۱-

$$\lim_{x\to 2} \frac{2x-5}{x^2+ax+b} = -\infty \longrightarrow x^2+ax+b=0$$

$\longrightarrow$ صورت $\rightarrow 2(2)-5=-1$

که چون جواب کل $-\infty$ شده پس

مخرج حاصل عبارت $+0$ است

$$(x-2)^2=0$$

$$x^2-4x+4 = x^2+ax+b$$

$$a=-4,\quad b=4 \rightarrow a+b=0$$

۲

۲-

$$\lim_{x\to \sqrt[3]{4}} \frac{\overset{\nearrow \text{مثبت}}{x}}{x^2+ax+b} = +\infty$$

$$\searrow x^2+ax+b=0 \rightarrow (x-\sqrt[3]{4})^2$$

وازطرفی ۲ است.

$$x^2+\sqrt[3]{16}-2x\sqrt[3]{4} = x^2+ax+b$$

$$b \rightarrow \sqrt[3]{16}$$

$$a=-2\sqrt[3]{4}$$

۲

$$\left[\frac{b}{a}\right] = \left[\frac{\sqrt[3]{16}}{-2\sqrt[3]{4}}\right] = \left[\frac{\cancel{2}\sqrt[3]{2}}{-\cancel{2}\sqrt[3]{4}}\right] = \left[\frac{-\sqrt[3]{2}}{\sqrt[3]{4}}\right] = -1$$

Scanned with CamScanner

۳

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

$$\left[-\frac{1}{\sqrt{3}}\right] = -1$$

$$x = \frac{1}{\sqrt{3}} \to \frac{\sqrt{3}}{3}x = \frac{\cancel{\sqrt{3}}}{3}\times\frac{1}{\cancel{\sqrt{3}}} = \frac{1}{3}$$

۲

$$\lim \frac{-1+a}{\left|\frac{1}{3}^+ + a\right| + a} = -\infty$$

$$\frac{[-x]+a}{\left|\frac{1}{3}+a\right|+a} = -\infty$$

$$\frac{a-1}{\frac{1}{3}+2a} = -\infty$$

$$[a] = \left[-\frac{1}{6}\right] = -1$$

$$\frac{1}{3}+a = 0$$
$$a = -\frac{1}{3}$$

$$\frac{a-1}{\frac{a-1}{\frac{1}{3}+2a}} \quad -\frac{1}{3}$$

یعنی نمی‌تواند بشود $\leftarrow \frac{a-1}{-\frac{1}{3}}$

$$\frac{1}{3} + 2a = 0$$
$$2a = -\frac{1}{3}$$
$$a = -\frac{1}{6}$$

۴

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

$$x > -\frac{1}{2}$$

$$x^2 < \frac{1}{4} \to$$

$$\frac{1}{x^2} > 4 \to \frac{3}{x^2} > 12$$

$$\left[-\frac{2}{x^2}\right] = -9$$

$$\frac{2}{x^2} > 8$$

$$-\frac{2}{x^2} < -8$$

$$\frac{-8+9}{-12^+ + 12} = \frac{+1}{0^+} = +\infty$$

۲

۵

$$\lim_{x\to 2^+} \frac{x^2-4}{x^3-8} = \frac{(x-2)(x+2)}{(x-2)(x^2+4+2x)}$$

$$x > 2$$
$$x^3 > 8$$
$$[x^3] = 8$$

$$= \frac{4}{12} = \frac{1}{3}$$

۲

۶ -

$$\lim_{x\to -8} \frac{x^2+10x+16}{12+6\sqrt[3]{x}} = \frac{(x+8)(x+2)}{6(2+\sqrt[3]{x})} = \frac{\cancel{(x+8)}(\sqrt[3]{x}+2)(\sqrt[3]{x^2}+4-2\sqrt[3]{x})}{6(\cancel{\sqrt[3]{x}+2})}$$

$$= -1(12) = -12$$

۲

۷ -

$$\lim_{x\to 0^-} \frac{\sqrt{2+3x}-\sqrt{2-x}}{\sqrt{\cancel{1-\cos x}}} \times \frac{\sqrt{2+3x}+\sqrt{2-x}}{\sqrt{2+3x}+\sqrt{2-x}} = \frac{2+3x-(2-x)}{\sqrt{2+3x}+\sqrt{2-x}} \times \frac{-\sin\frac{x}{2}}{-\sin\frac{x}{2}} = \frac{4x}{2\sqrt{2}(-\sin\frac{x}{2})}$$

$-\sin\frac{x}{2}$

$$\frac{4\sqrt{2}}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = -2\sqrt{2} = -4$$

با توجه به رابطه هم ارزی $\sin\alpha \to \alpha$

$$\sin^2\frac{x}{2} = \frac{1-\cos x}{2}$$

۲

۸ -

$$\frac{K+\cos(\sqrt{a}\,x)}{Kx^2} = \frac{0}{0} \xrightarrow[\text{Hop}]{\text{قاعده}} \frac{\sqrt{a}(-\sin x)}{2Kx} \overset{\text{Hop}}{\Longrightarrow}$$

بهتر است از راه هم ارزی برویم چون Hop ۲ بار هم صورت

$$K+\cancel{\cos}(0) = 0$$

$K = -1$

$\to \frac{a}{\ }$ = $-\frac{1}{4}$

$\sin^2\alpha \to \alpha$

$\cos\alpha \to 1-\frac{\alpha^2}{2}$

$K + 1 - a x^2$ ... $K + 1 = a x^2$

$K = -1$

$a = -4 \quad \to \frac{a}{K} = -4$

بریم چون HOP بازم صفر شد

$\sin^2\alpha \sim \alpha$

$\cos\alpha \to 1 - \frac{\alpha^2}{2}$

$$\frac{K + 1 - \frac{ax^2}{2}}{Kx^2} = 3$$

$$\frac{-1 + 1 - \frac{ax^2}{2}}{-x^2} = 3 \to a = 6$$

2

$$\frac{2\sqrt{x-3a} + 3\sqrt{x} - 3\sqrt{3a}}{\sqrt{x^2-9a^2}} \overset{0}{=} \frac{\ldots}{\sqrt{x-3a}\,\sqrt{x+3a}} = \frac{2\sqrt{x-3a} + \overbrace{3\sqrt{x} - 3\sqrt{3a}}^{3(\sqrt{x}-\sqrt{3a})}}{\sqrt{x-3a} \times \sqrt{x+3a}}$$

$$= \frac{2}{\sqrt{x+3a}} +$$

$$= \frac{2}{\sqrt{x+3a}} + \frac{3(\sqrt{x}-\sqrt{3a})}{\sqrt{x+3a}} = \frac{2}{\sqrt{6a}}$$

$$\frac{2}{\sqrt{6a}} \times \frac{\sqrt{6a}}{\sqrt{6a}} = \frac{2\sqrt{6a}}{6a} = \frac{\sqrt{6a}}{3a} = \frac{\sqrt{2\times3\times a}}{\sqrt{3\times3\times a\times a}}$$

$$= \frac{\sqrt{2}}{\sqrt{3a}}$$

2

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

$(k\pi, \cos k\pi)$ نقاط مشترک

$x<0$, $y<0$

$\longrightarrow x \to (-1)^+$

$x^2 - 1 < 0 \to 1 - K[x] > 0$

$[x] = -1$

$1 + K > 0$

$K > -1$

$\longrightarrow x \to (-1)^-$

$x^2 - 1 > 0$

$1 - K[x] < 0$

$[x] = -2$

$1 + 2K < 0$

$2K < -1$

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

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

2