نام و نام خانوادگی .سینا رجوانی(؟)........ پاسخنامه تشریحی تکلیف شماره ...۳۰... کلاس .یازدهم..[illegible]...A........

۱۸٫۲۵

حاصل حدهای زیر را بدست آورید.

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

$$\frac{4(x-1)(x-\frac{3}{4})}{5(x-1)(x-\frac{3}{5})}\Rightarrow\frac{4(x-\frac{3}{4})}{5(x-\frac{3}{5})}\xrightarrow{x\to 1}\frac{4(\frac{4}{4}-\frac{3}{4})}{5(\frac{5}{5}-\frac{3}{5})}=\boxed{\frac{1}{2}}$$

$\frac{1}{4}$ ، $\frac{2}{5}$

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$$\lim_{x\to 0}\frac{|3x-1|-|3x+1|}{x}=\frac{0}{0}$$

$$x\to 0^+\quad \frac{1-3x-3x-1}{x}=\frac{-6x}{x}=\boxed{-6}$$

$$x\to 0^-\quad \frac{1-3x-3x-1}{x}=\frac{-6x}{x}=\boxed{-6}$$

حد دارد

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$$\lim_{x\to 4}\frac{x-4}{\sqrt{x}-2}=\frac{0}{0}$$

$$\frac{x-4}{\sqrt{x}-2}\times\frac{\sqrt{x}+2}{\sqrt{x}+2}\Rightarrow\frac{(x-4)(\sqrt{x}+2)}{(x-4)}=\sqrt{x}+2\xrightarrow{x\to 4}2+2=\boxed{4}$$

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$$\lim_{x\to 2}\frac{x-\sqrt{2x}}{2x^2-x-6}\Rightarrow\frac{0}{0}$$

$$\frac{x-\sqrt{2x}}{2x^2-x-6}\Rightarrow\frac{x-\sqrt{2x}}{2(x-2)(x+\frac{3}{2})}\times\frac{x+\sqrt{2x}}{x+\sqrt{2x}}=$$

$$\Longrightarrow\frac{x^2-2x}{2(x-2)(x+\frac{3}{2})(x+\sqrt{2x})}\xrightarrow{\text{فاکتور گیری}}\frac{x(x-2)}{2(x-2)(x+\frac{3}{2})(x+\sqrt{2x})}\xrightarrow{x\to 2}\frac{2}{2\times(\frac{7}{2})\times 4}=\boxed{\frac{1}{14}}$$

$$\frac{4}{2}+\frac{3}{2}=\frac{7}{2}\qquad 2+\sqrt{4}=4$$

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$$\lim_{x\to 1}\frac{1-\sqrt{x}}{2-\sqrt{5-x}}=\frac{0}{0}$$

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

$$4-(5-x)=x-1$$

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

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$\lim_{x\to 1} \frac{\sqrt{x+3}-2}{\sqrt[3]{3x+5}-2} = \frac{0}{0}$ $\quad * a^3-b^3=(a-b)(a^2+ab+b^2)$

$\frac{\sqrt{x+3}-2}{\sqrt[3]{3x+5}-2} \times \frac{\sqrt{x+3}+2}{\sqrt{x+3}+2} \times \frac{(\sqrt[3]{3x+5})^2+2\sqrt[3]{3x+5}+4}{(\sqrt[3]{3x+5})^2+2\sqrt[3]{3x+5}+4} \Rightarrow \frac{x-1}{3x-3} \times \frac{(\sqrt[3]{3x+5})^2+2\sqrt[3]{3x+5}+4}{\sqrt{x+3}+2}$ (A)

$\frac{x-1}{3(x-1)} \times \frac{(\sqrt[3]{3x+5})^2+2\sqrt[3]{3x+5}+4}{\sqrt{x+3}+2} \xrightarrow{x\to 1} \frac{1}{3} \times \frac{4+4+4}{2+2} = \frac{12}{12} = 1$ (B)

$\lim_{x\to 1} \frac{\sqrt[3]{x+\sqrt{x}}-2}{\sqrt[4]{x}-1} = \frac{0}{0}$ $\quad * a^3-b^3=(a-b)(a^2+ab+b^2)$

$\frac{\sqrt[3]{x+\sqrt{x}}-2}{\sqrt[4]{x}-1} \times \frac{\sqrt[3]{x^2}+\sqrt[3]{x}+1}{\sqrt[3]{x^2}+\sqrt[3]{x}+1} \times \frac{\sqrt[3]{x+\sqrt{x}}+2}{\sqrt[3]{x+\sqrt{x}}+2} = \frac{x+\sqrt{x}-8}{x-1} \times \frac{\sqrt[3]{x^2}+\sqrt[3]{x}+1}{\sqrt[3]{x+\sqrt{x}}+2}$

$\sqrt{x}=t \rightarrow \frac{t^2+t-6}{t^4-1} = \frac{(t-2)(t+3)}{(t-1)(t+1)(t^2+1)} = \frac{(\sqrt{x}+3)}{(\sqrt{x}+1)(x+1)} \times \frac{\sqrt[3]{x^2}+\sqrt[3]{x}+1}{\sqrt[3]{x+\sqrt{x}}+2} \xrightarrow{x\to 1} \frac{4}{2\times 2} \times \frac{1}{4} = \frac{1}{8}$

$\lim_{x\to \pi} \frac{1+\cos^3 x}{\sin^2 x} = \frac{0}{0}$ $\quad * (a^3+b^3) = (a+b)(a^2-ab+b^2)$

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

$(1-\cos)(1+\cos x)$

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

$\Rightarrow \frac{1}{\cos x} = \frac{-1}{\frac{\sqrt{2}}{2}} \Rightarrow \frac{2}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \frac{2\sqrt{2}}{2} = -\sqrt{2}$ (D)

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

$-\frac{\left(\frac{\cos x-\sin x}{\cos x}\right)\left(\frac{\cos x+\sin x}{\cos x}\right)}{(\cos x-\sin x)(\cos x+\sin x)} \Rightarrow -\frac{1}{\cos^2 x} \Rightarrow \frac{-1}{\cos^2\left(\frac{\pi}{4}\right)} = \frac{-1}{\left(\frac{\sqrt{2}}{2}\right)^2}$

$= -\frac{4}{2} = -2$

۷) $\lim_{x\to 1} \frac{\sqrt[3]{x+\sqrt{x}}-2}{\sqrt[4]{x}-1} \times \frac{\sqrt[3]{x+\sqrt{x}}+2}{\sqrt[3]{x^2}+1+\sqrt[3]{x}} \times \frac{3}{2}$

HOP $\rightarrow \frac{3}{2} \times \frac{\frac{1}{3\sqrt[3]{x^2}}}{\frac{1}{2\sqrt{x}}} = \frac{3}{2} \times \frac{2}{3} = 1$