نام: دینا احمدی شماره کلاس: ۲۰ مقطع: دوازدهم ریاضی B

① $\lim_{x\to 2} \frac{2x-5}{x^2+ax+b} = \frac{-1}{x^2+ax+b} = -\infty \to (x-2)^2 = x^2-4x+4 \to a+b = 4-4=0$

② $\lim_{x\to(\sqrt[3]{2})} \frac{x}{x^2+ax+b} = \frac{x}{(x-\sqrt[3]{2})^2} \to x^2 - \underbrace{2\sqrt[3]{2}}_{a}\, x + \underbrace{\sqrt[3]{4}}_{b} \to \left[\frac{b}{a}\right] = -1$

③ $\lim_{x\to(\frac{1}{\sqrt{2}})^+} \frac{a-1}{|\frac{\sqrt{2}}{2}x+a|+a} = \lim_{x\to(\frac{1}{\sqrt{2}})^+} \frac{a-1}{|\frac{1}{2}+a|+a} = +\infty \to \frac{1}{2}+a+a=0 \to a=\frac{-1}{4} \to [a]=-1$

④ $\lim_{x\to(-\frac{1}{2})^+} \frac{16x-[-\frac{2}{x^2}]}{24x+[\frac{2}{x^2}]} = \lim_{x\to(-\frac{1}{2})^+} \frac{16x-(-8^+)}{24x+[8^-]} = \frac{16x+8}{24x+12} = \frac{8(2x+1)}{12(2x+1)} = \frac{2}{3}$

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

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

$= -3(4-4+\sqrt[3]{64}) = -12$

⑦ $\lim_{x\to 0^-} \frac{\sqrt{2+3x}-\sqrt{2-x}}{\sqrt{1-\cos x}} \times \frac{\sqrt{2+3x}+\sqrt{2-x}}{\sqrt{2+3x}+\sqrt{2-x}} = \frac{2+3x-2+x}{\sqrt{\underbrace{1-\cos x}_{2\sin^2\frac{x}{2}}} \times 2\sqrt{2}} = \frac{4x}{2\sqrt{2}\times\sqrt{2}\,|\sin\frac{x}{2}|} = \frac{4\times\frac{x}{2}}{-2\sin\frac{x}{2}} = -2$

⑧ $\lim_{x\to 0} \frac{k+\cos(\sqrt{a}x)}{kx^2} = \lim_{x\to 0} \frac{k+(1-\frac{ax^2}{2})}{kx^2} = \frac{2k+2-ax^2}{2kx^2} = 3 \to 2k+2=0 \to k=-1$

$\frac{-a}{2k} = 3 \to a=6$

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

⑨ $a>0 \to a=1 \to \lim_{x\to 3^+} \frac{2\sqrt{x-3}+3\sqrt{x}-\sqrt{27}}{\sqrt{x^2-9}} \xrightarrow{Hop} \frac{\frac{2}{2\sqrt{x-3}}+\frac{3}{2\sqrt{x}}}{\frac{1}{2\sqrt{x^2-9}}} = \frac{2\sqrt{x}+3\sqrt{x-3}}{2\sqrt{x-3}\sqrt{x}} \times 2\sqrt{x^2-9}$

$= \frac{2\sqrt{x}+3\sqrt{x-3}}{2\sqrt{x-3}\sqrt{x}} \times 2\sqrt{x-3}\sqrt{x+3} = \frac{2\sqrt{3}}{2\sqrt{3}} \times 2\sqrt{6} = 2\sqrt{6}$

⑩ $\lim_{x\to -1} \frac{1-k[x]}{x^2-1}$

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

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

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

$(k\pi, \cos k\pi)$: $k=-1$: $(-\pi, \cos(-\pi))$; $k=-\frac{1}{2}$: $(-\frac{\pi}{2}, \cos(-\frac{\pi}{2}))$ $\xrightarrow{\cap} (-\frac{\pi}{2}, \cos(-\frac{\pi}{2})) \to$ ناصحیح