-۱ $\lim_{x\to 2}\frac{2x-5}{x^2+ax+b}=-\infty \to \frac{-1}{x^2+ax+b}=-\infty \qquad x^2+ax+b=(x-2)^2=x^2-4x+4$

آرمین نوری ۱۵

$a=-4 \qquad b=4 \qquad a+b=0$ ✓ ۲

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-۲ $\lim_{x\to\sqrt[3]{4}}\frac{x}{x^2+ax+b}=+\infty \to \frac{\sqrt[3]{4}}{(x-\sqrt[3]{4})^2}=\frac{\sqrt[3]{4}}{x^2-2\sqrt[3]{4}+\sqrt[3]{16}} \qquad a=-2\sqrt[3]{4} \quad b=\sqrt[3]{16}$

$\left[\frac{\sqrt[3]{4}\cdot\sqrt[3]{4}}{-2\sqrt[3]{4}}\right]=\left[\frac{\sqrt[3]{4}}{-2}\right]=\left[-\frac{1.\sim}{2}\right]=-1$ ✓ ۲

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-۳ $\lim_{x\to\frac{1}{\sqrt{3}}^+}\frac{[-x]+a}{\left|\frac{\sqrt{3}}{3}x+a\right|+a}=-\infty \to \frac{-1+a}{\left|\frac{1}{3}^+ +a\right|+a} \qquad \frac{1}{3}+2a=0 \qquad a=-\frac{1}{6}$

۲

$\frac{-7/6}{\frac{1}{3}^+-\frac{2}{6}}=\frac{-7/6}{0^+}=-\infty \qquad [a]=\left[-\frac{1}{6}\right]=-1$ ✓

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-۴ $x>-\frac{1}{2} \qquad \frac{1}{x}<-2 \qquad \frac{1}{x^2}>4 \qquad \frac{3}{x^2}>12 \qquad \frac{-2}{x^2}<-8$

$\frac{16x+9}{24x+12}\to\frac{1}{0^+}=+\infty$ ✓ ۲

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-۵ $\lim_{x\to 2^+}\frac{x^2-4}{x^3-[x^3]}=\frac{x^2-4}{x^3-8}=\frac{(x-2)(x+2)}{(x-2)(x^2+4+2x)}=\frac{x+2}{x^2+2x+4}=\frac{4}{12}=\frac{1}{3}$ ✓ ۲

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-۶ $\lim_{x\to -8}\frac{x^2+10x+16}{12+6\sqrt[3]{x}}=\frac{0}{0}\xrightarrow{\text{هوپیتال}}\frac{2x+10}{\frac{6}{3\sqrt[3]{x^2}}}=\frac{-6}{\frac{6}{3\sqrt[3]{64}}}=\frac{-6}{\frac{6}{12}}=-12$ ✓ ۲

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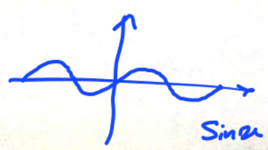
-۷ $\lim_{x\to 0^-}\frac{\sqrt{2+3x}-\sqrt{2-x}}{\sqrt{1-\cos x}}=\frac{\sqrt{2+3x}-\sqrt{2-x}}{\sqrt{2\sin^2\frac{x}{2}}}=\frac{\sqrt{2+3x}-\sqrt{2-x}}{-\sin\frac{x}{2}\cdot\sqrt{2}}$ ۰

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

$\lim_{x\to 0^-}\frac{4x\times\sqrt{2}}{|\sin x|\times 2\sqrt{2}}=\lim_{x\to 0^-}\frac{4x\times\sqrt{2}}{-2\sqrt{2}\sin x}\xrightarrow{\text{فشردگی}}\lim_{x\to 0^-}\underbrace{\frac{x}{\sin x}}_{1}\times\frac{4\sqrt{2}}{-2\sqrt{2}}=-2$



آرمین نوری

۸-

$$\frac{K+\cos(0)}{0}=3 \implies K+1=0 \quad K=-1 \qquad \lim_{x\to 0}\frac{-1+\cos(\sqrt{a}\,x)}{-x^2}=3$$

حد مخرج صفر و حاصل حد عددی حقیقی و غیر صفر ← حد صورت نیز برابر صفر بوده

$$\lim_{x\to 0}\frac{-1+\cos(\sqrt{a}\,x)}{-x^2}\xrightarrow{\text{هم ارزی}}\lim_{x\to 0}\frac{-1+1-\frac{(\sqrt{a}\,x)^2}{2}}{-x^2}=\lim_{x\to 0}\frac{\frac{-ax^2}{2}}{-x^2}=\frac{a}{2}\rightarrow\frac{a}{2}=3\rightarrow a=6$$

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

۱

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۹-

۵

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

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

$$\rightarrow\frac{\sqrt{4}}{\sqrt{6a}}=\sqrt{\frac{4}{6a}}=\sqrt{\frac{2}{3a}}$$

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۱۰-

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

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

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

۲

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

$$1+2K<0\rightarrow K<-\tfrac{1}{2}$$

$$-1<K<-\tfrac{1}{2}$$

در ناحیه سوم قرار دارد