۱) $\lim\limits_{x\to 1} \dfrac{4x^2-7x+3}{5x^2-8x+3} = \dfrac{0}{0} = \dfrac{(x-1)(4x-3)}{(x-1)(5x-3)} = \dfrac{4x-3}{5x-3} = \dfrac{4-3}{5-3} = \dfrac{1}{2}$

۲) $\lim\limits_{x\to 0} \dfrac{|3x-1|-|3x+1|}{x} = \dfrac{0}{0} = \dfrac{-3x+1-3x-1}{x} = \dfrac{-6x}{x} = -6$

$3x-1=0 \to x=\frac{1}{3}$ $\quad \frac{1}{3}$ $\quad - \mid +$ $\Rightarrow$ x در دور صفر منفی است

$3x+1=0 \to x=\frac{-1}{3}$ $\quad \frac{-1}{3}$ $\quad - \mid +$ $\Rightarrow$ x در دور صفر مثبت است

۳) $\lim\limits_{x\to 4} \dfrac{x-4}{\sqrt{x}-2} = \dfrac{0}{0} = \dfrac{(\sqrt{x}-2)(\sqrt{x}+2)}{\sqrt{x}-2} = \sqrt{x}+2 = 4$

۴) $\lim\limits_{x\to 2} \dfrac{x-\sqrt{2x}}{2x^2-x-6} = \dfrac{0}{0} = \times \dfrac{x+\sqrt{2x}}{x+\sqrt{2x}} = \dfrac{x^2-2x}{(x+\sqrt{2x})(2x^2-x-6)} = \dfrac{x(x-2)}{(x+\sqrt{2x})(x-2)(2x+3)} = \dfrac{2}{(2+3)(7)} = \dfrac{1}{14}$

۵) $\lim\limits_{x\to 1} \dfrac{1-\sqrt{x}}{2-\sqrt{5-x}} = \dfrac{0}{0} = \times \dfrac{1+\sqrt{x}}{1+\sqrt{x}} \times \dfrac{2+\sqrt{5-x}}{2+\sqrt{5-x}} = \dfrac{(1-x)(2+\sqrt{5-x})}{(4-5+x)(1+\sqrt{x})} = \dfrac{(1-x)(2+\sqrt{5-x})}{-(1-x)(1+\sqrt{x})} = \dfrac{(2+2)}{-(2)} = -2$

۶) $\lim\limits_{x\to 4} \dfrac{\sqrt{3x+4}-4}{\sqrt[3]{5x+7}-3} = \dfrac{0}{0} = \times \dfrac{\sqrt{3x+4}+4}{\sqrt{3x+4}+4} \times \dfrac{\sqrt[3]{(5x+7)^2}+3\sqrt[3]{5x+7}+9}{\sqrt[3]{(5x+7)^2}+3\sqrt[3]{5x+7}+9} = \dfrac{(3x-12)(\sqrt[3]{(5x+7)^2}+3\sqrt[3]{5x+7}+9)}{(5x+7-27)(\sqrt{3x+4}+4)} =$

$(5x-20)$

$\dfrac{3(x-4)(9+9+9)}{5(x-4)(4+4)} = \dfrac{3\times 27}{5\times 8} = \dfrac{81}{40}$

۷) $\lim\limits_{x\to 1} \dfrac{\sqrt{3x+\sqrt{x}}-2}{\sqrt[3]{x}-1} = \dfrac{0}{0} = \times \dfrac{\sqrt{3x+\sqrt{x}}+2}{\sqrt{3x+\sqrt{x}}+2} \times \dfrac{\sqrt[3]{x^2}+\sqrt[3]{x}+1}{\sqrt[3]{x^2}+\sqrt[3]{x}+1} = \dfrac{(\sqrt{x}-1)(3\sqrt{x}+4)}{(3x+\sqrt{x}-4)(\sqrt[3]{x^2}+\sqrt[3]{x}+1)} = \dfrac{\overset{0}{(3\sqrt{x}+4)}\overset{3}{(1+1+1)}}{\underset{2}{(\sqrt{x}+1)}\underset{4}{(2+2)}} = \dfrac{3}{8}$

$(x-1)$ $\quad (\sqrt{3x+\sqrt{x}}+2)$ $\quad (\sqrt{x}-1)(\sqrt{x}+1)$

۸) $\lim\limits_{x\to \pi} \dfrac{1+\cos^3 x}{\sin^2 x} = \dfrac{(1+\cos x)(1+\cos^2 x-\cos x)}{1-\cos^2 x} = \dfrac{1+1+1}{1+1} = \dfrac{3}{2}$

$\dfrac{0}{0}$ $\quad (1-\cos x)(1+\cos x)$

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

$\dfrac{0}{0}$

۱۰) $\lim\limits_{x\to \frac{3\pi}{4}} \dfrac{\tan^2 x-1}{\cos 2x} = \dfrac{\frac{\sin^2 x}{\cos^2 x}-1}{\cos^2 x-\sin^2 x} = \dfrac{\frac{\sin^2 x-\cos^2 x}{\cos^2 x}}{-(-\cos^2 x+\sin^2 x)} = \dfrac{-1}{\cos^2 x} = \dfrac{-1}{\underbrace{(\frac{\sqrt{2}}{2})^2}_{\frac{1}{2}}} = -2$

$\dfrac{0}{0}$

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