

លីមីតត្រៀមបាក់ខុប

ឧទាហរណ៍ ១

គណនាលីមីតខាងក្រោម៖

ក $\lim_{x \rightarrow 1} \frac{x^3 - 2x^2 + 3x - 2}{1 - x^2}$

ខ $\lim_{x \rightarrow 0} \frac{\sin 3x}{4x}$

គ $\lim_{x \rightarrow \frac{\pi}{4}} \frac{\sin x - \cos x}{\pi - 4x}$

ដំណោះស្រាយ

ក $\lim_{x \rightarrow 1} \frac{x^3 - 2x^2 + 3x - 2}{1 - x^2}$ រាងមិនកំណត់ $\frac{0}{0}$

$$\begin{aligned}\lim_{x \rightarrow 1} \frac{x^3 - 2x^2 + 3x - 2}{1 - x^2} &= \lim_{x \rightarrow 1} \frac{x^3 - x^2 - x^2 + x + 2x - 2}{-(x^2 - 1)} \\&= \lim_{x \rightarrow 1} \frac{x^2(x - 1) - x(x - 1) + 2(x - 1)}{-(x^2 - 1^2)} \\&= \lim_{x \rightarrow 1} \frac{\cancel{(x - 1)}(x^2 - x + 2)}{\cancel{-(x - 1)}(x + 1)} \\&= \lim_{x \rightarrow 1} \frac{x^2 - x + 2}{-(x + 1)} = \frac{1^2 - 1 + 2}{-(1 + 1)} = -1\end{aligned}$$

ដំណោះស្រាយ

ខ $\lim_{x \rightarrow 0} \frac{\sin 3x}{4x}$ រាងមិនកំណត់ $\frac{0}{0}$

$$\begin{aligned}\lim_{x \rightarrow 0} \frac{\sin 3x}{4x} &= \lim_{x \rightarrow 0} \frac{\sin 3x}{3x} \times \frac{3}{4} \\ &= 1 \times \frac{3}{4} = \frac{3}{4}\end{aligned}$$

គុណភាគយក និងភាគបែងដោយ 3

ព្រោះ $\lim_{u \rightarrow 0} \frac{\sin u}{u} = 1$ ដែល $u = 3x$

ដំណោះស្រាយ

គ $\lim_{x \rightarrow \frac{\pi}{4}} \frac{\sin x - \cos x}{\pi - 4x}$ រាងមិនកំណត់ $\frac{0}{0}$

$$\begin{aligned} \lim_{x \rightarrow \frac{\pi}{4}} \frac{\sin x - \cos x}{\pi - 4x} &= \lim_{x \rightarrow \frac{\pi}{4}} \frac{\sqrt{2} \left(\frac{\sqrt{2}}{2} \sin x - \frac{\sqrt{2}}{2} \cos x \right)}{4 \left(\frac{\pi}{4} - x \right)} \\ &= \lim_{x \rightarrow \frac{\pi}{4}} \frac{\sqrt{2}}{4} \left(\frac{\sin x \cos \frac{\pi}{4} - \cos x \sin \frac{\pi}{4}}{\frac{\pi}{4} - x} \right) \end{aligned}$$

ដំណោះស្រាយ

$$\begin{aligned} &= \lim_{x \rightarrow \frac{\pi}{4}} \frac{\sqrt{2}}{4} \left[\frac{\sin \left(x - \frac{\pi}{4} \right)}{- \left(x - \frac{\pi}{4} \right)} \right] \\ &= \frac{\sqrt{2}}{4}(-1) = -\frac{\sqrt{2}}{4}, \text{ ព្រោះ } \lim_{u \rightarrow 0} \frac{\sin u}{u} = 1 \text{ នៃដល } u = x - \frac{\pi}{4} \end{aligned}$$