1

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

2

$$\lim_{x\to 0}\frac{|3x-1|-|3x+1|}{x}=\frac{0}{0}\xrightarrow[\text{ابهام}]{\text{رفع}}\frac{1-3x-3x-1}{x}=\frac{-6x}{x}=-6$$

3

$$\lim_{x\to 4}\frac{x-4}{\sqrt{x}-2}=\frac{0}{0}\xrightarrow[\text{ابهام}]{\text{رفع}}\frac{(\sqrt{x}-2)(\sqrt{x}+2)}{\sqrt{x}-2}=\sqrt{4}+2=4$$

4

$$\lim_{x\to 2}\frac{x-\sqrt{3x}}{3x^2-x-4}=\frac{0}{0}\xrightarrow[\text{ابهام}]{\text{رفع}}\frac{x-\sqrt{3x}}{3x^2-x-4}\times\frac{x+\sqrt{3x}}{x+\sqrt{3x}}=\frac{x^2-3x}{(x-2)(3x+4)}\times\frac{1}{x+\sqrt{3x}}$$

با روش مزدوج: $12-x-3x^2$

$(3x+4)(3-x)$

$x=\frac{3}{2}\to 3-6\to -3$

ریشه‌های مخرج

$$\frac{x(x-3)}{(x-2)(3x+4)(x+\sqrt{3x})}\to\frac{2}{4\times 4}=\frac{1}{8}$$

5

$$\lim_{x\to 1}\frac{1-\sqrt{x}}{2-\sqrt{5-x}}=\frac{0}{0}\xrightarrow[\text{ابهام}]{\text{رفع}}\frac{1-\sqrt{x}}{2-\sqrt{5-x}}\times\frac{2+\sqrt{5-x}}{2+\sqrt{5-x}}=$$

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

$$\to -1\times(2+2)=-4$$

Parsian

6

$$\lim_{x\to 4}\frac{\sqrt{3x+4}-\sqrt{9x-3}}{\sqrt{5x+5}-3}=\frac{0}{0}\ \text{(ضرب مزدوج)}\Rightarrow \frac{3x+4-9x+3}{-4x+20}\times\frac{\sqrt{5x+5}+3}{\sqrt{3x+4}+\sqrt{9x-3}}$$

$$\frac{-6x+7}{-4(x-5)}\times\frac{\sqrt{5x+5}+3}{\sqrt{3x+4}+\sqrt{9x-3}}=\frac{-6(4)+7}{-4}\times\frac{6}{4}=\frac{17}{8}$$

7

$$\lim_{x\to 1}\frac{\sqrt{x^3+\sqrt{x}}-2}{\sqrt[3]{x}-1}=\frac{0}{0}\ \text{(ضرب مزدوج)}\Rightarrow \frac{x^3+\sqrt{x}-4}{x-1}\times\frac{\sqrt{x^3+\sqrt{x}}+2}{\sqrt[3]{x}-1}\times\frac{\sqrt[3]{x^2}+\sqrt[3]{x}+1}{\sqrt[3]{x^2}+\sqrt[3]{x}+1}$$

$$\frac{x^3+\sqrt{x}-4}{x-1}\times\frac{\sqrt[3]{x^2}+\sqrt[3]{x}+1}{\sqrt{x^3+\sqrt{x}}+2}=\left(\frac{(x-1)(x^2+x+4)}{x-1}+\frac{\sqrt{x}-1}{x-1}\right)\times\frac{3}{4}=\frac{3}{4}\times\frac{9}{4}=\frac{27}{16}$$

8

$$\lim_{x\to\pi}\frac{1+\cos^3 x}{\sin^2 x}=\frac{0}{0}\ \text{(ضرب مزدوج)}\Rightarrow \frac{(1+\cos x)(1-\cos x+\cos^2 x)}{(1-\cos x)(1+\cos x)}=\frac{3}{2}$$

9

$$\lim_{x\to\frac{\pi}{4}}\frac{1-\tan x}{\sin x-\cos x}=\frac{0}{0}\ \text{(ضرب مزدوج)}\Rightarrow \frac{1-\frac{\sin x}{\cos x}}{\sin x-\cos x}=\frac{\cos x-\sin x}{\cos x(\sin x-\cos x)}$$

$$\frac{-1}{\cos x}=\frac{-1}{\frac{\sqrt{2}}{2}}=-\sqrt{2}$$

10

$$\lim_{x\to\frac{\pi}{4}}\frac{\tan^2 x-1}{\cos 2x}=\frac{0}{0}\ \text{(ضرب مزدوج)}\Rightarrow \frac{\frac{\sin^2 x}{\cos^2 x}-1}{\cos^2 x-\sin^2 x}=\frac{\sin^2 x-\cos^2 x}{\cos^2 x(\cos^2 x-\sin^2 x)}$$

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

Parsian