آیناز دهآبی

۱)

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

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

۲)

$$\lim_{x\to 0}\frac{|3x-1|-|3x+1|}{x}\ \left(\frac{0}{0}\right)=\frac{1-3x-3x-1}{x}=\frac{-6x}{x}=-6$$

۳)

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

۴)

$$\lim_{x\to 2}\frac{x-\sqrt{2x}}{2x^2-x-6}\ \left(\frac{0}{0}\right)=\frac{\sqrt{x}(\sqrt{x}-\sqrt{2})}{(x-\frac{-3}{2})(2x+3)}=\frac{\sqrt{x}(\sqrt{x}-\sqrt{2})}{(x-2)(2x+3)}=\frac{\sqrt{x}}{(\sqrt{x}+\sqrt{2})(2x+3)}$$

$$(\sqrt{x}-\sqrt{2})(\sqrt{x}+\sqrt{2})$$

$$\frac{\sqrt{2}}{7(2\sqrt{2})}=\frac{1}{14}$$

۵)

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

$$\frac{0}{0}\xrightarrow{\text{رفع ابهام}}$$

۶)

$$\lim_{x\to 4}\frac{\sqrt{3x+4}-4}{\sqrt[3]{5x+7}-3}\times\frac{\sqrt{3x+4}+4}{\sqrt{3x+4}+4}\times\frac{\overbrace{\sqrt[3]{(5x+7)^2}+9+3\sqrt[3]{5x+7}}^{27}}{\underbrace{\sqrt[3]{(5x+7)^2}+9+3\sqrt[3]{5x+7}}_{3\cdot}}=$$

$$\frac{27\times 3}{8\times 5}=\frac{81}{40}$$

7)

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

$$\frac{3x+\sqrt{x}-4}{x-1} \times \frac{3}{4} = \frac{(3\sqrt{x}+4)(\cancel{\sqrt{x}-1})}{(\cancel{\sqrt{x}-1})(\sqrt{x}+1)} = \frac{3\sqrt{x}+4}{\sqrt{x}+1} \times \frac{3}{4}$$

$$\lim \quad \frac{7}{2} \times \frac{3}{4} = \boxed{\frac{21}{8}}$$

8)

$$1+1+1$$

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

$\frac{0}{0} \longrightarrow$ رفع ابهام

9)

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

$\frac{0}{0}$ رفع ابهام

$$\frac{-2}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{-\cancel{2}\sqrt{2}}{\cancel{2}} = \boxed{-\sqrt{2}}$$

10)

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

$$= \frac{1}{\cos^2 x} = \frac{1}{\frac{1}{2}} = \boxed{2}$$

$\frac{0}{0}$ رفع ابهام

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