روژانو صدرالعلمائی　　یازدهم ریاضی C　　تکلیف ۳۰

۱-

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

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

$$=\frac{1}{2}$$

۲-

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

$$0^+:\ \frac{-3x+\cancel{1}-3x-\cancel{1}}{x}=\frac{-6x}{x}=-6$$

$$0^-:\ \frac{-3x+\cancel{1}-3x-\cancel{1}}{x}=\frac{-6x}{x}=-6$$

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

۴-

$$\lim_{x\to 2}\frac{x-\sqrt{2x}}{2x^2-x-6}=\frac{0}{0}\xrightarrow{\text{رفع ابهام}}=\frac{\sqrt{x}\,\cancel{(\sqrt{x}-\sqrt{2})}}{\cancel{(\sqrt{x}-\sqrt{2})}(\sqrt{x}+\sqrt{2})(2x+3)}$$

$$4x^2-2x-12$$

$$\div 2\ (2x-4)(2x+3)$$

$$(x-2)(2x+3)$$

$$\frac{\cancel{\sqrt{2}}}{2\cancel{\sqrt{2}}(7)}=\frac{1}{14}$$

۵-

$$\lim_{x\to 1}\frac{1-\cancel{\sqrt{x}}}{2-\cancel{\sqrt{5-x}}}=\frac{0}{0}\xrightarrow{\text{رفع ابهام}}\times\frac{\overset{4}{2+\sqrt{5-x}}}{\cancel{2+\sqrt{5-x}}}\times\frac{\cancel{1+\sqrt{x}}}{1+\sqrt{\overset{1}{x}}}=\frac{\overset{-1}{1-x}}{\underset{-1+x}{4-5+x}}\times\frac{4}{2}=-2$$

۶-

$$3^2\times 9=27$$

$$\lim_{x\to 4}\frac{\cancel{\sqrt{3x+4}}-4}{\cancel{\sqrt[3]{5x+7}}-3}=\frac{0}{0}\xrightarrow{\text{رفع ابهام}}\times\frac{\sqrt[3]{(5x+7)^2}+9+3\sqrt[3]{5x+7}}{\cancel{\sqrt[3]{(5x+7)^2}+9+3\sqrt[3]{5x+7}}}\times\frac{\cancel{\sqrt{3x+4}+4}}{\underset{8}{\sqrt{3x+4}+4}}$$

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

۷-

$$\lim_{x\to 1} \frac{\cancel{\sqrt{3x+\sqrt{x}}-2}}{\cancel{\sqrt[3]{x}-1}} \times \frac{\sqrt[3]{x^2}+1+\sqrt[3]{x}}{\cancel{\sqrt[3]{x^2}+1+\sqrt[3]{x}}} \times \frac{\cancel{\sqrt{3x+\sqrt{x}}+2}}{\sqrt{3x+\sqrt{x}}+2} = \frac{\cancel{3x-4+\sqrt{x}}}{x-1} \times \frac{3}{4} \times \frac{\cancel{(3x-4)-\sqrt{x}}}{\underbrace{(3x-4)-\sqrt{x}}_{-2}}$$

$$9x^2-24x+16$$

$$\frac{9x^2+16-24x-x}{x-1} \times \frac{3}{4} \times \frac{1}{-2} = \frac{(\cancel{x-1})(9x-16)}{\cancel{x-1}} \times \frac{3}{-8}$$

$$\begin{array}{r|l} 9x^2-25x+16 & x-1 \\ \hline -(9x^2-9x) & 9x-16 \\ \hline -16x+16 & \end{array}$$

$$\frac{\cancel{-}7\times 3}{\cancel{-}8} = \boxed{\frac{21}{8}}$$

۸-

$$\lim_{x\to \pi} \frac{1+\cos^3 x}{\underset{1-\cos^2 x}{\sin^2 x}} \quad \frac{\cancel{(1+\cos x)}\,(\overset{1}{1}-\overset{1}{\cos x}+\overset{-(-1)}{\cos^2 x})}{(1-\underbrace{\cos x}_{-1})\,\cancel{(1+\cos x)}} = \boxed{\frac{3}{2}}$$

۹-

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

$$\frac{\dfrac{\cancel{\cos x-\sin x}}{\cos x}\ -1}{\dfrac{\cancel{\sin x-\cos x}}{1}} = \frac{-1}{\cos x} = \frac{-2\times\sqrt{2}}{\sqrt{2}\times\sqrt{2}} = \frac{-\cancel{2}\sqrt{2}}{\cancel{2}} = \boxed{-\sqrt{2}}$$

$$\cos x = \frac{\sqrt{2}}{2}$$

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

$$\cos\frac{3\pi}{4} = -\frac{\sqrt{2}}{2} \xrightarrow{\text{توان ۲}} \frac{2}{4} = \frac{1}{2}$$