تمرین: از صفحه ۱۰۰ کتاب A

① $\lim_{x\to 1} \frac{4x^2-7x+3}{5x^2-8x+3}$ $\xrightarrow{\text{تجزیه}}$ $\frac{(4x-3)(x-1)}{(5x-3)(x-1)}$ $\xrightarrow{x=1}$ $\frac{1}{2}$

$4x^2-7x+3 \to 4x^2-7x+3$
$(x-3)(x-4) \to (4x-3)(x-1)$
$5x^2-8x+3 \to 5x^2-8x+3$
$(x-3)(x-5) \to (5x-3)(x-1)$

② $\lim_{x\to 0} \frac{|3x-1|-|3x+1|}{x}$ $\xrightarrow{0}$ $\frac{-3x+1-3x-1}{x} \to -6$

③ $\lim_{x\to 4} \frac{x-4}{\sqrt{x}-2}$ $\to$ $\frac{(\sqrt{x}-2)(\sqrt{x}+2)}{\sqrt{x}-2} \Rightarrow 4$

④ $\lim_{x\to 2} \frac{x-\sqrt{3x}}{x^2-x-2}$ $\to$ $\frac{x-\sqrt{3x}}{(x-2)(x+1)}$ $\to$ $\frac{\sqrt{x}(\sqrt{x}-\sqrt{3})}{(\sqrt{x}-\sqrt{3})(\sqrt{x}+\sqrt{3})(x+1)}$ $\to$ $\frac{\sqrt{2}}{2\times\sqrt{2}\times 4}$ $\to \frac{1}{16}$

⑤ $\lim_{x\to 1} \frac{1-\sqrt{x}}{2-\sqrt{5-x}} \times \frac{1+\sqrt{x}}{1+\sqrt{x}} \times \frac{2+\sqrt{5-x}}{2+\sqrt{5-x}}$ $\to$ $\frac{(1-x)\times 4}{2(-1+x)} = -2$

$\frac{0}{0}$ حالت $\Leftarrow$ $0=\sqrt{x}-1$ یعنی $x=1$ برابر است با $2=\sqrt{5-x}$ و صفر شدن $0=2-\sqrt{5-x}$ یعنی $x=1$ و $\sqrt{x}+1$

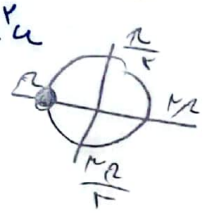
⑥ $\lim_{x\to 4} \frac{\sqrt[3]{3x+4}-4}{\sqrt[3]{5x+7}-3} \times \frac{\sqrt{3x+4}+4}{\sqrt{3x+4}+4} \times \frac{\sqrt[3]{(5x+7)^2}+9+3\sqrt[3]{5x+7}}{\sqrt[3]{(5x+7)^2}+9+3\sqrt[3]{5x+7}}$ $\to$ $\frac{3(x-4)}{8(5x-20)} \to \frac{3\times 24}{8\times 5}$ $\to \frac{9}{10}$

$\frac{0}{0}$ حالت $\Leftarrow$ $0=x-4$ یعنی $x=4$ و $\sqrt{3x+4}=4$ و $\sqrt[3]{5x+7}=3$

⑦ $\lim_{x\to 1} \frac{\sqrt[3]{x^2+\sqrt{x}}-2}{\sqrt[3]{x}-1} \times \frac{\sqrt[3]{x^2+\sqrt{x}}+2}{\sqrt[3]{x^2+\sqrt{x}}+2} \times \frac{\sqrt[3]{x^4}+1+\sqrt[3]{x}}{\sqrt[3]{x^4}+1+\sqrt[3]{x}}$ $\to$ $\frac{x^2+\sqrt{x}-4}{x-1} \times \frac{3}{4}$

$= \frac{(\sqrt{x}-1)(3\sqrt{x}+4)}{(\sqrt{x}+1)(\sqrt{x}-1)} \times \frac{3}{4} \to \frac{7}{4}$

⑨ $\lim_{u \to \pi} \frac{1+\cos^{\mu} u}{\sin^{\mu} u} \to \frac{1+\cos^{\mu} u}{1-\cos^{\mu} u} \to \frac{(1+\cos)(1+\cos^{\mu}-\cos)}{(1-\cos)(1+\cos)} \to \frac{1+1+1}{\mu} \to \frac{\mu}{\mu}$



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⑩ $\lim_{u \to \frac{\pi}{\mu}} \frac{1-\tan u}{\sin u - \cos u} \to \frac{1-\frac{\sin}{\cos}}{\sin-\cos} \to \frac{\frac{\cos-\sin}{\cos}(-1)}{\sin-\cos} \to \frac{-1}{\cos u} \to -\sqrt{\mu}$

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⑪ $\lim_{u \to \frac{\mu\pi}{\mu}} \frac{\tan^{\mu} u - 1}{\cos \mu u} \to \frac{\sin^{\mu}-\cos^{\mu}}{\cos^{\mu}} \to \frac{-1(\sin-\cos)(\sin+\cos)}{\cos^{\mu}(\cos-\sin)(\cos+\sin)} \to \frac{-1}{\cos^{\mu} u} \to \frac{-\mu}{\frac{-1}{1}} \to$

$\mu\pi$