Date: Subject:

★ آزمون کلاسی

★ تکلیف: ۳۰

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

ریشه ۱ → $a+b+c=0$

② $\lim_{x\to 0} \frac{\overset{\text{منفی}}{|2x-1|} - \overset{\text{مثبت}}{|3x+1|}}{x} = \frac{0}{0} \xrightarrow{\text{رفع ابهام}} \frac{-2x+1-3x-1}{x} = \frac{-5x}{x} = \boxed{-5}$

③ $\lim_{x\to 4} \frac{x-4}{\sqrt{x}-2} = \frac{0}{0} \xrightarrow{\text{رفع ابهام}} \frac{x-4}{\sqrt{x}-2} \times \frac{\overbrace{\sqrt{x}+2}^{4}}{\sqrt{x}+2} = \frac{4(x-4)}{x-4} = \boxed{4}$

④ $\lim_{x\to 2} \frac{x-\sqrt{2x}}{2x^2-x-6} = \frac{0}{0} \xrightarrow{\text{رفع ابهام}} \frac{x-\sqrt{2x}}{(x-2)(2x+3)} \times \frac{\overbrace{x+\sqrt{2x}}^{4}}{x+\sqrt{2x}} = \frac{x^2-2x}{4(x-2)(2x+3)} = \frac{x\cancel{(x-2)}}{4\cancel{(x-2)}(2x+3)} = \boxed{\frac{1}{14}}$

$\xrightarrow{\text{روش ضربی}} x^2-x-12=0 \to (x-4)(x+3)=0 \to x=\frac{4}{2}=2,\ x=-\frac{3}{2}$

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

$4-5+x$

⑥ $\lim_{x\to 4} \frac{\sqrt{3x+4}-4}{\sqrt[3]{5x+7}-3} = \frac{0}{0} \xrightarrow{\text{رفع ابهام}} \frac{\sqrt{3x+4}-4}{\sqrt[3]{5x+7}-3} \times \frac{\sqrt{3x+4}+4}{\underbrace{\sqrt{3x+4}+4}_{8}} \times \frac{\sqrt[3]{(5x+7)^2}+9+3\sqrt[3]{5x+7}}{\underbrace{\sqrt[3]{(5x+7)^2}+9+3\sqrt[3]{5x+7}}_{27}}$

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

⑦ $\lim_{x\to 1} \frac{\sqrt{3x+\sqrt{x}}-2}{\sqrt[3]{x}-1} = \frac{0}{0} \xrightarrow{\text{رفع ابهام}} \times \frac{\overset{\text{مزدوج صورت}}{\text{ص.م}}}{\text{ص.م}} \times \frac{\overset{\text{مزدوج مخرج}}{\text{م.ص}}}{\text{م.ص}} = \frac{(3x+\sqrt{x}-4)3}{(x-1)4} \xrightarrow{a+b+c=0}$

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

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

$\sin^2 x \to (1-\cos^2 x)$

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

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