هلیا غفاری

۱)

$$\lim_{x\to ۱} \frac{۴x^۲-۷x+۳}{۵x^۲-۸x+۳} \xrightarrow{x=۱} \frac{۰}{۰} \to \text{مبهم}$$

$$\Rightarrow \frac{\cancel{(x-۱)}(۴x-۳)}{\cancel{(x-۱)}(۵x-۳)} \Rightarrow \lim_{x\to ۱} \frac{۴x-۳}{۵x-۳} = \frac{۱}{۲}$$

۲)

$$\lim_{x\to ۰} \frac{\overbrace{|۳x-۱|}^{\xrightarrow{x=۰} <۰} - \overbrace{|۳x+۱|}^{>۰}}{x} \Rightarrow \frac{۱-۳x-۳x-۱}{x} = \frac{-۶x}{x} = -۶$$

$$= \frac{۰}{۰} = \text{مبهم}$$

۳)

$$\lim_{x\to ۴} \frac{x-۴}{\sqrt{x}-۲} = \frac{۰}{۰} \to \text{مبهم} \Rightarrow \frac{\cancel{(\sqrt{x}-۲)}(\sqrt{x}+۲)}{\cancel{\sqrt{x}-۲}} = \sqrt{x}+۲ = ۴$$

۴)

$$\lim_{x\to ۲} \frac{x-\sqrt{۲x}}{۲x^۲-x-۶} = \frac{۰}{۰} \to \text{مبهم} ; \frac{\cancel{x-۲}}{\cancel{(x-۲)}(۲x-۳)} = \frac{۱}{۲x-۳} \xrightarrow{x=۲} \frac{۱}{۱} = ۱$$

$$\Delta = ۱+۴۸ = ۴۹$$

$$x = \frac{۱\pm ۷}{۴} = ۲, -\frac{۳}{۲}$$

۵)

$$\lim_{x\to ۱} \frac{۱-\sqrt{x}}{۲-\sqrt{۵-x}} = \frac{۰}{۰} \to \text{مبهم} \to \frac{۱-\sqrt{x}}{۲-\sqrt{۵-x}} \times \frac{۱+\sqrt{x}}{۱+\sqrt{x}} \times \frac{۲+\sqrt{۵-x}}{۲+\sqrt{۵-x}}$$

$$\Rightarrow \frac{۱-x}{۴-(۵-x)} \times \frac{۲+\sqrt{۵-x}}{۱+\sqrt{x}} = \frac{\overset{-۱}{\cancel{۱-x}}}{\cancel{x-۱}} \times \frac{۴}{۲} = -۲$$

۶)

$x^۲-۴x+۴$

$$\lim_{x\to ۴} \frac{\sqrt{۳x+۴}-۴}{\sqrt[۳]{۵x+۷}-۳} = \frac{۰}{۰} \to \text{مبهم}$$

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

$$\Rightarrow \frac{3x+4-16}{5x+7-27} \times \frac{\sqrt[3]{(5x+7)^2}+3\sqrt[3]{5x+7}+9}{\sqrt{3x+4}+4}$$

$$\xrightarrow{x=4} \frac{3\cancel{(x-4)}}{5\cancel{(x-4)}} \times \frac{9+9+9}{4+4} = \frac{3}{5}\times\frac{27}{8} = \frac{81}{40}$$

7

$$\frac{\sqrt{3x+\sqrt{x}}-2}{\sqrt[3]{x}-1} \xrightarrow[\frac{0}{0}]{hop} \frac{\dfrac{3+\frac{1}{2\sqrt{x}}}{2\sqrt{3x+\sqrt{x}}}}{\dfrac{1}{3\sqrt[3]{x}}}$$

$$\xRightarrow{x\to 1} \frac{\dfrac{3+\frac{1}{2}}{4}}{\dfrac{1}{3}} = \frac{\frac{7}{2}}{\frac{4}{1}}\times 3 = \frac{7}{8}\times 3 = \frac{21}{8}$$

8

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

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

$$\xRightarrow{x=\pi} \frac{1+1+1}{1-(-1)} = \frac{3}{2}$$

$\cos\pi = -1$

9

$$\lim_{x\to\frac{\pi}{4}} \frac{1-\tan x}{\sin x-\cos x} = \frac{0}{0} \Rightarrow \frac{1-\frac{\sin x}{\cos x}}{\sin x-\cos x} = \frac{\frac{\cancel{\cos x-\sin x}}{\cos x}}{\cancel{\sin x-\cos x}} = -\frac{1}{\cos x}$$

$$\xrightarrow{x=\frac{\pi}{4}} -\frac{1}{\cos x} = -\frac{1}{\frac{\sqrt{2}}{2}} = -\frac{2}{\sqrt{2}} = -\sqrt{2}$$

10

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

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

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