۱۰٪ مسائل - گروه پسر B　　　　بنام خدا　　　　تکلیف شماره ۲۰

-۱ $\lim\limits_{x\to 2}\frac{2x-5}{x^2+ax+b}=-\infty \to \frac{-1}{4+2a+b}=-\infty \to 2a+b+4=0 \to 2a+b=-4$

$x^2+ax+b=(x+\frac{a}{2})^2=(x-2)^2=x^2-4x+4 \to a=-4,\ b=4 \to a+b=(-4)+4=0$

-۲ $\lim\limits_{x\to\sqrt[3]{4}}\frac{x}{x^2+ax+b}=+\infty \to \frac{\sqrt[3]{4}}{\sqrt[3]{16}+\sqrt[3]{4}a+b}=-\infty \to \sqrt[3]{4}a+b+\sqrt[3]{16}=0 \to \sqrt[3]{4}a+b=-\sqrt[3]{16}$

$x^2+ax+b=(x+\frac{a}{2})^2=(x-\sqrt[3]{4})^2=x^2-2\sqrt[3]{4}x+\sqrt[3]{16} \to a=-2\sqrt[3]{4},\ b=\sqrt[3]{16}\quad [\frac{b}{a}]=-1$

-۳ $\lim\limits_{x\to\frac{1}{10}^+}\frac{[-x]+a}{|\frac{10}{3}x+a|+a}=-\infty \to \frac{a-1}{|\frac{1}{3}+a|+a}=-\infty \to |a+\frac{1}{3}|+a=0 \to a\geq-\frac{1}{3} \to 2a+\frac{1}{3}=0 \to \frac{-\frac{7}{6}}{0^-}=-\infty$

$a<-\frac{1}{3} \to -a-\frac{1}{3}-a=0 \to -\frac{1}{3}=0\ \times$

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

-۴ $\lim\limits_{x\to(-\frac{1}{2})^+}\frac{16x-[-\frac{2}{x^2}]}{24x+[\frac{3}{x^2}]} \to \lim\limits_{x\to(-\frac{1}{2})^+}\frac{16x+9}{24x+12} \to \frac{1}{0^+}=+\infty$

-۵ $\lim\limits_{x\to2^+}\frac{x^2-4}{x^3-[x^3]}=\frac{x^2-4}{x^3-8}=\frac{(x-2)(x+2)}{(x-2)(x^2+2x+4)}=\frac{x+2}{x^2+2x+4}=\frac{4}{12}=\frac{1}{3}$

-۶ $\lim\limits_{x\to-8}\frac{x^2+10x+16}{12+6\sqrt[3]{x}}=\frac{(x+8)(x+2)}{6(2+\sqrt[3]{x})}=\frac{(\sqrt[3]{x}+2)(\sqrt[3]{x^2}-2\sqrt[3]{x}+4)(x+2)}{6(2+\sqrt[3]{x})}=\frac{(\sqrt[3]{x^2}+2\sqrt[3]{x}+4)}{6}=\frac{12\cdot(-6)}{6}=-12$

-۷ $\lim\limits_{x\to0^-}\frac{\sqrt{2+3x}-\sqrt{2-x}}{\sqrt{1-\cos x}} \to \times\frac{\sqrt{2+3x}+\sqrt{2-x}}{\sqrt{2+3x}+\sqrt{2-x}}=\frac{2+3x-2+x}{\sqrt{\frac{x^2}{2}}\times2\sqrt{2}}=\frac{4x}{|x|\cdot2}=-2$

$1-\cos x=\frac{x^2}{2}$

-۸ $\lim\limits_{x\to0}\frac{k+\cos(\sqrt{a}x)}{kx^2}=3 \to \frac{k+\cos0}{0}=3 \to k+1=0 \to k=-1 \to \lim\limits_{x\to0}\frac{\cos(\sqrt{a}x)-1}{-x^2}$

hop: $\lim\limits_{x\to0}\frac{-\sqrt{a}\sin(\sqrt{a}x)}{-2x}=\frac{0}{0}\xrightarrow{hop}\frac{-a\cos(\sqrt{a}x)}{-2}=\frac{-a}{2}=\frac{a}{2}=3 \to a=6$

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

مهرام ستاری

$$\lim_{x\to(3a)^+} \frac{2\sqrt{x-3a}+3\sqrt{x}-\sqrt{27x}}{\sqrt{x^2-9a^2}} = \frac{0}{0} \to \lim \frac{2}{\sqrt{x+3a}} + \frac{3\sqrt{x}-3\sqrt{3a}}{\sqrt{x^2-9a^2}} = \frac{2}{\sqrt{6a}} + \frac{3(x-3a)}{\sqrt{x+3a}\cdot\sqrt{x-3a}\cdot 2\sqrt{3a}} = 9$$

$$\left(\frac{2}{\sqrt{6a}}+0\right)$$

$$\frac{2}{\sqrt{6a}}$$

-۱۰.

$$\lim_{x\to -1} \frac{1-k[x]}{x^2-1} \begin{cases} + \to \dfrac{1+k}{x^2-1} = \dfrac{1+k}{0^-} = -\infty \to 1+k>0 \to k>-1 \\[2ex] - \to \dfrac{1+2x}{x^2-1} = \dfrac{1+2k}{0^+} = +\infty \to 1+2k<0 \to k<-\dfrac{1}{2} \end{cases}$$

ناحیه ۳

$$-1<k<-\frac{1}{2} \begin{cases} \to -\pi<k\pi<-\dfrac{\pi}{2} \\[2ex] \to -1<\cos k\pi<0 \end{cases}$$