هلیا غفاری

۱۷,۷۵

۱)

$$\lim_{x\to1}\frac{4x^2-7x+3}{5x^2-8x+3}\xrightarrow{x=1}\frac{0}{0}\to \text{مبهم}$$

$$\Rightarrow\frac{\cancel{(x-1)}(4x-3)}{\cancel{(x-1)}(5x-3)}\Rightarrow\lim_{x\to1}\frac{4x-3}{5x-3}=\frac{1}{2}$$

۱

۲)

$$\lim_{x\to0}\frac{|\overbrace{3x-1}^{\xrightarrow{x=0}\,<0}|-|\overbrace{3x+1}^{>0}|}{x}\Rightarrow\frac{1-3x-3x-1}{x}=\frac{-6x}{x}=-6$$

$$=\frac{0}{0}=\text{مبهم}$$

۱

۳)

$$\lim_{x\to4}\frac{x-4}{\sqrt{x}-2}=\frac{0}{0}\to\text{مبهم}\Rightarrow\frac{\cancel{(\sqrt{x}-2)}(\sqrt{x}+2)}{\cancel{\sqrt{x}-2}}=\sqrt{x}+2=4$$

۱

۴)

$$\lim_{x\to2}\frac{x-\sqrt{2x}}{2x^2-x-6}=\frac{0}{0}\to\text{مبهم}\;؛\;\frac{\cancel{x-2}}{\cancel{(x-2)}(2x-3)}=\frac{1}{2x-3}\xrightarrow{x=2}\frac{1}{1}=1$$

$$\Delta=1+48=49$$

$$x=\frac{1\pm7}{4}=2,-\frac{3}{2}$$

$$\text{hop}\to\frac{1-\frac{2}{2\sqrt{2x}}}{4x-1}=\frac{1}{14}$$

۰

۵)

$$\lim_{x\to1}\frac{1-\sqrt{x}}{2-\sqrt{5-x}}=\frac{0}{0}\to\text{مبهم}\to\frac{1-\sqrt{x}}{2-\sqrt{5-x}}\times\frac{1+\sqrt{x}}{1+\sqrt{x}}\times\frac{2+\sqrt{5-x}}{2+\sqrt{5-x}}$$

$$\Rightarrow\frac{1-x}{4-(5-x)}\times\frac{\cancel{4+0}\;2+\sqrt{5-x}}{1+\sqrt{x}}=\frac{\overset{-1}{\cancel{1-x}}}{\cancel{x-1}}\times\frac{4}{2}=-2$$

۱

۶)

x^2-4x+4

$$\lim_{x\to4}\frac{\sqrt{3x+4}-4}{\sqrt[3]{5x+7}-3}=\frac{0}{0}\to\text{مبهم}$$

$$\Rightarrow\frac{\sqrt{3x+4}-4}{\sqrt[3]{5x+7}-3}\times\frac{\sqrt{3x+4}+4}{\sqrt{3x+4}+4}\times\frac{\sqrt[3]{(5x+7)^2}+3\sqrt[3]{5x+7}+9}{\sqrt[3]{(5x+7)^2}+3\sqrt[3]{5x+7}+9}$$

۱

$$\Rightarrow \frac{۳x+۴-۱۶}{۵x+۷-۲۷} \times \frac{\sqrt[۳]{(۵x+۷)^۲}+۳\sqrt[۳]{۵x+۷}+۹}{\sqrt{۳x+۴}+۴}$$

$$\xrightarrow{x=۴} \frac{۳\cancel{(x-۴)}}{۵\cancel{(x-۴)}} \times \frac{۹+۹+۹}{۴+۴} = \frac{۳}{۵} \times \frac{۲۷}{۸} = \frac{۸۱}{۴۰}$$

۷

$$\frac{\sqrt{۳x+\sqrt{x}}-۲}{\sqrt[۳]{x}-۱} \xrightarrow[\frac{0}{0}]{hop} \frac{\dfrac{۳+\frac{۱}{۲\sqrt{x}}}{۲\sqrt{۳x+\sqrt{x}}}}{\dfrac{۱}{۳\sqrt[۳]{x}}}$$

۲

$$\xRightarrow{x=۱} \frac{\dfrac{۳+\frac{۱}{۲}}{۴}}{\dfrac{۱}{۳}} = \frac{\frac{۷}{۲}}{\frac{۴}{۱}} \times ۳ = \frac{۷}{۸} \times ۳ = \frac{۲۱}{۸}$$

۸

$$\lim_{x\to\pi} \frac{۱+\cos^۳ x}{\sin^۲ x} = \frac{\cancel{(۱+\cos x)}(۱-\cos x+\cos^۲ x)}{\cancel{(۱+\cos x)}(۱-\cos x)}$$

۲

$$\sin^۲ x = ۱-\cos^۲ x$$

$$\xRightarrow[\cos\pi=-۱]{x=\pi} \frac{۱+۱+۱}{۱-(-۱)} = \frac{۳}{۲}$$

۹

$$\lim_{x\to\frac{\pi}{۴}} \frac{۱-\tan x}{\sin x-\cos x} \overset{\frac{0}{0}}{=} \frac{۱-\frac{\sin x}{\cos x}}{\sin x-\cos x} = \frac{\frac{\cancel{\cos x-\sin x}}{\cos x}}{\cancel{\sin x-\cos x}} = -\frac{۱}{\cos x}$$

۲

$$\xrightarrow{x=\frac{\pi}{۴}} -\frac{۱}{\cos x} = -\frac{۱}{\frac{\sqrt{۲}}{۲}} = -\frac{۲}{\sqrt{۲}} = -\sqrt{۲}$$

۱۰

۱,۷۵

$$\lim_{x\to \frac{3\pi}{4}} \frac{\tan^2 x - 1}{\cos 2x} = \frac{0}{0} \text{ مبهم} \Rightarrow \tan^2 x$$

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

$$= \frac{2}{1+\cos 2x} = \frac{2}{1+\cos\frac{3\pi}{2}} = \frac{2}{1} = -2 \checkmark$$