آیلا میرونیا

۱. چون جواب در هر بس ریشه مضاعف دارد → $x^2+ax+b=0$

$(x-2)^2 = x^2-4x+4 \to a=-4 \,/\, b=4$

$a+b = -4+4 = 0$

۲. ریشه مضاعف داشته → $x^2+ax+b=0$

$(x-\sqrt[3]{2^2})^2 = x^2 - \underbrace{2\sqrt[3]{2^2}}_{-a}\,x + \underbrace{2\sqrt[3]{2}}_{b}$

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

۳. $\lim\limits_{x\to(\frac{1}{\sqrt3})^{+}} \dfrac{[-x]+a}{\left|\frac{\sqrt3}{3}x+a\right|+a} = -\infty \to [-x] = \left[-\frac{\sqrt3}{3}\right] = -1$

$\left|\frac{\sqrt3}{3}\left(\frac{\sqrt3}{3}\right)+a\right|+a=0 \to \frac{1}{3}+a+a=0 \to 2a=\frac{-1}{3} \to a=\frac{-1}{6}$

$\to -\frac{1}{3}-a+a=0$ غ ق ق

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

۴. $\lim\limits_{x\to(-\frac{1}{2})^{+}} \dfrac{16x-\left[-\frac{2}{x^2}\right]}{24x+\left[\frac{3}{x^2}\right]}$ $\to -8-(-9)=1$ ~ صورت $\neq 0$

$x>-\frac{1}{2} \to \frac{1}{x}<-2 \to \frac{1}{x^2}>4 \to \frac{-2}{x^2}<-8 \to \left[\frac{-2}{x^2}\right]=-9$

$\frac{3}{x^2}>12 \to \left[\frac{3}{x^2}\right]=12$

$-12+12=0 \sim 0^{+}$

$\to \frac{1}{0^{+}} = +\infty$

آیلا منوچهرنیا

۵. $\lim\limits_{x\to 2^+} \dfrac{x^2-4}{x^3-[x^3]}$

$\hookrightarrow [x^3] = [2^{+3}] = [8^+] = 8$

$\dfrac{\cancel{(x-2)}(x+2)}{\cancel{(x-2)}(x^2+4+2x)} = \dfrac{x+2}{x^2+4+2x} = \dfrac{4}{12} = \dfrac{1}{3}$

۶. $\lim\limits_{x\to -8} \dfrac{x^2+10x+16}{12+6\sqrt[3]{x}} \overset{\text{Hop}}{=} \dfrac{2x+10}{6\,\dfrac{1}{3\sqrt[3]{x^2}}} = \dfrac{(2x+10)(3\sqrt[3]{x^2})}{6}$

$= \dfrac{-6\times 12}{6} = -12$

۷. $\lim\limits_{x\to 0^-} \dfrac{\sqrt{2+3x}-\sqrt{2-x}}{\sqrt{1-\cos x}} \times \dfrac{\sqrt{1+\cos x}}{\sqrt{1+\cos x}} \times \dfrac{\sqrt{2+3x}+\sqrt{2-x}}{\sqrt{2+3x}+\sqrt{2-x}} =$

$\dfrac{\overbrace{2+3x-2+x}^{4x}}{-\underbrace{\sin x}_{-x}} \times \dfrac{\sqrt{1+\cos x}}{\sqrt{2+3x}+\sqrt{2-x}} = -4 \times \dfrac{\sqrt{2}}{2\sqrt{2}} = -2$

۸. $\lim\limits_{x\to 0} \dfrac{k+\cos(\sqrt{a}\,x)}{kx^2} = 3 \overset{\text{Hop}}{=} \dfrac{-\sqrt{a}\,\overset{\sim \sqrt{a}x}{\sin \sqrt{a}\,x}}{2kx}$

$= \dfrac{-\sqrt{a}\times\sqrt{a}\,\cancel{x}}{2k\cancel{x}} = \dfrac{-a}{2k} = 3 \rightarrow -a = 6k \rightarrow a = -6k$

$\dfrac{a}{k} = \dfrac{-6k}{k} = -6$

آیلا فیروزنیا

۹.
$$\lim_{x\to(3a)^+}\frac{2\sqrt{x-3a}+3\sqrt{x}-\sqrt{27a}}{\sqrt{x^2-9a^2}}=\frac{0}{0}$$

$$\sqrt{(x+3a)}\times\sqrt{x-3a}$$

$$\overset{Hop}{=}\left(\frac{1}{\sqrt{x-3a}}+\frac{3}{2\sqrt{x}}\right)\times\frac{\sqrt{x^2-9a^2}}{x}=\left(\frac{1}{\sqrt{x-3a}}+\frac{3}{2\sqrt{x}}\right)\frac{\left(\sqrt{x-3a}\sqrt{x+3a}\right)}{x}$$

$$=\left(\frac{\sqrt{x+3a}}{x}\right)\left(1+\cancel{\frac{3\sqrt{x-3a}}{2\sqrt{x}}}\right)=\frac{\sqrt{6a}}{3a}\times 1=\frac{2}{\sqrt{6a}}$$

۱۰.
$$\lim_{x\to-1}\frac{1-k[x]}{x^2-1}=-\infty$$

$$-1^-\to\frac{1+k}{x^2-1}=\frac{1+k}{0^-}=-\infty\to k>-1$$

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

$$2k<-1\to k<\frac{-1}{2}$$

$$\to -1<k<\frac{-1}{2}\to -\pi<k\pi<\frac{-\pi}{2}$$