Subject.

۱۶٫۵ Day. Month. Year.

آزمون تشریحی دوازدهم دهستر A

① $\lim_{x\to 2} \frac{2x-5}{x^2+ax+b} = -\infty \xrightarrow[\text{۲ در مخرج قرار دارد}]{\text{ریشه مضاعف}} \lim_{x\to 2}\frac{2x-5}{(x-2)^2} = \frac{-1}{0^+} = -\infty \to a=-4 \quad b=4 \to a+b=0$

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② $\lim_{x\to \sqrt[3]{2^2}} \frac{x}{x^2+ax+b} = +\infty \xrightarrow[\text{در مخرج قرار دارد } \sqrt[3]{2^2}]{\text{ریشه مضاعف}} \lim_{x\to\sqrt[3]{2^2}}\frac{\sqrt[3]{2^2}}{(x-\sqrt[3]{2^2})^2} = \frac{\sqrt[3]{2^2}}{0^+} = +\infty \to a=-2\sqrt[3]{2^2} \quad b=\sqrt[3]{2^4}$

$\left[\frac{\sqrt[3]{2^4}}{-2\sqrt[3]{2^2}}\right] = \left[-\frac{\sqrt[3]{2^2}}{2}\right] = \left[-\frac{1/\sim}{2}\right] = -1$

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③ $\lim_{x\to(\frac{1}{\sqrt3})^+} \frac{[-x]+a}{|\frac{\sqrt3}{3}x+a|+a} = -\infty \longrightarrow \lim_{x\to(\frac{1}{\sqrt3})^+} \frac{a-1}{|\frac{\sqrt3}{3}x+a|+a} = -\infty \xrightarrow{x=\frac{1}{\sqrt3}^+} \lim_{x\to(\frac{1}{\sqrt3})^+}\frac{a-1}{|\frac13+a|+a} = -\infty$

$\xrightarrow[\text{صفر شود}]{\text{مخرج باید برابر}}$ $\frac13+2a=0$; $\frac13=0$ غ ق ق $\longrightarrow \boxed{a=-\frac16} \longrightarrow \frac{-\frac76}{0^+} = -\infty$; $[a] = \left[-\frac16\right] = -1$

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④ $\lim_{x\to(-\frac12)^+} \frac{16x-[-\frac{2}{x^2}]}{24x+[\frac{3}{x^2}]} = \lim_{x\to(-\frac12)^+} \frac{16x-(-9)}{24x+12} = \lim_{x\to(-\frac12)^+}\frac{16x+9}{24x+12} = \lim \frac{1}{0^+} = \boxed{+\infty}$

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⑤ $\lim_{x\to 2^+}\frac{x^2-4}{x^3-[x^3]} = \lim_{x\to2^+}\frac{x^2-4}{x^3-8} \xrightarrow[\frac00]{hop} \lim_{x\to2^+}\frac{2x}{3x^2} = \lim_{x\to2^+}\frac{4}{3\times4} = \frac13$

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⑥ $\lim_{x\to-8}\frac{x^2+10x+16}{16+6\sqrt[3]{x}} = \lim_{x\to-8}\frac{(x+8)(x+2)}{16+6\sqrt[3]{x}} \xrightarrow[\frac00]{hop} \lim_{x\to-8}\frac{2x+10}{6\frac{1}{3\sqrt[3]{x^2}}} = \lim_{x\to-8}\frac{(2x+10)(\sqrt[3]{x^2})}{2}$

$\lim_{x\to-8}\frac{(-6)\times(4)}{2} = -12$

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⑦ $\lim_{x\to0^-}\frac{\sqrt{2+3x}-\sqrt{2-x}}{\sqrt{1-\cos x}} \times \frac{\cancel{\text{مزدوج مخرج}}}{\cancel{\text{مزدوج مخرج}}} \times \frac{\text{مزدوج صورت}}{\text{مزدوج صورت}} = \lim_{x\to0^-}\frac{2+3x-2+x}{1-\cos x}\times\frac12 = \lim_{x\to0^-}\frac{4x}{1-\cos x}\times\frac12$

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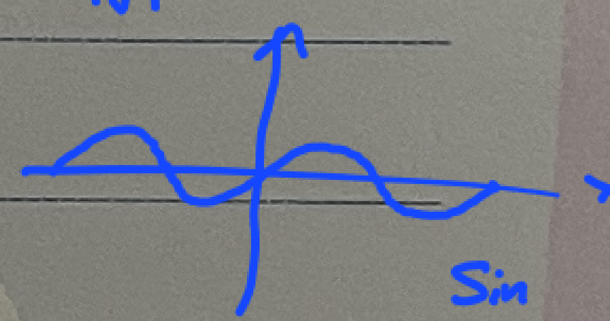
$\lim_{x\to0^-}\frac{2+3x-2+x}{\sqrt{1-\cos^2x}}\times\frac{\sqrt{1+\cos x}}{2\sqrt2} =$

