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۱) $\lim_{x\to 1} \frac{4x^2-7x+3}{5x^2-8x+3} = \frac{4-7+3}{5-8+3} = \frac{0}{0}$ H.O.P $\frac{8x-7}{10x-8} = \frac{8-7}{10-8} = \frac{1}{2}$

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

۳) $\lim_{x\to 4} \frac{x-4}{\sqrt{x}-2} = \frac{0}{0}$ H.O.P $\lim \frac{1}{\frac{1}{2\sqrt{x}}} = 2\sqrt{x} = 4$

۴) $\lim_{x\to 2} \frac{x-\sqrt{2x}}{2x^2-x-6} = \frac{2-2}{8-2-6} = \frac{0}{0}$ H.O.P $\frac{1-\frac{2}{2\sqrt{2x}}}{4x-1} = \frac{1-\frac{1}{2}}{7} = \frac{1}{14}$

یا $\frac{x^2-2x}{(x-2)(x+\frac{1}{2})\times 4} = \frac{1}{\frac{7}{2}\times 4} = \frac{1}{14}$

a) $\lim_{x\to 1} \frac{1-\sqrt{x}}{4^x-\sqrt{5-x}} = \frac{0}{3-2} = \frac{0}{0}$ H.O.P $\frac{-\frac{1}{2\sqrt{x}}}{\ln 4 \cdot 4^x + \frac{1}{2\sqrt{5-x}}} = \frac{-1}{\ln 4 \cdot 4 + \frac{1}{4}} = -0.23$

۶) $\lim_{x\to 4} \frac{\sqrt{3x+4}-4}{\sqrt[3]{5x+7}-3} = \frac{3}{5}\times\frac{27}{8} = \frac{81}{40}$

یا $\frac{3x-12}{5x+7-27}\times\frac{27}{8} = \frac{3}{5}\times\frac{27}{8} = \frac{81}{40}$

۷) $\lim_{x\to 1} \frac{\sqrt{3x+\sqrt{x}}-2}{\sqrt{x}-1} = \frac{0}{0} = \frac{3+\frac{1}{2\sqrt{x}}}{1}\times\frac{3}{4} = \frac{7}{2}\times\frac{3}{4} = \frac{21}{8}$

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

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

$(1-\cos x)$

۹) $\lim_{x \to \frac{\pi}{4}} \frac{1-\tan x}{\sin x - \cos x} = \frac{1-1}{\frac{\sqrt{2}}{2}-\frac{\sqrt{2}}{2}} = \frac{0}{0} = \frac{\frac{\cos x - \sin x}{\cos x}}{\frac{\sin x - \cos x}{\cos x}} = \frac{-1}{\cos x} = -\frac{1}{\frac{\sqrt{2}}{2}} = -\sqrt{2}$ ✓

۱۰) $\lim_{x \to \frac{\pi}{4}} \frac{\tan^2 x - 1}{\cos 2x} = \frac{1-1}{0} = \frac{0}{0} = \frac{\frac{\sin^2 x - \cos^2 x}{\cos^2 x}}{\cos^2 x - \sin^2 x} = \frac{-1}{\cos^2 x} = \frac{-1}{(\frac{\sqrt{2}}{2})^2} = \frac{-1}{\frac{1}{2}} = -2$ ✓