លីមីតត្រៀមបាក់ឌុប

ឧទាហរណ៍ ៤

គណនាលីមីតខាងក្រោម៖

ក $\lim_{x \to 1} \frac{-2x^3 - 2x^2 + 5x - 1}{x^2 + 2x - 3}$

ខ $\lim_{x \to 0} \frac{\sin 2x}{-3x}$

គ $\lim_{x \to 1} \frac{\sin(\pi x)}{x^2 - 1}$

ដំណោះស្រាយ

ក $\lim\limits_{x\to 1}\dfrac{-2x^3-2x^2+5x-1}{x^2+2x-3}$ រាងមិនកំណត់ $\dfrac{0}{0}$

$$\begin{aligned}
\lim_{x\to 1}\frac{-2x^3-2x^2+5x-1}{x^2+2x-3} &= \lim_{x\to 1}\frac{-2x^3+2x^2-4x^2+4x+x-1}{x^2-x+3x-3}\\
&= \lim_{x\to 1}\frac{-2x^2(x-1)-4x(x-1)+(x-1)}{x(x-1)+3(x-1)}\\
&= \lim_{x\to 1}\frac{\cancel{(x-1)}(-2x^2-4x+1)}{\cancel{(x-1)}(x+3)}\\
&= \lim_{x\to 1}\frac{-2x^2-4x+1}{x+3}=\frac{-2-4+1}{1+3}=-\frac{5}{4}
\end{aligned}$$

ដំណោះស្រាយ

ខ $\lim_{x\to 0}\frac{\sin 2x}{-3x}$ រាងមិនកំណត់ $\frac{0}{0}$

$$\lim_{x\to 0}\frac{\sin 2x}{-3x}=\lim_{x\to 0}\left(\frac{\sin 2x}{2x}\times\frac{2}{-3}\right)=(1)\left(-\frac{2}{3}\right)=-\frac{2}{3}$$

ព្រោះ $\lim_{u\to 0}\frac{\sin u}{u}=1$ ដែល $u=2x$

ដំណោះស្រាយ

គ $\lim\limits_{x\to1}\dfrac{\sin(\pi x)}{x^2-1}$ រាងមិនកំណត់ $\dfrac{0}{0}$

$$
\begin{aligned}
\lim_{x\to1}\frac{\sin(\pi x)}{x^2-1} &= \lim_{x\to1}\frac{\sin(\pi-\pi x)}{(x-1)(x+1)} \\
&= \lim_{x\to1}\left[\frac{\sin(\pi-\pi x)}{\pi(x-1)}\times\frac{\pi}{x+1}\right] \\
&= \lim_{x\to1}\left[\frac{\sin(\pi-\pi x)}{\pi-\pi x}\times\frac{-\pi}{x+1}\right] \\
&= (1)\left(-\frac{\pi}{1+1}\right) = -\frac{\pi}{2}
\end{aligned}
$$

ព្រោះ $\sin(\pi-\alpha)=\sin\alpha$

ព្រោះ $\lim\limits_{u\to0}\dfrac{\sin u}{u}=1$