آرمین ایزدی تکلیف ۳۰ کلاس A

۲۰

۱- (۲)

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

۲- (۲)

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

$$0^+:\ \frac{(-3x+1)-(3x+1)}{x}=\frac{-6x}{x}=\boxed{-6}$$

$$0^-:\ \frac{(-3x+1)-(3x+1)}{x}=\frac{-6x}{x}=\boxed{-6}$$

۳- (۲)

$$\lim_{x\to 4}\frac{x-4}{\sqrt{x}-2}=\frac{0}{0}\xrightarrow{\text{رفع ابهام}}\lim_{x\to 4}\frac{x-4}{\sqrt{x}-2}\times\frac{\sqrt{x}+2}{\sqrt{x}+2}=\frac{x\sqrt{x}+2x-4\sqrt{x}-8}{x-4}=\frac{2(x-4)+\sqrt{x}(x-4)}{x-4}$$

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

۴- (۲)

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

$$=\frac{x}{(2x+3)(x+\sqrt{2x})}=\frac{2}{7\times 4}=\boxed{\frac{1}{14}}$$

۵- (۲)

$$\lim_{x\to 1}\frac{1-\sqrt{x}}{2-\sqrt{5-x}}=\frac{0}{0}\xrightarrow{\text{رفع ابهام}}\lim_{x\to 1}\frac{1-\sqrt{x}}{2-\sqrt{5-x}}\times\frac{1+\sqrt{x}}{1+\sqrt{x}}\times\frac{2+\sqrt{5-x}}{2+\sqrt{5-x}}=\frac{(1-x)(2+\sqrt{5-x})}{(x-1)(1+\sqrt{x})}$$

$$=\frac{-2-\sqrt{5-x}}{1+\sqrt{x}}=\frac{-2-2}{2}=\boxed{-2}$$

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۶-   ۲

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

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

۷-   ۲

$$\lim_{x\to 1}\frac{\sqrt{3x+\sqrt{x}}-2}{\sqrt[3]{x}-1}=\frac{0}{0}\xrightarrow{\text{رفع ابهام}}\lim_{x\to 1}\frac{\sqrt{3x+\sqrt{x}}-2}{\sqrt[3]{x}-1}\times\frac{\sqrt[3]{x^2}+1+\sqrt[3]{x}}{\sqrt[3]{x^2}+1+\sqrt[3]{x}}\times\frac{\sqrt{3x+\sqrt{x}}+2}{\sqrt{3x+\sqrt{x}}+2}=\frac{3x+\sqrt{x}-4}{x-1}\times\frac{3}{4}$$

$$=\frac{3(x-1)+\sqrt{x}-1}{x-1}\times\frac{3}{4}=\frac{3(\sqrt{x}-1)(\sqrt{x}+1)+(\sqrt{x}-1)}{(\sqrt{x}-1)(\sqrt{x}+1)}\times\frac{3}{4}=\frac{(\sqrt{x}-1)(3(\sqrt{x}+1)+1)}{(\sqrt{x}-1)(\sqrt{x}+1)}\times\frac{3}{4}=\frac{7}{2}\times\frac{3}{4}=\boxed{\frac{21}{8}}$$

۸-   ۲

$$\lim_{x\to \pi}\frac{1+\cos^3 x}{\sin^2 x}=\frac{0}{0}\xrightarrow{\text{رفع ابهام}}\frac{(1+\cos x)(1+\cos^2 x-\cos x)}{(1+\cos x)(1-\cos x)}=\frac{1+\cos^2 x-\cos x}{1-\cos x}=\frac{1-(-1)+(-1)^2}{2}$$

$$=\boxed{\frac{3}{2}}$$

۹-   ۲

$$\lim_{x\to \frac{\pi}{4}}\frac{1-\tan x}{\sin x-\cos x}=\frac{0}{0}\xrightarrow{\text{رفع ابهام}}\frac{1-\frac{\sin x}{\cos x}}{-(\cos x-\sin x)}=\frac{\frac{\cos x-\sin x}{\cos x}}{-(\cos x-\sin x)}=-\frac{1}{\cos x}=-\frac{1}{\frac{\sqrt{2}}{2}}=\boxed{-\sqrt{2}}$$

۱۰-   ۲

$$\lim_{x\to \frac{3\pi}{4}}\frac{\tan^2 x-1}{\cos 2x}=\frac{0}{0}\xrightarrow{\text{رفع ابهام}}\frac{\frac{\sin^2 x}{\cos^2 x}-1}{\cos 2x}=\frac{\frac{-(\cos 2x)}{\cos^2 x}}{\cos 2x}=-\frac{1}{\cos^2 x}=\frac{-1}{\left(-\frac{\sqrt{2}}{2}\right)^2}=\frac{-1}{\frac{1}{2}}=\boxed{-2}$$