(۱)

$$\lim_{x\to 2} x^2+ax+b=0^+$$

$$\Rightarrow (x-2)^2 = x^2+ax+b$$

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

$$\Rightarrow a=-4$$

$$b=4$$

$$a+b=0$$

(۲)

$$\lim_{x\to \sqrt[3]{4}} x^2-ax+b=0^+$$

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

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

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

$$b=2\sqrt[3]{4}$$

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

(۳)

$$\lim_{x\to\left(\frac{1}{\sqrt2}\right)^+} \left|\frac{\sqrt2}{2}x+a\right|+a=0$$

$$\frac{\sqrt2}{2}\times\frac{1}{\sqrt2}+2a=0$$

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

(٤)

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

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

$$x^2<\frac{1}{4} \to \frac{1}{x^2}>4 \to \frac{2}{x^2}>8$$

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

$$\Rightarrow \frac{16\times-\frac12-(-8)}{24\times\left(-\frac12\right)^2+12} = \frac{1}{0^+} = +\infty$$

$$x>-\frac12 \to 24x>-12$$

(۵)

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

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

(۶)

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

$$=-6$$

(۷)

$$\lim_{x\to 0^-}\frac{2+3x-2+x}{\cancel{\sqrt{1-\cos^2 x}}}\times\frac{8\sqrt2}{4\sqrt2}$$

$$|\sin x|$$

$$=\lim_{x\to 0^-}\frac{2}{-\sin x}=+\infty$$

(۸)

$$\overset{\text{هوپ}}{=}\lim_{x\to 0}\frac{-\sqrt{a}\,\overset{\sqrt{a}x}{\cancel{\sin(\sqrt{a}x)}}}{2k\,x} = -\frac{a}{2k}=3$$

$$\Rightarrow \frac{a}{k}=-6$$