លីមីតត្រៃមាក់ខុប

ឧទាហរណ៍ ២

គណនាលីមីតខាងក្រោម៖

ក $\lim\limits_{x\to 1} \dfrac{2x^3+x^2-4x+1}{x^2+x-2}$

ខ $\lim\limits_{x\to 0} \dfrac{-2x}{\sin 4x}$

គ $\lim\limits_{x\to \frac{\pi}{3}} \dfrac{\sqrt{3}\cos x-\sin x}{2\pi-6x}$

ដំណោះស្រាយ

ក $\lim\limits_{x\to 1}\dfrac{2x^3+x^2-4x+1}{x^2+x-2}$ វាងមិនកំណត់ $\dfrac{0}{0}$

$$\lim_{x\to 1}\frac{2x^3+x^2-4x+1}{x^2+x-2}=\lim_{x\to 1}\frac{2x^3-2x^2+3x^2-3x-x+1}{x^2-x+2x-2}$$

$$=\lim_{x\to 1}\frac{2x^2(x-1)+3x(x-1)-(x-1)}{x(x-1)+2(x-1)}$$

$$=\lim_{x\to 1}\frac{(x-1)(2x^2+3x-1)}{(x-1)(x+2)}$$

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

ដំណោះស្រាយ

$$= \frac{2(1)^2 + 3(1) - 1}{(1) + 2} = \frac{2 + 3 - 1}{3} = \frac{4}{3}$$

ខ $\lim\limits_{x \to 0} \dfrac{-2x}{\sin 4x}$ វាងមិនកំណត់ $\dfrac{0}{0}$

$$\lim_{x \to 0} \frac{-2x}{\sin 4x} = \lim_{x \to 0} \left(\frac{4x}{\sin 4x} \times \frac{-2}{4} \right)$$

$$= 1 \times \left(-\frac{1}{2} \right) = -\frac{1}{2}$$

ព្រោះ $\lim\limits_{u \to 0} \dfrac{u}{\sin u} = \lim\limits_{u \to 0} \dfrac{1}{\frac{\sin u}{u}} = \dfrac{1}{1} = 1$

ដំណោះស្រាយ

គ $\lim\limits_{x\to\frac{\pi}{3}} \dfrac{\sqrt{3}\cos x - \sin x}{2\pi - 6x}$ វាងមិនកំណត់ $\dfrac{0}{0}$

$$\lim_{x\to\frac{\pi}{3}} \frac{\sqrt{3}\cos x - \sin x}{2\pi - 6x} = \lim_{x\to\frac{\pi}{3}} \frac{2\left(\frac{\sqrt{3}}{2}\cos x - \frac{1}{2}\sin x\right)}{6\left(\frac{\pi}{3} - x\right)}$$

$$= \lim_{x\to\frac{\pi}{3}} \left(\frac{2}{6} \times \frac{\sin\frac{\pi}{3}\cos x - \cos\frac{\pi}{3}\sin x}{\frac{\pi}{3} - x}\right)$$

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

ដំណោះស្រាយ

$$= \frac{1}{3} \times 1 = \frac{1}{3}$$

ព្រោះ $\lim\limits_{u \to 0} \dfrac{\sin u}{u} = 1$ ដែល $u = \dfrac{\pi}{3} - x$