سانیا شیرمحمدی یازدهم دختر A – شماره تکلیف (۳۵)

۱)

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

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۲)

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

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

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۳)

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

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۴)

$$\lim_{x\to 2}\frac{x-\sqrt{2x}}{2x^2-x-6}\times\frac{x+\sqrt{2x}}{\underbrace{x+\sqrt{2x}}_{4}}=\frac{x^2-2x}{(2x^2-x-6)4}=\frac{x\cancel{(x-2)}}{\cancel{(x-2)}\underbrace{(2x+3)}_{7}4}=\frac{1}{28}$$

$$\begin{array}{l|l} 2x^2-x-6 & x-2 \\ \hline -2x^2+4x & 2x+3 \\ \hline 3x-6 & \\ -3x+6 & \\ \hline 0 & \end{array}$$

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۵)

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

$$(-1+x)$$

$$-\cancel{(1-x)}$$

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۶)

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

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

۷

$$\lim_{x\to ۱} \frac{\sqrt{۳x+\sqrt{x}}-۲}{\sqrt[۳]{x}-۱} \times \frac{\sqrt{۳x+\sqrt{x}}+۲}{\sqrt{۳x+\sqrt{x}}+۲} \times \frac{\sqrt[۳]{x^۲}+۱+\sqrt[۳]{x}}{\sqrt[۳]{x^۲}+۱+\sqrt[۳]{x}} = $$

$\sqrt{۳x+\sqrt{x}}+۲ \to ۴$, $\sqrt[۳]{x^۲}+۱+\sqrt[۳]{x} \to ۳$

$$\frac{۳x+\sqrt{x}-۴}{x-۱} \times \frac{۳}{۴} = \frac{\cancel{(\sqrt{x}-۱)}(\sqrt{x}+\frac{۴}{۳})}{\cancel{(\sqrt{x}-۱)}(\sqrt{x}+۱)} \times \frac{۳}{۴}$$

$$\Rightarrow \frac{۱+\frac{۴}{۳}}{۲} \times \frac{۳}{۴} = \frac{\frac{۷}{۳}}{\frac{۲}{۱}} \times \frac{۳}{۴} = \frac{۷}{۶} \times \frac{۳}{۴} = \frac{۷}{۸}$$

۸

$$\lim_{x\to \pi} \frac{۱+\cos^۳ x}{\sin^۲ x} = \frac{\cancel{(۱+\cos x)}(۱^۲+\cos^۲ x-\cos x)}{\cancel{(۱+\cos x)}(۱-\cos x)} = \frac{۱+۱-(-۱)}{۱-(-۱)} = \frac{۳}{۲}$$

$\sin^۲ x \to ۱-\cos^۲ x$

۹

$$\lim_{x\to \frac{\pi}{۴}} \frac{۱-\tan x}{\sin x-\cos x} = \frac{۱-\frac{\sin x}{\cos x}}{\sin x-\cos x} = \frac{\frac{\cos x-\sin x}{\cos x}}{\frac{\cancel{(\sin x-\cos x)}}{۱}} = \frac{-۱}{\cos x} = \frac{-۱}{\frac{\sqrt{۲}}{۲}} = \frac{-۲}{\sqrt{۲}} = -\sqrt{۲}$$

$\cos x-\sin x = -(\sin x-\cos x)$

۱۰

$$\lim_{x\to \frac{۳\pi}{۴}} \frac{\tan^۲ x-۱}{\cos ۲x} = \frac{\frac{\sin^۲ x}{\cos^۲ x}-۱}{\cos^۲ x-\sin^۲ x} = \frac{\frac{\cancel{\sin^۲ x-\cos^۲ x}}{\cos^۲ x}}{-\cancel{(\sin^۲ x-\cos^۲ x)}} = \frac{-۱}{\cos^۲ x} = \frac{-۱}{(\frac{\sqrt{۲}}{۲})^۲} = \frac{-۱}{\frac{۲}{۴}} = -۲$$

$\cos ۲x \to \cos^۲ x-\sin^۲ x$