$\xrightarrow{\text{هم ارزی}}$ $1-\cos x \simeq \frac{x^2}{2}$, $x\to0$; $\lim_{x\to0^-}\frac{2x}{\frac{x^2}{2}} = \lim_{x\to0^-}\frac{4}{x} = \frac{4}{0^-} = -\infty$

$\lim_{x\to0^-}\frac{4x\times\sqrt2}{|\sin x|\times2\sqrt2} = \lim_{x\to0^-}\frac{4x\times\sqrt2}{-2\sqrt2\sin x} \xrightarrow{\text{مثلثاتی}} \lim_{x\to0^-}\underbrace{\frac{x}{\sin x}}_{1}\times\frac{4\sqrt2}{-2\sqrt2} = -2$



⑧ $\lim_{x\to0}\frac{k+\cos(\sqrt{a}x)}{kx^2} = 3 \xrightarrow[1-\cos x\to\frac{x^2}{2}]{\text{هم ارزی اساسی}} \lim_{x\to0}\frac{k+1-ax^2}{kx^2} = 3$

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$\xrightarrow{\text{صورت } \frac00 \text{ باید بشود}}$ $k+1=0 \to k=-1 \xrightarrow{\text{جایگذاری}} \lim_{x\to0}\frac{-ax^2}{-x^2} = 3 \longrightarrow a=3$, $\frac{a}{k} = -3$

~~⑨ $\lim_{x\to4a^+}\frac{2\sqrt{x-4a}+3\sqrt{x}-\sqrt{24a}}{\sqrt{x^2-9a^2}} \xrightarrow[\frac00]{hop} \lim 2\left(\frac{1}{2\sqrt{x-4a}}\right)+3\left(\frac{1}{2\sqrt{x}}\right) \big/ \frac{2x}{2\sqrt{x^2-9a^2}}$~~

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

$\lim_{x\to0}\frac{-1+\cos(\sqrt{a}x)}{-x^2} \xrightarrow{\text{هم ارزی}} \lim_{x\to0}\frac{-1+1-\frac{(\sqrt{a}x)^2}{2}}{-x^2} = \lim_{x\to0}\frac{\frac{-ax^2}{2}}{-x^2} = \frac{a}{2} \longrightarrow \frac{a}{2} = 3 \longrightarrow a=6$

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$$\lim_{x\to 3a} \frac{2\sqrt{x-3a}+3\sqrt{x}-\sqrt{27a}}{\sqrt{x^2-9a^2}} \xrightarrow{hop} \lim_{x\to 3a} \frac{\frac{1}{\sqrt{x-3a}}+\frac{3}{2\sqrt{x}}}{\frac{x}{\sqrt{x^2-9a^2}}} = \lim_{x\to 3a^+} \frac{\sqrt{x^2-9a^2}\left(\frac{1}{\sqrt{x-3a}}+\frac{3}{2\sqrt{x}}\right)}{x}$$

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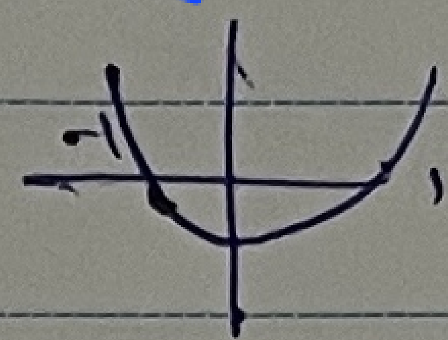
$$\lim_{x\to 3a^+} \frac{2\sqrt{x-3a}}{\sqrt{x-3a}\sqrt{x+3a}}+\frac{3\sqrt{x}-3\sqrt{3a}}{\sqrt{x-3a}\sqrt{x+3a}} = \lim_{x\to 3a^+}\left(\frac{2}{\sqrt{6a}}+\frac{3(\sqrt{x}-\sqrt{3a})}{\sqrt{x-3a}\sqrt{x+3a}}\times\frac{\sqrt{x}+\sqrt{3a}}{\sqrt{x}+\sqrt{3a}}\right)\to$$

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

$\lim$

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



$$(10)\quad \lim_{x\to -1} \frac{1-k[x]}{x^2-1} = -\infty$$

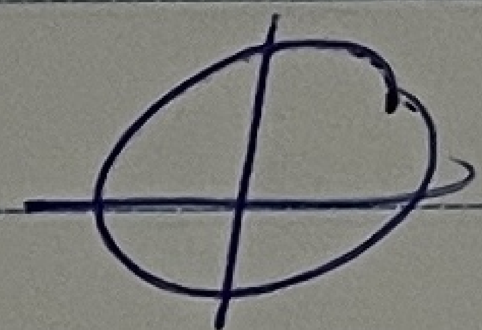
$-1^+ \to \frac{1+k}{x^2-1} = \frac{1+k}{0^-}$ $\quad 0<1+k \quad -1<k$

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

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

$\longrightarrow k=-\frac{3}{4}$ $\quad \left(-\frac{3}{4}\pi \quad \cos\frac{3a}{4}\right)$

$-\frac{3a}{4}<0 \quad \cos-\frac{3a}{4}<0$



[illegible]

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