Subject

Date : Year: Month: Day:

سارینا اسپیانی ـ یازدهم رختند C ـ شماره تکلیف (۳۰)

(۱)

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

(۲)

$$\lim_{x\to 0}\frac{\overbrace{|3x-1|}^{\ominus}-\overbrace{|3x+1|}^{\oplus}}{x}=\frac{-3x+1-3x-1}{x}=\frac{-6x}{x}=-6$$

(۳)

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

(۴)

$$\lim_{x\to 2}\frac{x-\sqrt{2x}}{2x^2-x-6}\xrightarrow{hop}\frac{1-\frac{2}{2\sqrt{2x}}}{4x-1}=\frac{1}{14}$$

(۵)

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

[-1 written above $1-x$; $(x-1)$ written below $4-5+x$; 2 written beside $\frac{4}{2}$]

(۶)

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

$$\frac{3x+4-16}{5x+7-27}\times\frac{27}{8}=\frac{(3x-12)}{(5x-20)}\times\frac{27}{8}=\frac{81}{40}$$

[$3(x-4)$ written above $(3x-12)$; $5(x-4)$ written below $(5x-20)$]

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

$$\frac{3x+\sqrt{x}-4}{x-1} \times \frac{3}{4} \Rightarrow \frac{3(\sqrt{x}-1)(\sqrt{x}+\frac{4}{3})}{(\sqrt{x}-1)(\sqrt{x}+1)} = \frac{3\times\frac{7}{3}}{2} = \frac{7}{2}$$

جمع ضرایب صفر $\rightarrow$ $(1) = x$, $\left(\frac{-4}{3}\right) = x$

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

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

$\sin^2 x \rightarrow 1-\cos^2 x$

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

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

۱۰

$$\lim_{x\to \frac{3\pi}{4}} \frac{\tan^2 x-1}{\cos 2x} = \frac{\frac{\sin^2 x-\cos^2 x}{\cos^2 x}}{\cos^2 x-\sin^2 x} = \frac{-1}{\cos^2 x} = \frac{-1}{\frac{2}{4}} = \boxed{-2}$$