عسل طاهری

سوال ۱ ←

$$\lim_{x\to 1} \frac{4x^2-7x+3}{3x^2-8x+5} = \frac{0}{0} \xrightarrow{\text{مزدوج}} \frac{(x-1)(4x-3)}{(x-1)(3x-5)}$$

$$\frac{4x-3}{3x-5} \xrightarrow{x=1} \frac{1}{2}$$

سوال ۲ ←

$$\lim_{x\to 0} \frac{|3x-1|-|1+3x|}{x} = \frac{0}{0} = \text{مزدوج}$$

$$0^+ \to \frac{-3x+1-1-3x}{x} = -6$$

$$0^- \to \frac{1-3x-1-3x}{x} = 6$$

سوال ۳ ←

$$\lim_{x\to 4} \frac{x-4}{\sqrt{x}-2} \to \frac{(\sqrt{x}+2)(\sqrt{x}-2)}{\sqrt{x}-2} = \sqrt{x}+2 \to 4$$

سوال ۴ ←

$$\lim_{x\to 2} \frac{x-\sqrt{2x}}{2x^2-x-6} \to \frac{x-\sqrt{2x}}{(x+1)(2x-3)} \propto \frac{x+\sqrt{2x}}{x+\sqrt{2x}}$$

$$\to \frac{x^2-2x}{4(x-2)(2x+3)} \to \frac{x(x-2)}{4(x-2)(2x+3)} = \frac{x}{4(2x+3)} = \frac{1}{14}$$

سوال ۵ ←

$$\lim_{x\to 1} \frac{\sqrt{x}-1}{3-\sqrt{8-x}} \propto \frac{\sqrt{x}+1}{\sqrt{8-x}+3} \propto \frac{8-x+6}{x+\sqrt{x}+2}$$

$$\to \frac{(1-x)(4)}{(1-x)(2)} = -2$$

سوال ۶ ←

$$\lim_{x\to 4} \frac{\sqrt{3x+4}-4}{\sqrt[3]{5x+7}-3} \to \frac{(3x+12-16)(8)}{(5x-20)(4)}$$

$$\to \frac{3x-4}{x-4} \propto \frac{3}{5} = \frac{12}{20}$$

سوال ۷ ←

$$\lim_{x\to 1}\frac{\sqrt{3x+\sqrt{x}}-2}{\sqrt[3]{x}-1}\times\frac{\sqrt{3x+\sqrt{x}}+2}{\sqrt{3x+\sqrt{x}}+2}\times\frac{\sqrt[3]{x^2}+\sqrt[3]{x}+1}{\sqrt[3]{x^2}+\sqrt[3]{x}+1}$$

$$\rightarrow \frac{3x+\sqrt{x}-4}{x-1}\times\frac{\sqrt[3]{x^2}+\sqrt[3]{x}+1}{\sqrt{3x+\sqrt{x}}+2}=\frac{(\sqrt{x}+\frac{4}{3})(\sqrt{x}-1)}{x-1}$$

$$\rightarrow \frac{3}{4}\times\frac{\frac{7}{3}}{\sqrt{x}+1}\rightarrow\frac{7}{4}\times\frac{1}{2}\rightarrow\frac{7}{8}$$

سوال ۸ ←

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

$$\rightarrow\frac{(1+\cos x)(\cos^2 x+1-\cos x)}{(1-\cos x)(1+\cos x)}\rightarrow\frac{\cos^2 x+1-\cos x}{1-\cos x}$$

$$\rightarrow\frac{3}{2}$$

سوال ۹ ←

$$\lim_{x\to\frac{\pi}{4}}\frac{1-\tan x}{\sin x-\cos x}\rightarrow\frac{\cos x-\sin x}{\cos x}=-\frac{1}{\cos x}=-\sqrt{2}$$

سوال ۱۰ ←

$$\lim_{x\to\frac{3}{4}\pi}\frac{\tan^2 x-1}{\cos 2x}=\frac{(\tan x+1)(\tan x-1)}{-(\sin^2 x-\cos^2 x)}\rightarrow\frac{\frac{\sin^2 x-\cos^2 x}{\cos^2 x}}{-\sin x+\cos^2 x}$$

$$\rightarrow\frac{-1}{\cos^2 x}\rightarrow\frac{-1}{\frac{1}{2}}=-2$$

سوال ۸ ← روش دوم

$$\lim_{u\to 1}\frac{\sqrt{3u+\sqrt{u}}-2}{\sqrt[3]{u}-1}\times\frac{\sqrt{3u+\sqrt{u}}+2}{\sqrt[3]{u^2}+1+\sqrt[3]{u}}\times\frac{3}{4}$$

$$\text{Hop}\rightarrow\frac{3}{4}\times\frac{3+\frac{1}{2\sqrt{u}}}{1}=\frac{3}{4}\times\frac{7}{2}=\frac{21}{8}$$