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حسابان ضمیمه B

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① در $x=2$ ، $f(x)$ حد دارد $\Rightarrow \lim\limits_{x\to 2^-} f(x) = \lim\limits_{x\to 2^-} f(x) \to 2 = 4-a \Rightarrow a=2$

$\xrightarrow{a=2} \left\lfloor \frac{a}{3} \right\rfloor - \left\lfloor \frac{2}{3} \right\rfloor = 0$

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②

$\lim\limits_{x\to \frac{\pi}{6}^-} \lfloor 2\sin x - 1 \rfloor \to$ $\sin x$ $\Rightarrow \lim\limits_{x\to \frac{\pi}{6}^-} \lfloor 1^- - 1 \rfloor = -1$

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③

$\lim\limits_{x\to -\frac{1}{2}} \lfloor 8x^3 - x \rfloor = \left\lfloor \cancel{8} \times \frac{-1}{\cancel{8}} + \frac{1}{2} \right\rfloor = \left\lfloor \frac{-1}{2} \right\rfloor = -1$

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④

$\lim\limits_{x\to (-\frac{1}{2})^-} \dfrac{10x - 7 + \left\lfloor \frac{3}{x^2} \right\rfloor}{14x - \left\lfloor \frac{-2}{x^2} \right\rfloor}$ $\longrightarrow \left\lfloor \frac{3}{x^2} \right\rfloor = 11$, $\frac{1}{x^2}$, $\longrightarrow \left\lfloor \frac{-2}{x^2} \right\rfloor = -8$

$\Rightarrow = \dfrac{10x+4}{14x+8} = \dfrac{5x+2}{7x+4} = \dfrac{+\frac{1}{2}}{0^-} = -\infty$

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⑤

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

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⑥

$\lim\limits_{x\to -1} \dfrac{\sqrt{2x+3} - \sqrt{3x+4}}{1+\sqrt[3]{x^2}} \; \frac{0}{0} \xrightarrow{Hop} \dfrac{\frac{2}{2\sqrt{2x+3}} - \frac{3}{2\sqrt{3x+4}}}{\frac{1}{\sqrt[3]{x}}} = \dfrac{1-\frac{3}{2}}{-1} = \dfrac{1}{2}$

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⑦

$\lim\limits_{x\to 1} \dfrac{2x - 7\sqrt{x} + 5}{2x - \sqrt{3x+1}} = \frac{0}{0} \xrightarrow{Hop} \dfrac{2 - \frac{7}{2} x^{-\frac{1}{2}}}{2 - \frac{1}{2}(3x+1)^{-\frac{1}{2}}} = \dfrac{2 - \frac{7}{2}}{2 - \frac{1}{4}} = \dfrac{-6}{7}$

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⑧

$\lim\limits_{x\to 0} \dfrac{a + \sqrt{bx+c}}{\underbrace{x}_{=0}} = \dfrac{1}{4}$, $a+\sqrt{bx+c} \longrightarrow = 0$ $\Rightarrow a = -\sqrt{c}$

$\xrightarrow{Hop} \dfrac{\frac{b}{2\sqrt{bx+c}}}{1} = \dfrac{1}{4} \xrightarrow{x=0} \dfrac{b}{\cancel{2}\sqrt{c}} = \dfrac{1}{\cancel{4}_{2}} \to 2b = \sqrt{c}$

$\longrightarrow \dfrac{ab}{c} = \dfrac{-2b \cdot b}{4b^2} = \dfrac{-1}{2}$

(۹)

$$\lim_{x\to -2\pi} \frac{4 + k\left\lfloor \frac{x}{\pi} \right\rfloor}{\sin x} \xrightarrow{\text{در } -2\pi \text{ حد دارد}} \lim_{x\to -2\pi^-} \bigcirc = \lim_{x\to -2\pi^+} \bigcirc \Rightarrow$$

$$\frac{4 + k\left\lfloor \frac{-2\pi^+}{\pi} \right\rfloor}{0^+} = \frac{4-2k}{0^+} = +\infty \Rightarrow k = 2^- \Rightarrow \lfloor -k \rfloor = -2$$

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(۱۰)

$$\lim_{x\to 8} \frac{b\sqrt{2+\sqrt[3]{x}} - 2b}{ax-b} = \frac{0}{?} \xrightarrow[x\to 8]{\lim \bigcirc \neq 0} \lim_{x\to 8} \frac{b\sqrt{2+\sqrt[3]{x}} - 2b}{ax-b} = \frac{0}{0} \Rightarrow 8a - b = 0$$

$$\Rightarrow \frac{b}{a} = 8 \;/\; \xrightarrow{\text{Hop}} \frac{\frac{b}{2}\left(2+\sqrt[3]{x}\right)^{-\frac{1}{2}}}{a} = \frac{b}{4a}^{=8} = 2$$
