{\lim} 0 \quad \frac{\sin(\pi x/180)}{x}$$

$$= x \xrightarrow{\lim} 0 \quad \frac{\sin(\pi x/180)}{180/x \left(\pi x/180\right)} = \frac{\pi}{180} \quad \frac{\pi x}{180} \xrightarrow{\lim} 0 \quad \frac{\sin(\pi x/180)}{\pi x/180}$$

$$= \frac{\pi}{180} \times 1 = \frac{\pi}{180} \quad \because \frac{\pi x}{180} \xrightarrow{\lim} 0 \quad \frac{\sin(\pi x/180)}{\pi x/180} = 1$$

$$x \xrightarrow{\lim} 1 \quad \frac{1 - \sqrt{x}}{(\cos^{-1} x)^2}$$

$$\begin{aligned} \cos^{-1} x &= \theta \\ \cos \theta &= x \\ \cos 0 &= 1 \\ \theta &= 0 \end{aligned}$$

$$x \xrightarrow{\lim} 1 \Rightarrow \theta \xrightarrow{\lim} 0$$

$$= \theta \xrightarrow{\lim} 0 \quad \frac{1 - \sqrt{\cos \theta}}{\theta^2} \times \frac{(1 + \sqrt{\cos \theta})}{(1 + \sqrt{\cos \theta})}$$

$$= \theta \xrightarrow{\lim} 0 \quad \frac{1 - \cos \theta}{\theta^2 (1 + \sqrt{\cos \theta})} = \theta \xrightarrow{\lim} 0 \quad \frac{1 - (1 - \sin^2 \theta/2)}{\theta^2 (1 + \sqrt{\cos \theta})}$$

$$= \theta \rightarrow 0 \quad \frac{2 \sin^2 \theta/2}{(2 \times \theta/2)^2 (1 + \sqrt{\cos \theta})}$$

$$= \frac{2}{4} \left[\theta/2 \xrightarrow{\lim} 0 \quad \frac{\sin \theta/2}{\theta/2} \right]^2 \times \theta \xrightarrow{\lim} 0 \quad \frac{1}{1 + \sqrt{\cos \theta}} = \frac{1}{2} \times 1^2 \times \frac{1}{1 + \sqrt{1}}$$

$$= \frac{1}{2} \times 1 \times \frac{1}{2} = \frac{1}{4}$$

$$\because \theta/2 \xrightarrow{\lim} 0 \quad \frac{\sin \theta/2}{\theta/2} = 1$$