علیرضا قدوسی یازدهم [redacted]لیبر سری ۲ **۱۶**

۱) $\lim\limits_{x\to 1} \dfrac{4x^2-7x+3}{5x^2-8x+3}$ ۲

$$\longrightarrow = \frac{0^{\sim}}{0^{\sim}} \xRightarrow{hop} \frac{8x-7}{10x-8} = \frac{8-7}{10-8} = \frac{1}{2}$$

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۲) $\lim\limits_{x\to 0} \dfrac{|3x-1|-|3x+1|}{x}$ $\longrightarrow$ $\lim\limits_{x\to 0} \dfrac{-3x+1-3x-1}{x} = \dfrac{-6x}{x} = \boxed{-6}$ ۰

$$\begin{cases} 0^+ \longrightarrow \dfrac{[-1^+]-[1^+]}{0^+} = \dfrac{-2}{0^+} = -\infty \\ 0^- \longrightarrow \dfrac{[-1^-]-[1^-]}{0^-} = \dfrac{-2}{0^-} = +\infty \end{cases}$$

قدر مطلقه نه براکت!

تابع در $x=0$ حد ندارد

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۳) $\lim\limits_{x\to 4} \dfrac{x-4}{\sqrt{x}-2} = \dfrac{(\sqrt{x}-2)(\sqrt{x}+2)}{\sqrt{x}-2} = \dfrac{\sqrt{x}+2}{1} = \dfrac{\sqrt{4}+2}{1} = 4$ ۲

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۴) $\lim\limits_{x\to 2} \dfrac{x-\sqrt{2x}}{2x^2-x-6} \xrightarrow{\sqrt{2x}=2} \dfrac{x-2}{2x^2-x-6} = \dfrac{x-2}{(x-2)(2x+3)} = \dfrac{1}{2x+3} = \cancel{\dfrac{1}{7}}$ ۰

$$\xrightarrow{Hop} \lim_{x\to 2} \frac{1-\frac{1}{\sqrt{2x}}}{4x-1} = \frac{\frac{1}{2}}{7} = \frac{1}{14}$$

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۵) $\lim\limits_{x\to 1} \dfrac{1-\sqrt{x}}{2-\sqrt{5-x}} = \dfrac{1-x}{4-5+x} \times \dfrac{2+\sqrt{5-x}}{1+\sqrt{x}} = -\dfrac{2+\sqrt{5-x}}{1+\sqrt{x}} = -\dfrac{2+\sqrt{5-1}}{1+\sqrt{1}} = -\dfrac{4}{2} = -2$ ۲

۶)

$$\lim_{x\to 4}\frac{\sqrt{3x+4}-4}{\sqrt[3]{5x+7}-3}=\frac{3x+4-16}{5x+7-27}\times\frac{\sqrt[3]{(5x+7)^2}+3\sqrt[3]{5x+7}+9}{\sqrt{3x+4}+4}=\frac{3x-12}{5x-20}\times\frac{27}{8}=\frac{3}{5}\times\frac{27}{8}=\frac{81}{40}=2{,}025$$

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۷)

$$\lim_{x\to 1}\frac{\sqrt{3x+\sqrt{x}}-2}{\sqrt[3]{x}-1}=\frac{3x+\sqrt{x}-4}{x-1}\times\frac{\sqrt[3]{x^2}+\sqrt[3]{x}+1}{\sqrt{3x+\sqrt{x}}+2}=\frac{(\sqrt{x}-1)(3\sqrt{x}+3+1)}{(\sqrt{x}-1)(\sqrt{x}+1)}\times\frac{3}{4}=\frac{7}{2}\times\frac{3}{4}=\frac{21}{8}=2{,}625$$

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۸)

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

$\cos\pi=-1$

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۹)

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

$\cos\frac{\pi}{4}=\frac{\sqrt{2}}{2}$

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۱۰)

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

$\cos\frac{3\pi}{4}=\frac{-\sqrt{2}}{2}$

$\cos^2\frac{3\pi}{4}=\frac{1}{2}$

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