Subject.

Date.

دوازدهم A — تکلیف ۴ — پریا نگار آریا

۱ـ

$$\lim_{x\to 2}\frac{2x-5}{x^2+ax+b}=-\infty \qquad a+b=?$$

$2(2)-5=-1 \longrightarrow x^2+ax+b \geq 0 \longrightarrow$ مخرج همیشه از صفر و مثبت است که ریشه مضاعف ۲ داشته باشد:

$$(x-2)^2 \to x^2-4x+4 \to \begin{cases} a=-4 \\ b=4 \end{cases} \to \boxed{a+b=0}$$

۲ـ

$$\lim_{x\to \sqrt[3]{4}}\frac{\overset{>0}{x}}{x^2+ax+b}=+\infty \qquad \left[\frac{b}{a}\right]=?$$

$\longrightarrow x^2+ax+b \geq 0 \to (x-\sqrt[3]{4})^2 = x^2+\sqrt[3]{16}-2\sqrt[3]{4}\,x$

$$\begin{cases} a=-2\sqrt[3]{4} \\ b=\sqrt[3]{16} \end{cases} \to \left[\frac{b}{a}\right]=\left[\frac{\sqrt[3]{16}}{-2\sqrt[3]{4}}\right]=\left[-\frac{1}{2}\times \underbrace{\sqrt[3]{4}}_{1/\dots}\right]=-1$$

۳ـ

$$\lim_{x\to \left(\frac{1}{\sqrt{3}}\right)^+}\frac{[-x]+a}{\left|\frac{\sqrt{3}}{3}x+a\right|+a}=-\infty \qquad [a]=?$$

$$\frac{-1+a}{\left|\frac{\sqrt{3}}{3}x+a\right|+a}$$

$\longrightarrow -1+a>0 \to a>1 \to \frac{\sqrt{3}}{3}x+2a<0 \to a<-\frac{2}{3}$ غقق

$\longrightarrow -1+a<0 \to a<1 \to \underbrace{\left|\frac{\sqrt{3}}{3}x+a\right|}_{+}+a>0$

$\boxed{[a]=0} \longleftarrow 0<a<1 \longleftarrow a>0$

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$$\lim_{x\to(-\frac{1}{2})^+} \frac{16x-\left[-\frac{2}{x^2}\right]}{24x+\left[\frac{3}{x^2}\right]} = \frac{16x+9}{24x+12} = \frac{1}{0^-} = -\infty$$ ۴

$$\lim_{x\to 2^+} \frac{x^2-4}{x^3-[x^3]} = \frac{x^2-4}{x^3-8} = \frac{(x-2)(x+2)}{(x-2)(x^2+2x+4)} = \frac{x+2}{x^2+2x+4} = \frac{4}{12} = \frac{1}{3}$$ ۵

$$\lim_{x\to -8} \frac{x^2+10x+16}{12+6\sqrt[3]{x}} = \frac{0}{0} \xrightarrow{Hop} \frac{2x+10}{\frac{6}{3\sqrt[3]{x^2}}} = \frac{-16+10}{\frac{6}{3\sqrt[3]{64}}} = \frac{-6}{\frac{1}{2}} = -12$$ ۶

$$\lim_{x\to 0^-} \frac{\sqrt{2+3x}-\sqrt{2-x}}{\sqrt{1-\cos x}} \times \frac{\sqrt{2+3x}+\sqrt{2-x}}{\sqrt{2+3x}+\sqrt{2-x}} = \frac{2+3x-2+x}{\sqrt{1-\underbrace{\cos x}_{\sim 1-\frac{x^2}{2}}} \times (\sqrt{2+3x}+\sqrt{2-x})}$$ ۷

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

$$\lim_{x\to 0} \frac{k+\cos(\sqrt{a}x)}{kx^2} = 3 \qquad \frac{a}{k} = ? \qquad k+\cos(\sqrt{a}\cdot 0) = 0 \to k=-1$$ ۸

$$\cos(\sqrt{a}x) \sim 1 - \frac{ax^2}{2} \to \frac{k+\overbrace{1-\frac{ax^2}{2}}^{-\frac{ax^2}{2}}}{kx^2} = 3 \to \frac{-\frac{x^2}{2}}{-x^2} = 3 \to$$

$$\to -\frac{a}{2} = 3 \to a = -6, \quad k = -1 \to \frac{a}{k} = 6$$

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$$\lim_{x \to (3a)^+} \frac{2\sqrt{x-3a} + 3\sqrt{x} - \sqrt{27a}}{\sqrt{x^2-9a^2}} \xrightarrow[\text{Hop}]{\frac{0}{0}}$$

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$$\xrightarrow{\text{Hop}} \frac{\dfrac{2}{2\sqrt{x-3a}} + \dfrac{3}{2\sqrt{x}}}{\dfrac{2x}{2\sqrt{x^2-9a^2}}} = \frac{\dfrac{2\sqrt{x} + 3\sqrt{x-3a}}{2\sqrt{x-3a}\sqrt{x}}}{\dfrac{2x}{2\sqrt{(x-3a)(x+3a)}}}$$

ط)

$$\lim_{x \to (-1)} \frac{1 - k[x]}{x^2 - 1} = -\infty$$

	-1		1	
$+$		$-$		$+$

$\to x \to (-1)^+ \to \dfrac{1+k}{\underbrace{x^2-1}_{-}} = -\infty \to 1+k>0 \to k>-1$

$\to x \to (-1)^- \to \dfrac{1+2k}{\underbrace{x^2-1}_{+}} = -\infty \to 1+2k<0 \to k<-\frac{1}{2}$

$-1<k<-\frac{1}{2}$

$(k\pi, \cos k\pi) \to$ ناحیهٔ سوم و چهارم