۱۸,۵

نام و نام خانوادگی .... پاسخنامه تشریحی تکلیف شماره .... کلاس ....

۱	(۲)	$\lim\limits_{x\to 1} \dfrac{4x^2-7x+3}{5x^2-8x+3} \overset{hop}{=} \dfrac{8x-7}{10x-8} = \dfrac{1}{2}$ ✓
۲	(۲)	$\lim\limits_{x\to 0} \dfrac{\lvert 3x-1\rvert - \lvert 3x+1\rvert}{x} = \begin{cases} x\to 0^+ : \dfrac{-(3x-1)-(3x+1)}{0^+} = \dfrac{-6x}{x} = -6 \\ x\to 0^- : \dfrac{-3x+1-3x-1}{0^-} = \dfrac{-6x}{x} = -6 \end{cases}$ ✓
۳	(۲)	$\lim\limits_{x\to 4} \dfrac{x-4}{\sqrt{x}-2} = \dfrac{(\sqrt{x}-2)(\sqrt{x}+2)}{\sqrt{x}-2} = \sqrt{x}+2 = 2+2 = 4$ ✓
۴	(۱,۵)	$\lim\limits_{x\to 2} \dfrac{x-\sqrt{2x}}{2x^2-x-6} = \dfrac{\sqrt{x}(\sqrt{x}-\sqrt{2})}{(x-2)(2x+3)}$, $(\sqrt{x}+\sqrt{2})$, $= \dfrac{\sqrt{2}}{7}$ ✗ $\quad \dfrac{1}{14}$ $\overset{Hop}{\longrightarrow} \lim\limits_{x\to 2} \dfrac{1-\frac{1}{\sqrt{2x}}}{4x-1} = \dfrac{\frac{1}{2}}{7} = \dfrac{1}{14}$
۵	(۲)	$\lim \dfrac{1-\sqrt{x}}{2-\sqrt{5-x}} = \dfrac{1-x}{x-1}\cdot\dfrac{(4)}{(2)} = -2$ ✓

۶ (۱)

$$\lim_{x\to 1} \frac{\sqrt{3x+\sqrt{x}}-2}{\sqrt[3]{5x+7}-3} = \frac{27}{8}$$

$$\frac{\sqrt{3x+\sqrt{x}}-4}{\sqrt[3]{5x+7}-3} \times \frac{\sqrt[3]{(5x+7)^2}+9+3\sqrt[3]{5x+7}}{\sqrt[3]{(5x+7)^2}+9+3\sqrt[3]{5x+7}} \times \frac{\sqrt{3x+\sqrt{x}}+2}{\sqrt{3x+\sqrt{x}}+2} = \frac{27}{8}$$

۷ (۲)

(crossed out)

$$\lim_{x\to 1} \frac{\sqrt{3x+\sqrt{x}}-2}{\sqrt[4]{x}-1} = 3$$

$$\frac{\sqrt{3x+\sqrt{x}}-2}{\sqrt[4]{x}-1} \times \frac{\sqrt{3x+\sqrt{x}}+2 \times \sqrt[4]{x^3}+\sqrt{x}+1}{\sqrt{3x+\sqrt{x}}+2 \times \sqrt[4]{x^3}+\sqrt{x}+1} = \frac{3x+\sqrt{x}-4\times 4}{(x-1)\times 4} = \frac{(3x+x-4)\times 3}{(x-1)\times 4} = 3$$

۸ (۲)

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

$$\sin^2 x = 1-\cos^2 x = (1-\cos x)(1+\cos x)$$

۹ (۳)

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

۱۰ (۲)

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

$$\lim \frac{\sqrt{3x+\sqrt{x}}-2}{\sqrt[3]{x}-1} = \frac{21}{8}$$

$$\frac{\sqrt{3x+\sqrt{x}}-2}{\sqrt[3]{x}-1} \times \frac{\sqrt{3x+\sqrt{x}}+2}{\sqrt{3x+\sqrt{x}}+2} \times \frac{\sqrt[3]{x^2}+\sqrt[3]{x}+1}{\sqrt[3]{x^2}+\sqrt[3]{x}+1}$$

$$\lim \frac{(3x+\sqrt{x}-4)(\sqrt[3]{x^2}+\sqrt[3]{x}+1)}{(x-1)(\sqrt{3x+\sqrt{x}}+2)} = \lim_{x\to 1} \frac{3\left[3(\sqrt{x}-1)(\sqrt{x}+\frac{4}{3})\right]}{4(\sqrt{x}-1)(\sqrt{x}+1)}$$

$$= \frac{21}{8}$$

$$\xrightarrow{Hop} \lim_{x \to ۴} \frac{\dfrac{۳}{۲\sqrt{۳x+۴}}}{\dfrac{۵}{۳\sqrt[۳]{(۵x+۷)^{۲}}}} = \frac{\dfrac{۳}{۸}}{\dfrac{۵}{۲۷}} = \frac{۸۱}{۴۰}$$

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