نوران امامی

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

$$\lim_{x\to 0}\frac{|3x-1|-|3x+1|}{x} \quad \begin{cases} 0^+: \; 1-3x-3x-1 = \frac{-6x}{x} = -6 \\ 0^-: \; 1-3x-3x-1 \quad \frac{-6x}{x} = -6 \end{cases}$$

حد دارد -6

$$\lim_{x\to 4}\frac{0}{0}\quad \frac{x-4}{\sqrt{x}-2}\times\frac{\sqrt{x}+2}{\sqrt{x}+2} = \frac{x-4}{x-4}\times(\sqrt{x}+2) = 4$$

$$\lim_{x\to 2}\frac{x-\sqrt{2x}}{2x^2-x-6}\times\frac{x+\sqrt{2x}}{x+\sqrt{2x}} = \frac{x^2-2x}{2x^2-x-6}\times\frac{1}{4} \Rightarrow \frac{x(x-2)}{(2x+3)(x-2)} = \frac{2}{7}\times\frac{1}{4} = \frac{1}{14}$$

$$\lim_{x\to 1}\frac{1-\sqrt{x}}{2-\sqrt{5-x}}\times\frac{1+\sqrt{x}}{1+\sqrt{x}}\times\frac{2+\sqrt{5-x}}{2+\sqrt{5-x}} = \frac{1-x}{4-(5-x)} \Rightarrow \frac{-1(1-x)}{x-1}\times\frac{4}{2} = -2$$

$$\lim_{x\to 4}\frac{\sqrt{3x+4}-4}{\sqrt[3]{5x+7}-3}\times\left(\frac{\sqrt{3x+4}+4}{\sqrt[3]{(5x+7)^2}+9+3\sqrt[3]{5x+7}}\right) = \frac{3x+4-16}{5x+7-27} \Rightarrow \frac{3x-12}{5x-20} \Rightarrow \frac{3(x-4)}{5(x-4)}\times\frac{1}{8}$$

$$\Rightarrow \frac{3}{5}\times\frac{3\times 9}{8} = \frac{81}{40}$$

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

$$\frac{3}{4} \xrightarrow{hop} \frac{3+\frac{1}{2\sqrt{x}}}{1} \Rightarrow 3+\frac{1}{2} = \frac{7}{2}\times\frac{3}{4}$$

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

$$\sin^2 x = 1-\cos^2 x$$

$$\lim_{x\to \frac{\pi}{4}}\frac{1-\tan x}{\sin x-\cos x} \xrightarrow{hop} \frac{-(1+\tan^2 x)}{\cos x+\sin x} = \frac{-(1+1)}{2\frac{\sqrt{2}}{2}} = \frac{-2}{\sqrt{2}}\times\frac{\sqrt{2}}{\sqrt{2}} = -\sqrt{2}$$

$$\lim_{x\to \frac{3\pi}{4}}\frac{\tan^2 x-1}{\cos 2x} = \frac{\frac{\sin^2 x}{\cos^2 x}-\frac{\cos^2 x}{\cos^2 x}}{\cos^2 x-\sin^2 x} = \frac{-1}{\cos^2 x} \Rightarrow \frac{-1}{\left(-\frac{\sqrt{2}}{2}\right)^2} = \frac{-1}{\frac{1}{2}} = -2$$