مهرزاد شوشتری ۳۰

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

2) $\lim_{x\to 0} \frac{|3x-1|-|3x+1|}{x} = \frac{-(3x-1)-(3x+1)}{x} = \frac{-3x\cancel{+1}-3x\cancel{-1}}{x} = \frac{-6x}{x} = -6$

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

4) $\lim_{x\to 2} \frac{x-\sqrt{2x}}{2x^2-x-6} = \frac{0}{0} = \frac{x-\sqrt{2x}}{(x-2)(2x+3)} \times \frac{x+\sqrt{2x}}{x+\sqrt{2x}} = \frac{x^2-2x}{(x-2)(2x+3)(4)} = \frac{x\cancel{(x-2)}}{\cancel{(x-2)}(2x+3)(4)} = \frac{2}{28} = \frac{1}{14}$

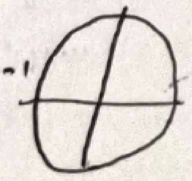
5) $\lim_{x\to 4} \frac{1-\sqrt{x}}{2-\sqrt{5-x}} \times \frac{\text{مزدوج صورت}}{\text{مزدوج صورت}} \times \frac{\text{مزدوج مخرج}}{\text{مزدوج مخرج}} = \frac{(1-x)\,\cancel{4}^{\,2}}{(4-5+x)\,\cancel{2}} = \frac{\overset{-1}{\cancel{(1-x)}}\,2}{\cancel{(x-1)}} = +2$

6) $\lim_{x\to 4} \frac{\sqrt{3x+4}-4}{\sqrt[3]{5x+7}-3} = \frac{\text{مزدوج صورت}}{\text{مزدوج صورت}} \times \frac{\text{مزدوج مخرج}}{\text{مزدوج مخرج}} = \frac{3x+4-16}{5x+7-27} \times \frac{27}{8} = \frac{3x-12}{5x-20} \times \frac{27}{8}$

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

7) $\lim_{x\to 1} \frac{\sqrt{3x+\sqrt{x}}-2}{\sqrt[3]{x}-1} \xrightarrow{hop} \frac{\frac{3+\frac{1}{2\sqrt{x}}}{2\times 2}}{\frac{1}{3\sqrt[3]{x^2}}} = \frac{\frac{3+\frac{1}{2}}{4}}{\frac{1}{3}} = \frac{\frac{\frac{7}{2}}{4}}{\frac{1}{3}} = \frac{\frac{7}{8}}{\frac{1}{3}} = \boxed{\frac{21}{8}}$

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



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$$\lim_{x \to \frac{\pi}{4}} \frac{1-\tan x}{\sin x - \cos x} \to \frac{1-\frac{\sin x}{\cos x}}{\sin x - \cos x} = \frac{\frac{\cos x - \sin x}{\cos x}}{\frac{\sin x - \cos x}{1}} = \frac{\cancel{\cos x - \sin x}}{\cos x\,\cancel{(\sin x - \cos x)}} = -\frac{1}{\cos x} = [1]$$

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

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

$$\boxed{-2}$$