

$$\lim_{x \rightarrow 2} \frac{x^r - 8}{x^r + ax + b} = -\infty \rightarrow \lim_{x \rightarrow 2} x^r + ax + b = 0^+$$

$$x^r + ax + b = (x - 2)^r \rightarrow x^r + ax + b = x^r - 2x + 4$$

$$a = -2$$

$$b = 4 \rightarrow a + b = 0 \quad \checkmark$$

(۲)

$$\lim_{x \rightarrow \sqrt[r]{\epsilon}} \frac{x}{x^r + ax + b} = +\infty \rightarrow \lim_{x \rightarrow \sqrt[r]{\epsilon}} x^r + ax + b = 0^+$$

$$x^r + ax + b = (x - \sqrt[r]{\epsilon})^r$$

$$x^r + ax + b = x^r - \sqrt[r]{\epsilon} x + \sqrt[r]{\epsilon} \rightarrow a = -\sqrt[r]{\epsilon} \quad b = \sqrt[r]{\epsilon}$$

$$\left[\frac{b}{a} \right] = \left[\frac{\sqrt[r]{\epsilon}}{-\sqrt[r]{\epsilon}} \right] = -1 \quad \checkmark$$

(۲)

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

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

$$\left| \frac{1}{\sqrt[r]{a}} + a \right| + a = 0$$

$$\text{I) } \frac{1}{\sqrt[r]{a}} + a + a = 0 \quad \text{دو طرفه} \\ a = -\frac{1}{\sqrt[r]{a}}$$

$$\text{II) } -\frac{1}{\sqrt[r]{a}} - a + a = 0 \quad \text{دو طرفه}$$

$$\lim_{x \rightarrow \left(\frac{1}{\sqrt[r]{a}}\right)^+} \frac{-\frac{1}{\sqrt[r]{a}}}{0^+} = -\infty \rightarrow [a] = -1 \quad \checkmark$$

(۲)

$$\lim_{x \rightarrow \left(-\frac{1}{\sqrt[r]{a}}\right)^+} \frac{14x - \left[-\frac{1}{\sqrt[r]{a}}\right]}{x^r + \left[\frac{1}{\sqrt[r]{a}}\right]} = \frac{14x - \left[-1\right]}{x^r + \left[1\right]} = \frac{14x - (-1)}{x^r + 1} \quad \begin{matrix} x > -\frac{1}{\sqrt[r]{a}} \\ x^r < \frac{1}{\sqrt[r]{a}} \\ \frac{1}{\sqrt[r]{a}} > x \end{matrix}$$

(۲)

$$\frac{14x + 1}{x^r + 1} \rightarrow \lim_{x \rightarrow \left(-\frac{1}{\sqrt[r]{a}}\right)^+} \frac{14x + 1}{x^r + 1} = \frac{+1}{0^+} = +\infty \quad \checkmark$$

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

(۲)

$$\lim_{x \rightarrow r^+} \frac{x^r - 8}{x^r - [x^r]} = \frac{1}{12} \quad \checkmark$$

$$\lim_{x \rightarrow -1} \frac{x^2 + 10x + 17}{17 + \sqrt[3]{x}} = \frac{(x+7)(x+1)}{\sqrt[3]{x}(\sqrt[3]{x}+1)}$$

$$= \frac{(x+7)(\sqrt[3]{x^3} - \sqrt[3]{x} + 1)(\sqrt[3]{x} + 1)}{17 \times (\sqrt[3]{x} + 1)} = \frac{(-6)(17)}{17} = -6$$

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$$\lim_{x \rightarrow 0^-} \frac{\sqrt{1+x} - \sqrt{1-x}}{1 - \cos x}$$

$$= \frac{\sqrt{1+x} - \sqrt{1-x}}{1 - \cos x} \times \frac{\sqrt{1+x} + \sqrt{1-x}}{\sqrt{1+x} + \sqrt{1-x}} = \frac{4x}{-2x \times 2\sqrt{1}} = -1$$

$\frac{|x|}{\sqrt{x}} \leftarrow \sqrt{\frac{x^2}{x}}$

$$\cos x \sim 1 - \frac{x^2}{2}$$

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$$\lim_{x \rightarrow 0} \frac{K + \cos(\sqrt{a}x)}{Kx^2} = \frac{K + (1 - \frac{a x^2}{2})}{Kx^2} = \frac{K+1 - \frac{a x^2}{2}}{Kx^2}$$

$$K+1=0 \rightarrow K=-1$$

$$a = -4K = 4$$

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

$$\cos x \sim 1 - \frac{x^2}{2}$$

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$$\lim_{x \rightarrow 0} \frac{\sqrt[3]{x-3a} + \sqrt[3]{x} - \sqrt[3]{3a}}{\sqrt{x+3a}} = \frac{\sqrt[3]{x-3a}}{\sqrt{x+3a}} + \frac{\sqrt[3]{x} - \sqrt[3]{3a}}{\sqrt{x+3a}}$$

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

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$$\lim_{x \rightarrow (-1)^+} \frac{1-K}{x^2-1} = -\infty \rightarrow 1-K > 0$$

$$\lim_{x \rightarrow (-1)^-} \frac{1+K}{x^2-1} = -\infty \rightarrow 1+K < 0$$

$$K > -1 \quad K < -\frac{1}{2} \rightarrow -1 < K < -\frac{1}{2}$$

نقاط بحر، نقر، لاف، سورا، واقع اند.

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