یاران [illegible] یازدهم ۲ تکلیف شماره ۳۰ ۲۰

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۱)

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

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۲)

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

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

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۳)

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

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۴)

$$\lim_{x\to 2}\frac{x-\sqrt{2x}}{2x^2-x-6}\times\frac{x+\sqrt{2x}}{x+\sqrt{2x}}=\frac{x^2-2x}{(2x^2-x-6)(x+\sqrt{2x})}=\frac{x\cancel{(x-2)}}{\cancel{(x-2)}(2x+3)(4)}=\frac{2}{7\times 4}=\frac{1}{14}$$

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۵)

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

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۶)

$$\lim_{x\to 4}\frac{\sqrt{3x+4}-4}{\sqrt[3]{5x+7}-3}\times\frac{\sqrt{3x+4}+4}{\sqrt{3x+4}+4}\times\frac{\sqrt[3]{(5x+7)^2}+9+3\sqrt[3]{5x+7}}{\sqrt[3]{(5x+7)^2}+9+3\sqrt[3]{5x+7}}=\frac{(\overbrace{3x+4-16}^{3x-12})(27)}{(\underbrace{5x+7-27}_{5x-20})(8)}=\frac{3\cancel{(x-4)}(27)}{5\cancel{(x-4)}(8)}$$

$$=\boxed{\frac{81}{40}}$$

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۷)

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

$$=\frac{(3)((3x-4)+\sqrt{x})}{4(x-1)}\times\frac{((3x-4)-\sqrt{x})}{((3x-4)-\sqrt{x})}=\frac{(3)(9x^2+16-24x-x)}{4(x-1)(-2)}=\frac{3(\overbrace{9x^2-25x+16}^{\cancel{(x-1)}(9x-16)})}{4\cancel{(x-1)}(-2)}=\frac{3(-7)}{4(-2)}$$

$$=\boxed{\frac{21}{8}}$$

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۸)

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

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۹)

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

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۱۰)

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

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