به نام خدا

لویا نظلیان

۲۰ آفرین

DATE / / SUBJECT:

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

$a+b=0$ ۲

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

$\to \left[\frac{b}{a}\right] = \left[\frac{\sqrt[3]{16}}{-2\sqrt[3]{4}}\right] = \left[\frac{\sqrt[3]{4}}{-2}\right] = \left[-2^{-\frac{1}{3}}\right] = \boxed{-1}$ ۲

③ $\lim_{x\to(\frac{1}{\sqrt{2}})^+} \frac{[-x]+a}{\left|\frac{1}{\sqrt{2}}x+a\right|+a} = -\infty \to \lim \frac{a-1}{\left|a+\frac{1}{2}\right|+a} = -\infty \to \frac{a-1}{2a+\frac{1}{2}} = -\infty$ ۲

$\to a=\frac{-1}{4} \to [a]=-1$

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

$x>\frac{-1}{2} \to x^2<\frac{1}{4} \to \frac{1}{x^2}>4 \to \frac{3}{x^2}>12 \to \left[\frac{3}{x^2}\right]=12$ ۲

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

⑤ $\lim_{x\to 2}\frac{x^2-4}{x^3-8} = \frac{(x-2)(x+2)}{(x-2)(x^2+2x+4)} = \frac{x+2}{x^2+2x+4} = \frac{4}{12} = \frac{1}{3}$ ۲

⑥ $\lim_{x\to -8}\frac{x^2+10x+16}{12+6\sqrt[3]{x}} = \frac{(x+2)(x+8)}{12+6\sqrt[3]{x}} = \frac{0}{0} \xrightarrow{HOP} \frac{2x+10}{\frac{6}{3\sqrt[3]{x^2}}} = \frac{\sqrt[3]{x^2}(2x+10)}{2} =$ ۲

$\frac{(4)(-6)}{2} = \boxed{-12}$

لیو یا فلیان

DATE / / SUBJECT:

۷) $\lim_{x\to 0^-} \frac{\sqrt{۳+۳x}-\sqrt{۳-x}}{\sqrt{1-\cos x}} = \frac{۴x}{(\sqrt{1-\cos x})(۲\sqrt{۳})} = \frac{۴x(\sqrt{۳})}{-\sin x(۲\sqrt{۳})} = \frac{-۴}{۲} = \boxed{-۲}$

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۸) $\lim_{x\to 0} \frac{k+\cos(\sqrt{a}\,x)}{kx^2} = ۳ \rightarrow$ صفر = مخرج $\rightarrow$ اما حاصل حد عدد است $\rightarrow$ صورت = ۰ $\rightarrow$

$k+1=0 \rightarrow k=-1 \rightarrow \lim_{x\to 0} \frac{\cos(\sqrt{a}\,x)-1}{-x^2} = ۳ \rightarrow \frac{0}{0} \rightarrow \text{Hop} \rightarrow$

$\frac{-\sin(\sqrt{a}\,x)\times\sqrt{a}}{-۲x} = ۳ \rightarrow \frac{-\sqrt{a}\,x\times\sqrt{a}}{-۲x} = ۳ \rightarrow$

$\frac{a}{۲} = ۳ \rightarrow \boxed{a=۶} \rightarrow \frac{a}{k} = \boxed{-۶}$

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۹) $\lim_{x\to(۳a)^+} \frac{۲\sqrt{x-۳a}+۲\sqrt{x}-\sqrt{۱۲a}}{\sqrt{x^2-۹a^2}} = \frac{\frac{1}{۲\sqrt{x-۳a}}+\frac{۳}{۲\sqrt{x}}}{\frac{۲x}{۲\sqrt{x^2-۹a^2}}} = \frac{\frac{۲\sqrt{x}+۶\sqrt{x-۳a}}{(۲\sqrt{x})(۲\sqrt{x-۳a})}}{\frac{x}{(\sqrt{x-۳a})(\sqrt{x+۳a})}} = \frac{۲\sqrt{۳a}}{۲x\times۲\sqrt{۳a}}\times\sqrt{۶a}$

$= \frac{\sqrt{۶a}}{۳a} = \frac{\sqrt{۶}}{۳\sqrt{a}}$

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۱۰) $x\to(-1)^+ \rightarrow \frac{1+k}{\underbrace{x^2-1}_{0^-}} = -\infty \rightarrow 0<k+1 \rightarrow -1<k$

$\begin{array}{c|c|c} -1 & & 1 \\ + & - & + \end{array}$

$x\to(-1)^- \rightarrow \frac{1+۲k}{\underbrace{x^2-1}_{0^+}} = -\infty \rightarrow 1+۲k<0 \rightarrow k<\frac{-1}{۲}$

$\rightarrow -1<k<\frac{-1}{۲}$

$\rightarrow -\pi < k\pi < \frac{-\pi}{۲} \rightarrow -1 < \cos k\pi < 0 \rightarrow$ گزینه ۱

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