فاطمه سلطان الکتابی

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①

$$f(x) = 2\left[\frac{2-x}{2}\right] + a\left[\frac{x+2}{3}\right]$$

$$\lim_{x\to -2^+} \to 2\underbrace{\left[\frac{2+2^-}{2}\right]}_{[2^-]=1} + a\underbrace{\left[\frac{-2^+ +2}{3}\right]}_{0} =$$

$$\lim_{x\to -2^-} \to 2\underbrace{\left[\frac{2+2^+}{2}\right]}_{\underbrace{[2^+]=2}_{4}} + a\underbrace{\left[\frac{-2^- +2}{3}\right]}_{-a} =$$

$2 = 4 - a$

$\Rightarrow a = 2$

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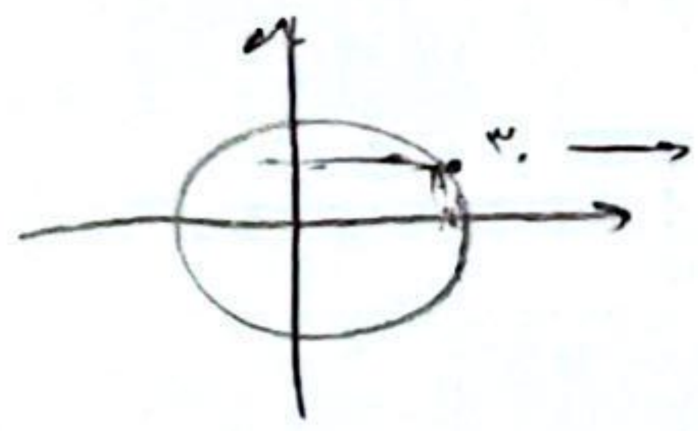
$$\left[\frac{2}{3}\right] = 0$$

②

$$\lim_{x\to \frac{\pi}{6}} [2\sin x - 1] = [1^- - 1] = [0^-] = -1$$



$\frac{\pi}{6} = 30°$

$30° \to \sin = \frac{1}{2}$

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③

$$\lim_{x\to -\frac{1}{2}} [8x^3 - x] = \left[8\left(-\frac{1}{2}\right)^3 - \left(-\frac{1}{2}\right)\right] = \left[-\frac{1}{2}\right] = -1$$

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⑤

$x \to 1^+ \to [x] = 1$

$(1+\cos \pi x)(1-\cos \pi x)$

$$\lim \frac{\sin^2 \pi x}{[x] + \cos \pi x} = \lim \frac{1-\cos^2 \pi x}{1+\cos \pi x}$$

$$\Rightarrow \lim_{x\to 1^+} (1 - \cos \pi x)$$

$$\Rightarrow 1 - \cos \pi = 1 - (-1) = 2$$

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6

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

Hop $\Leftarrow \frac{0}{0}$

$$\frac{\dfrac{2}{2\sqrt{2x+3}} - \dfrac{3}{2\sqrt{3x+4}}}{\dfrac{1}{3\sqrt[3]{x^2}}} \Rightarrow \frac{\dfrac{2-3}{2}}{\dfrac{1}{3}} = -\frac{3}{2}$$

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$$\lim_{x \to 1} \frac{2x - 7\sqrt{x} + 5}{2x - \sqrt{3x+1}} \longrightarrow$$

$\frac{0}{0} =$ Hop $\Rightarrow$

$$\lim \frac{2 - 7 \times \left(\dfrac{1}{2\sqrt{x}}\right)}{2 - \dfrac{3}{2\sqrt{3x+1}}} = \frac{2 - \dfrac{7}{2}}{2 - \dfrac{3}{4}} \quad \left(\frac{-3}{2}, \frac{5}{4}\right)$$

$$\Rightarrow \frac{-6}{5} = -1{,}2$$

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4

$$x^2 > \frac{1}{4} \Rightarrow \frac{1}{x^2} < 4 \begin{cases} \dfrac{3}{x^2} < 12 \rightarrow \left[\dfrac{3}{x^2}\right] = 11 \\ -\dfrac{2}{x^2} > -8 \Rightarrow \left[-\dfrac{2}{x^2}\right] = -8 \end{cases}$$

$$\xrightarrow{\lim} \lim_{x \to (-\frac{1}{2})^-} \frac{10x - 5 + 11}{16x + 8} = \frac{1}{0^-} = -\infty$$

