حسابی جان نثاری – یازدهم دختر B – شنبه‌ها – تکلیف شماره ۴ (حد)

۱) $\lim_{x\to 1} \frac{4x^2-7x+3}{2x^2-5x+3} = \frac{0}{0}$ هوپ $\Rightarrow \frac{8x-7}{10x-5} = \frac{8-7}{10-5} = \frac{1}{2}$

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

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

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

۵) $\lim_{x\to 1} \frac{1-\sqrt{x}}{2-\sqrt{5-x}} \times \frac{\cdots}{\cdots} \times \frac{\cdots}{\cdots} = \frac{(1-x)^2}{(4-5+x)} \times \frac{2}{1-x} = -2$

۶) $\lim_{x\to 3} \frac{\sqrt{2x+3}-3}{\sqrt[3]{5x+1}-2} \times \frac{\cdots}{\cdots} \times \frac{\cdots}{\cdots} = \frac{(2x+3-9)\times 28}{(5x+1-8)\times 7} = \frac{4(x-3)}{(5x-7)\times 1} = \frac{12}{8} = \frac{3}{2}$

۷) $\lim_{x\to 1} \frac{\sqrt[3]{2x+\sqrt{x}}-2}{\sqrt{x}-1} \times \frac{\cdots}{\cdots} \times \frac{\cdots}{\cdots} = \frac{(2x+\sqrt{x}-3)\,4}{(x-1)\,3} \times \frac{(2x-3+\sqrt{x})}{(2x-3+\sqrt{x})} = \frac{4(2x^2+x-3)}{3(x-1)(2x-\sqrt{x}-3)} = \frac{4(2x+3)(x-1)}{3(x-1)(2x-\sqrt{x}-3)} = \frac{-24}{-8} = \frac{24}{8}$

۸) $\lim_{x\to \pi} \frac{1+\cos^4 x}{\sin^4 x} = \frac{0}{0} = \frac{(1+\cos x)(1-\cos x+\cos^2 x)}{(1-\cos x)(1+\cos x)} = \frac{1-(-1)+(-1)^2}{1-(-1)} = \frac{3}{2}$

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

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