(به دلیل ننوشتن اسم نمره شما صفر لحاظ میگردد)

۱۴٫۲۵

۱) مخرج ریشه مضاعف $\Rightarrow$ چون علامت حد مشخص است

$$\lim_{x\to 2}\frac{2x-5}{x^2+ax+b}=-\infty \Rightarrow \lim_{x\to 2}\frac{-1}{(x-2)^2} \Rightarrow a=-4,\ b=4$$

$$a+b=0$$

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۲) مخرج ریشه مضاعف $\Rightarrow$ علامت حد مشخص

$$\lim_{x\to\sqrt[3]{4}}\frac{x}{x^2+ax+b}=+\infty \Rightarrow \lim_{x\to\sqrt[3]{4}}\frac{x}{x^2+ax+b}=\lim_{x\to\sqrt[3]{4}}\frac{x}{(x-\sqrt[3]{4})^2}$$

$$\Rightarrow a=-2\sqrt[3]{4}=-2^{\frac{5}{3}},\ b=2^{\frac{4}{3}} \Rightarrow \left[\frac{b}{a}\right]=\left[\frac{2^{\frac{4}{3}}}{-2^{\frac{5}{3}}}\right]=\left[-2^{-\frac{1}{3}}\right]=-1$$

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۳)

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

$$\xRightarrow{\text{مخرج صفر}} \left|\frac{1}{3}+a\right|+a=0 \quad \begin{cases}\frac{1}{3}+2a=0 \Rightarrow a=-\frac{1}{6}\\ -\frac{1}{3}=0 \ \text{غ ق ق}\end{cases}$$

$$\Rightarrow [a]=-1$$

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۴)

$$x>-\frac{1}{2} \Rightarrow \frac{1}{x}<-2 \rightarrow \frac{1}{x^2}>4 \rightarrow -\frac{2}{x^2}<-8$$

$$\frac{3}{x^2}>12$$

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

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۵)

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

$$= \frac{x+2}{x^2+2x+4} = \frac{4}{12} = \frac{1}{3}$$

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۶)

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

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۷)

$$\lim_{x\to 0^-} \frac{\sqrt{2+3x}-\sqrt{2-x}}{\sqrt{1-\cos x}} = \lim_{x\to 0^-} \frac{\sqrt{2+3x}-\sqrt{2-x}}{\sqrt{1-\cos x}} \times \frac{\sqrt{2+3x}+\sqrt{2-x}}{\sqrt{2+3x}+\sqrt{2-x}} \times \frac{\sqrt{1+\cos x}}{\sqrt{1+\cos x}}$$

$$= \lim_{x\to 0^-} \frac{4x\times\sqrt{2}}{\sqrt{\sin^2 x}\times 2\sqrt{2}} = \frac{4x}{|\sin x|} \xrightarrow{\text{هم‌ارزی}} \cancel{\frac{4x}{|x|}} \lim_{x\to 0^-} = \frac{4x}{|x|} = \frac{4x}{-x} = -4$$

$$\lim_{x\to 0^-} \frac{4x\times\sqrt{2}}{-2\sqrt{2}\sin x} = \frac{4\sqrt{2}}{-2\sqrt{2}} = -2$$

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۸)

جواب کرمشخص و مخرج صفر $\Rightarrow$ صورت صفر

$$\underbrace{K+\cos(\sqrt{a}\times 0)}_{1}=0 \Rightarrow K=-1$$

$$\lim_{x\to 0} \frac{-1+\cos(\sqrt{a}\,x)}{-1x^2} = 3 \xrightarrow{\text{هم‌ارزی}} \lim_{x\to 0} \frac{-1+\left(1-\frac{ax^2}{2}\right)}{-x^2} = 3$$

$$\Rightarrow \lim_{x\to 0} \frac{\frac{-ax^2}{2}}{-x^2} = 3 \Rightarrow a=6$$

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$$\frac{a}{K} = \frac{6}{-1} = -6$$

$$\lim_{x\to 3a^+} \frac{2\sqrt{x-3a}+3\sqrt{x}-\sqrt{27a}}{\sqrt{x^2-9a^2}} = \lim_{x\to 3a^+} \frac{2\sqrt{x-3a}}{\sqrt{(x-3a)(x+3a)}} + \frac{3\sqrt{x}-3\sqrt{3a}}{\sqrt{x-3a}\sqrt{x+3a}}$$

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

$$= \lim_{x\to 3a^+} \frac{2}{\sqrt{6a}} + \frac{3(x-3a)^{\sqrt{x-3a}}}{\sqrt{x-3a}\times\sqrt{x+3a}\times(\sqrt{x}+\sqrt{3a})} = \lim_{x\to 3a^+} \frac{2}{\sqrt{6a}} + 0 = \sqrt{\frac{2}{3}a}$$

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۱۵)

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

$$\Rightarrow \lim_{x\to -1^-} \frac{1-K\times -2}{0^+} = -\infty \Rightarrow 1+2K<0$$

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

$$\Rightarrow \lim_{x\to -1^+} \frac{1+K}{0^-} = -\infty \Rightarrow 1+K>0 \Rightarrow K>-1$$

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

$$\Rightarrow K\pi<0$$

$$\Rightarrow \cos K\pi<0$$ ⇒ ابجلوم

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