۱۳/۵

پاسخنامه تشریحی ۳۰ — آیلار ساعی

① (۵)

$$\lim_{x\to1}\frac{4x^2-7x+3}{5x^2-8x+3}=\frac{0}{0}=\frac{(x-1)(x-\frac{3}{4})}{(x-1)(x-\frac{3}{5})}=\frac{1-\frac{3}{4}}{1-\frac{3}{5}}=\frac{\frac{1}{4}}{\frac{2}{5}}=\frac{5}{8}$$

② (ج)

$$\lim_{x\to0}\frac{|3x-1|-|3x+1|}{x}=\frac{|9x^2-1|}{x\times2}=\begin{cases}0^+\to\frac{1}{0^+}=+\infty\\0^-\to\frac{1}{0^-}=-\infty\end{cases}$$

③ (ب)

$$\lim_{x\to4}\frac{x-4}{\sqrt{x}-2}=\frac{0}{0}=\frac{(\sqrt{x}-2)(\sqrt{x}+2)}{\sqrt{x}-2}=\sqrt{4}+2=4$$

④ (الف)

$$\lim_{x\to2}\frac{x-\sqrt{2x}}{2x^2-x-6}=\frac{0}{0}=\frac{x-\sqrt{2x}}{(x-2)(x+\frac{3}{2})}=\frac{x^2-2x}{(x-2)(x+\frac{3}{2})(4)}=\frac{x}{(x+\frac{3}{2})4}=\frac{2}{14}=\frac{1}{7}$$

⑤ (ب)

$$\lim_{x\to1}\frac{1-\sqrt{x}}{2-\sqrt{5-x}}=\frac{0}{0}=\frac{(1-x)\times(4)}{(4-5+x)\times2}=\frac{4-4x}{-2+2x}=\frac{2(2-2x)}{-(2-2x)}=-2$$

⑥ (ب)

$$\lim_{x\to4}\frac{\sqrt{3x+4}-4}{\sqrt[3]{5x+7}-3}=\frac{0}{0}=\frac{(3x+4-16)\,27}{(5x+7-27)\,8}=\frac{(3x-12)(27)}{(5x-20)\,8}=\frac{(x-4)\,3\times27}{(x-4)\,5\times8}=\frac{81}{40}$$

⑦ (۰/۵)

$$\lim_{x\to1}\frac{\sqrt{3x+\sqrt{x}}-2}{\sqrt[3]{x}-1}=\frac{0}{0}=\frac{(3x+\sqrt{x}-4)\times3}{(x-1)\times4}=\frac{9x+3\sqrt{x}-12}{4x-4}=\frac{3(\sqrt{x}-1)(\sqrt{x}+\frac{4}{3})}{4(\sqrt{x}-1)(\sqrt{x}+1)}=\frac{7}{8}$$

⑧ ~~$\lim_{x\to\frac{\pi}{4}}\frac{1-\tan x}{\sin x-\cos x}=\frac{0}{0}$ ...~~

⑨ (ب)

$$\lim_{x\to\pi}\frac{1+\cos^3x}{\sin^2x}=\frac{(1+\cos x)(1+\cos^2x-\cos x)}{(1-\cos x)(1+\cos x)}=\frac{1+1-(-1)}{2}=\frac{3}{2}$$

⑩

$$\lim_{x\to\frac{3\pi}{4}}\frac{\tan^2x-1}{\cos2x}=\frac{\frac{\sin^2x-\cos^2x}{\cos^2x}}{-(\sin^2x-\cos^2x)}=\frac{1}{-\cos^2x}=\frac{1}{-(\frac{\sqrt{2}}{2})^2}=\frac{1}{-\frac{1}{2}}=-2 \quad (ج)$$

⑪ (ب)

$$\lim_{x\to\frac{\pi}{4}}\frac{1-\tan x}{\sin x-\cos x}=\frac{\frac{\cos x-\sin x}{\cos x}}{-(\cos x-\sin x)}=\frac{1}{-\cos x}=\frac{1}{-\frac{\sqrt{2}}{2}}=-\sqrt{2}$$

۱) $\overset{\text{Hop}}{\longrightarrow} \dfrac{\lambda x - \nu}{1 \cdot x - \lambda} = \dfrac{1}{\mu}$

۲) $\dfrac{-\mu x + 1 - \mu x - 1}{x} = -\mu$

۴) $\overset{\text{Hop}}{\longrightarrow} \dfrac{1 - \dfrac{\mu}{\mu\sqrt{\mu x}}}{\mu x - 1} = \dfrac{1}{1\mu}$

۵) $\overset{\text{ریشه}}{\longrightarrow} \lim_{x \to 1} \dfrac{\sqrt{\mu x + \sqrt{x}} - \mu}{\sqrt[\mu]{x} - 1} \times \dfrac{\sqrt{\mu x + \sqrt{x}} + \mu}{\sqrt[\mu]{x^{\mu}} + 1 + \sqrt[\mu]{x}} \times \dfrac{\mu}{\mu}$

$\overset{\text{Hop}}{\longrightarrow} \dfrac{\mu}{\mu} \times \dfrac{\mu + \dfrac{1}{\mu\sqrt{x}}}{1} = \dfrac{\mu}{\mu} \times \dfrac{\nu}{\mu} = \dfrac{\mu 1}{\lambda}$