روژین شهریاری تکلیف ۱۹

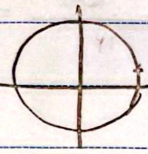
Subject. Day. Month. Year.

① $f(x) = 2\left[\frac{2-x}{2}\right] + a\left[\frac{x+2}{3}\right]$

$-2^+ \longrightarrow 2(1) + a(0) = 2$

$-2^- \longrightarrow 4 - a = 2 \longrightarrow a = 2 \longrightarrow \left[\frac{2}{3}\right] = 0$

② $\lim\limits_{x\to(\frac{\pi}{6})^-} [2\sin x - 1]$



$\longrightarrow \sin x < \frac{1}{2} \quad 2\sin x < 1 \quad 2\sin x - 1 < 0$

$\longrightarrow \lim\limits_{x\to\frac{\pi}{6}^-} [0^-] = -1$

③ $\lim\limits_{x\to-\frac{1}{2}} [8x^3 - x]$ $\quad y'(x) = 24x^2 - 1 \xrightarrow{x=-\frac{1}{2}} y'(-\frac{1}{2}) = 5 \longrightarrow \lim\limits_{x\to-\frac{1}{2}} f(x) = -1$

$-1 + \frac{1}{2}$

④ $\lim\limits_{x\to(-\frac{1}{2})^-} \dfrac{10x - 5 + \left[\frac{3}{x^2}\right]}{16x - \left[-\frac{2}{x^2}\right]}$ $\quad x < -\frac{1}{2} \to x^2 > \frac{1}{4} \to \frac{1}{x^2} < 4$

$\xrightarrow{\times 3} \frac{3}{x^2} < 12$

$\xrightarrow{\times -2} \frac{-2}{x^2} > -8$

$\longrightarrow \lim\limits_{x\to-\frac{1}{2}} \dfrac{10x - 5 + 11}{16x - 8}$

$\lim\limits_{x\to-\frac{1}{2}} \dfrac{10x + 6}{16x - 8} \longrightarrow \lim\limits_{x\to-\frac{1}{2}} \dfrac{1}{-16}$

⑤ $\lim\limits_{x\to1^+} \dfrac{\sin^2 \pi x}{1 + \cos \pi x} \xrightarrow{\text{hôp}} \lim \dfrac{1 - \cos^2 \pi x}{1 + \cos \pi x} = \lim\limits_{x\to1^+} 1 - \cos \pi x = 2$

⑥ $\lim\limits_{x\to-1} \dfrac{\sqrt{2x+3} - \sqrt{3x+4}}{1 + \sqrt[3]{x}} \xrightarrow[\text{hôp}]{} \dfrac{\frac{2}{2\sqrt{2x+3}} - \frac{3}{2\sqrt{3x+4}}}{\frac{1}{3\sqrt[3]{x^2}}} = \dfrac{\frac{2}{2} - \frac{3}{2}}{\frac{1}{3}} = \dfrac{-\frac{1}{2}}{\frac{1}{3}} = -\frac{3}{2}$

⑦ $\lim\limits_{x\to1} \dfrac{2x - 7\sqrt{x} + 5}{2x - \sqrt{3x+1}} \xrightarrow{\text{hôp}} \lim\limits_{x\to1} \dfrac{2 - 7\times\frac{1}{2\sqrt{x}}}{2 - \frac{3}{2\sqrt{3x+1}}} = \dfrac{2 - \frac{7}{2}}{2 - \frac{3}{4}} = \dfrac{-\frac{3}{2}}{\frac{5}{4}} = -\frac{12}{10} = -1.2$

⑧ $\lim\limits_{x\to0} \dfrac{a + \sqrt{bx+c}}{x} = \dfrac{1}{4} \longrightarrow a + \sqrt{c} = 0 \longrightarrow \sqrt{c} = -a$ — منفی

$\longrightarrow a = -\sqrt{c}$

$\xrightarrow{\text{hôp}} \dfrac{b}{2\sqrt{bx+c}} = \dfrac{1}{4} \longrightarrow \dfrac{b}{2\sqrt{c}} = \dfrac{1}{4} \quad 2b = \sqrt{c} \longrightarrow b = \dfrac{\sqrt{c}}{2} \to \dfrac{-\sqrt{c} \times \sqrt{c}}{2c} = -\frac{1}{2}$

⑨ $\lim\limits_{x\to-2\pi} \dfrac{4 + k\left[\frac{x}{\pi}\right]}{\sin x} = +\infty$

$-2\pi^+ \longrightarrow -2\pi < x \quad -2 < \frac{x}{\pi} \longrightarrow \dfrac{4 - 2k}{\sin x} \quad \dfrac{4 - 2k}{0^+} \quad 4 - 2k > 0$

$\boxed{2 > k}$ (*)

$-2\pi^- \longrightarrow x < -2\pi \quad \frac{x}{\pi} < -2 \quad \dfrac{4 - 3k}{\sin x} \quad \dfrac{4 - 3k}{0^-} \quad 4 - 3k < 0$

$\boxed{\frac{4}{3} < k}$ (**)

$\longrightarrow$ (**) (*) $\quad \frac{4}{3} < k < 2 \longrightarrow -\frac{4}{3} > -k > -2 \longrightarrow [-k] = -2$

MODIR

Subject. Day. Month. Year.

10. $\lim\limits_{x\to 8} \dfrac{b\sqrt{2+\sqrt[3]{x}}-2b}{ax-b} \xrightarrow[\text{صفر} \atop \text{مخرج صفر}]{\text{صورت}} 8a-b=0 \to a=\dfrac{b}{8} \to \lim\limits_{x\to 8} \dfrac{b\sqrt{2+\sqrt[3]{x}}-2b}{\frac{b}{8}x-b}$

$\sqrt[3]{x}-2$

$\to \dfrac{\cancel{b}\left(\sqrt{2+\sqrt[3]{x}}-2\right)}{\cancel{b}\left(\frac{1}{8}x-1\right)} \times \dfrac{\sqrt{2+\sqrt[3]{x}}+2}{4} = \dfrac{2+\cancel{\sqrt[3]{x}}-4}{\frac{x}{2}-4} \times \dfrac{\text{قبل}}{12} = \dfrac{\cancel{x-8}}{6\cancel{(x-8)}} = \dfrac{1}{6}$