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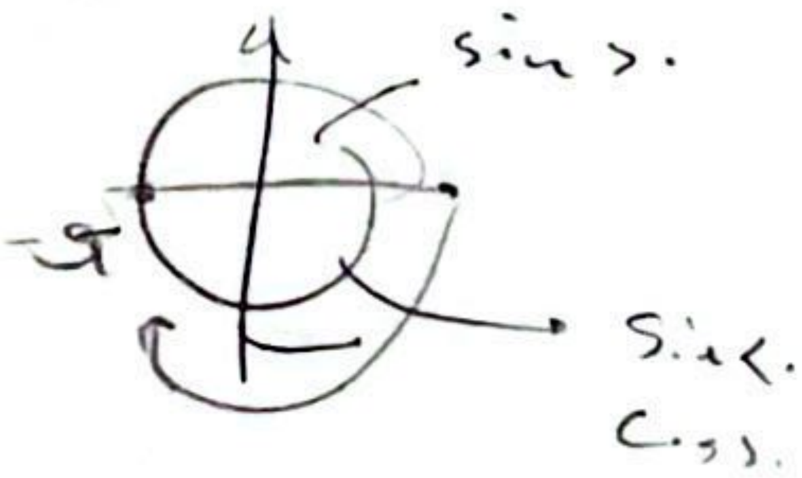
(9)

$x \to (-2\pi)^- \Longrightarrow \dfrac{4 + k\left[\frac{x}{\pi}\right]}{\sin x} = +\infty$

$\hookrightarrow \dfrac{4 + k\left[\cancel{-2}\right]^{-3}}{\sin(-2\pi)^-} = \dfrac{4 - 3k}{0^-} = +\infty$



$(4 - 3k < 0)$ I

$\Rightarrow k > \dfrac{4}{3}$

$\Rightarrow$

$x \to (-2\pi)^+ \Rightarrow \lim \dfrac{4 + k\left[\cancel{-2}\right]^{-1}}{\sin(-2\pi)^+} \Rightarrow \dfrac{4 - 2k}{0^+} = +\infty$

$\Rightarrow 4 - 2k > 0$

$\Rightarrow k < 2$ II

$\mathrm{I} \cap \mathrm{II} \Rightarrow \dfrac{4}{3} < k < 2$

$\hookrightarrow^{\times(-)} \; -\dfrac{4}{3} > -k > -2$

$\hookrightarrow [-k] = -2$ ✓

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(5)

مبهم $\Rightarrow$ باید $\frac{0}{0} \to 8a - b = 0$

$b = 8a$

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$\lim \dfrac{b\sqrt{2 + \sqrt[3]{x}} - 2b}{ax - b} \xrightarrow{\text{hop}} \lim\limits_{x \to 8} \dfrac{\dfrac{\frac{b}{3\sqrt[3]{x^2}}}{2\sqrt{2 + \sqrt[3]{x}}}}{a}$

$\dfrac{b}{48a} \xrightarrow{b = 8a} \dfrac{8a}{48a} = \dfrac{1}{6}$ ✓

$-\dfrac{1}{2} = \dfrac{\left(\frac{\sqrt{c}}{2}\right)\left(-\sqrt{c}\right)}{c} = \dfrac{ab}{c}$ (1)

(1)

$\dfrac{b}{2\sqrt{c}} = \dfrac{1}{4}$

$\Rightarrow \dfrac{\sqrt{c}}{2} = b \Rightarrow 2\sqrt{c} = 4b$

صورت باید ۰ شود $\Rightarrow -\sqrt{c} = a$

$\xrightarrow{\text{hop}} \dfrac{b}{2\sqrt{c}} = \dfrac{\sqrt{bx + c} + a}{x}$

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