سارا ساسانی یازدهم دختر ۹ — تکلیف شماره

۱-
$$\lim_{x\to 1}\frac{4x^2-7x+3}{5x^2-8x+3}=\frac{0}{0}\ \text{مبهم}\ \frac{\cancel{(x-1)}(4x-3)}{\cancel{(x-1)}(5x-3)}=\lim_{x\to 1}\frac{4x-3}{5x-3}=\frac{1}{2}$$

$$\begin{array}{l|l} 4x^2-7x+3 & x-1 \\ -(4x^2-4x) & 4x-3 \\ \hline -3x+3 & \\ -(-3x+3) & \\ \hline 0 & \end{array}\qquad \begin{array}{l|l} 5x^2-8x+3 & x-1 \\ -(5x^2-5x) & 5x-3 \\ \hline -3x+3 & \\ -(-3x+3) & \\ \hline 0 & \end{array}$$

۲-
$$\lim_{x\to 0}\frac{|3x-1|-|3x+1|}{x}=\frac{0}{0}\ \text{مبهم}\ \lim_{x\to 0}\frac{1-3x-3x-1}{x}=\lim_{x\to 0}\frac{-6\cancel{x}}{\cancel{x}}=-6$$

۳-
$$\lim_{x\to 4}\frac{x-4}{\sqrt{x}-2}=\frac{0}{0}\ \text{مبهم}\ =\lim_{x\to 4}\frac{\cancel{(\sqrt{x}-2)}(\sqrt{x}+2)}{\cancel{\sqrt{x}-2}}=\sqrt{x}+2=4$$

۴-
$$\lim_{x\to 2}\frac{x-\sqrt{2x}}{2x^2-x-6}=\frac{0}{0}\ \text{مبهم}\ =\lim_{x\to 2}\frac{x-\sqrt{2x}}{(x-2)(2x+3)}\times\frac{x+\sqrt{2x}}{x+\sqrt{2x}}=\lim_{x\to 2}\frac{x^2-2x}{(x-2)(2x+3)(x+\sqrt{2x})}$$

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

۵-
$$\lim_{x\to 1}\frac{1-\sqrt{x}}{2-\sqrt{5-x}}=\frac{0}{0}\ \text{تعریف}\qquad \lim\frac{1-\sqrt{x}}{2-\sqrt{5-x}}\times\frac{2+\sqrt{5-x}}{2+\sqrt{5-x}}=\lim_{x\to 1}\frac{(1-\sqrt{x})(2+\sqrt{5-x})}{4-5+x}=$$

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

۶-
$$\lim_{x\to 4}\frac{\sqrt{3x+4}-4}{\sqrt[3]{5x+7}-3}=\frac{0}{0}\ \text{مبهم}\ \frac{\sqrt{3x+4}-4}{\sqrt[3]{5x+7}-3}=\frac{3}{5}\times\frac{27}{8}=\frac{81}{40}$$

۷-
$$\lim_{x\to 1}\frac{\sqrt{3x+\sqrt{x}}-2}{\sqrt[3]{x}-1}=\frac{0}{0}\ \text{مبهم}\ \frac{\sqrt{3x+\sqrt{x}}-2}{\sqrt[3]{x}-1}\times\frac{\sqrt{3x+\sqrt{x}}+2}{\sqrt{3x+\sqrt{x}}+2}\times\frac{\sqrt[3]{x^2}+\sqrt[3]{x}+1}{\sqrt[3]{x^2}+\sqrt[3]{x}+1}=$$

$$\lim_{x\to 1}=\frac{(3x+\sqrt{x}-4)}{x-1}\times\frac{3}{4}=\lim_{x\to 1}\frac{(\sqrt{x}-1)(3\sqrt{x}+4)\,3}{(\sqrt{x}-1)(\sqrt{x}+1)\times 4}=\frac{7\times 3}{2\times 4}=\frac{21}{8}$$

$$\lim_{x\to\pi}\frac{1+\cos^3 x}{\underbrace{\sin^2 x}_{1-\cos^2 x}}=\frac{0}{0}\ \text{رفع :}\ \lim_{x\to\pi}\frac{\cancel{(1+\cos x)}(1+\cos^2 x-\cos x)}{(1-\cos x)\cancel{(1+\cos x)}}=\frac{1+1+1}{2}=\frac{3}{2}$$ ۸-

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$$\lim_{x\to\frac{\pi}{4}}\frac{1-\tan x}{\sin x-\cos x}=\frac{0}{0}\ \text{رفع :}\ \lim_{x\to\frac{\pi}{4}}\frac{1-\frac{\sin x}{\cos x}}{\sin x-\cos x}=\lim_{x\to\frac{\pi}{4}}\frac{\frac{\cos x-\sin x}{\cos x}}{\frac{\sin x-\cos x}{1}}=\lim_{x\to\frac{\pi}{4}}\frac{\cos x-\sin x}{\cos x(\sin x-\cos x)}=$$ ۹-

$$\lim_{x\to\frac{\pi}{4}}\frac{-\cancel{(\sin x-\cos x)}}{\cos x\,\cancel{(\sin x-\cos x)}}=\lim_{x\to\frac{\pi}{4}}\frac{-1}{\cos x}=\frac{-1}{\frac{\sqrt{2}}{2}}=\frac{-2}{\sqrt{2}}\times\frac{\sqrt{2}}{\sqrt{2}}=\frac{\cancel{2}\sqrt{2}}{\cancel{2}}=-\sqrt{2}$$

$$\lim_{x\to\frac{3\pi}{4}}\frac{\tan^2 x-1}{\underbrace{\cos^2 x}_{\frac{1-\tan^2 x}{1+\tan^2 x}}}=\frac{0}{0}\ \text{رفع :}=\lim_{x\to\frac{3\pi}{4}}\frac{\tan^2 x-1}{\frac{1-\tan^2 x}{1+\tan^2 x}}=\lim_{x\to\frac{3\pi}{4}}\frac{(\tan^2 x-1)(\tan^2 x+1)}{1-\tan^2 x}=$$ ۱۰-

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