امین جلالی

(۱)

$$\lim_{x\to 2} \frac{-1}{4-2a+b} = -\infty \Rightarrow \begin{cases} 4-2a+b=0 \xrightarrow{a=-4} b=4 \\ -\dfrac{a}{2} = 2 \Rightarrow a=-4 \end{cases} \Longrightarrow \boxed{a+b=0}$$

(۲)

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

$$b = 2\sqrt[3]{2}$$

$$\Longrightarrow \left[\frac{2\sqrt[3]{2}}{-2\sqrt[3]{4}}\right] \rightarrow \left[\sqrt[3]{-\frac{1}{2}}\right] = \boxed{-1}$$

(۳)

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

صورت <0

مخرج $>0 \Longrightarrow a = -\frac{1}{6} \Longrightarrow \left[-\frac{1}{6}\right] = \boxed{-1}$

(۴)

$$\lim_{x\to -\frac{1}{2}^+} \frac{16x+9}{24x+12} \Longrightarrow \frac{-8+9}{-12^+ + 12} = \frac{1}{0^+} = \boxed{+\infty}$$

(۵)

$$\lim_{x\to 2^+} \frac{x^2-4}{x^3-8} \Longrightarrow \lim_{x\to 2^+} \frac{(x-2)(x+2)}{(x-2)(x^2+4+2x)} \Rightarrow \frac{4}{12} = \boxed{\frac{1}{3}}$$

(۶)

$$\lim_{x\to -8} \frac{x^2+10x+6}{12+6\sqrt[3]{x}} \xRightarrow[\text{رفع ابهام}]{\frac{0}{0}} \lim_{x\to 8} \frac{(x+8)(x+2)}{6(2+\sqrt[3]{x})} = \lim_{x\to -8} \frac{\cancel{(2+\sqrt[3]{x})}(4+\sqrt[3]{x^2}-2\sqrt[3]{x})(x+2)}{6\cancel{(2+\sqrt[3]{x})}}$$

$$\frac{(4+4+4)\cancel{(-6)}}{\cancel{6}} = \boxed{-12}$$

(7)

$$1-\cos x = 2\sin^2\frac{x}{2} \Longrightarrow \lim_{x\to 0^-} \frac{\sqrt{2+3x}-\sqrt{2-x}}{\underset{2\sin^2\frac{x}{2}}{\sqrt{1-\cos x}}} \overset{\frac{0}{0}}{=} \lim \frac{\sqrt{2-3x}-\sqrt{2-x}}{\sqrt{2}\,\underset{\text{هم‌ارز}\ \frac{x\sqrt{2}}{2}}{\sin\frac{x}{2}}}$$

$$\xrightarrow{hop} \frac{\dfrac{-3}{2\sqrt{2-3x}} + \dfrac{5}{2\sqrt{2-x}}}{\dfrac{\sqrt{2}}{2}} \xrightarrow{x\to 0} \frac{\dfrac{-3}{2\sqrt{2}} + \dfrac{5}{2\sqrt{2}}}{\dfrac{\sqrt{2}}{2}} = \frac{\dfrac{2}{2\sqrt{2}}}{\dfrac{\sqrt{2}}{2}} = \frac{4}{4} = \boxed{1}$$

(8)

$$\lim_{x\to 0} \frac{k+1-\frac{ax^2}{2}}{kx^2} \Rightarrow \lim_{x\to 0} \frac{2k+2-ax^2}{2kx^2} = 3 \Rightarrow \boxed{k=-1},\ \boxed{a=6} \Rightarrow \frac{a}{k} = \boxed{-6}$$

(9)

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

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

(10)

$$\lim_{x\to -1} \frac{1-k[x]}{x^2-1}$$

$$-1^+ \to \frac{1+k}{0^-} = -\infty \Rightarrow 1+k>0$$

$$-1^- \to \frac{1+2k}{0^+} = -\infty \Rightarrow 1+2k<0$$

$$\Rightarrow -1<k<-0.5$$

$$\Longrightarrow (\overbrace{k\pi}^{\text{عدد منفی}},\ \overbrace{\cos k\pi}^{\text{عدد منفی}}) \longrightarrow \text{در ناحیه سوم}$$