فاطمه دهقانی

جزئیات ۱

تکلیف ۲۰

۲۶ جمعه
اردیبهشت ۱۴۰۴
16 May 2025 | ۱۸ ذی القعده ۱۴۴۶

۱) $\lim_{x\to 2} \frac{3x-5}{x^2+ax+b} = -\infty \rightarrow a+b=?$

$(x-2)^2 = x^2-4x+4 \rightarrow a=-4,\ b=4 \Rightarrow \boxed{a+b=0}$

۲) $\lim_{x\to(\sqrt[3]{3})} \frac{x}{x^2+ax+b} = +\infty \rightarrow \left[\frac{b}{a}\right]=?$

$0^+ \rightarrow (x-\sqrt[3]{3})^2 = (x^2-2\sqrt[3]{3}x+(\sqrt[3]{3})^2)$

$a=-2\sqrt[3]{3}$, $b=(\sqrt[3]{3})^2 \rightarrow \left[\frac{(\sqrt[3]{3})^2}{-2\sqrt[3]{3}}\right] = \left[\frac{\sqrt[3]{3}}{-2}\right] = \boxed{-1}$

۳) $\lim_{x\to(\frac{1}{\sqrt{3}})^+} \frac{[-x]+a}{\left|\frac{\sqrt{3}}{3}x+a\right|+a} = -\infty \rightarrow [a]=?$

$[-x]+a = -1+a \rightarrow \frac{-1+a}{\left|\frac{1}{3}+a\right|+a} = -\infty \rightarrow \left[-\frac{1}{6}\right] = \boxed{-1}$

$\frac{\sqrt{3}}{3}\times\frac{1}{\sqrt{3}} = \frac{1}{3}$

$\frac{-1+a}{\frac{1}{3}+2a} = \frac{-}{+}\ \checkmark = -\infty$

$2a = -\frac{1}{3} \rightarrow a = -\frac{1}{6}$

۴) $\lim_{x\to(-\frac{1}{2})^+} \frac{16x-\left[-\frac{2}{x^2}\right]}{24x+\left[\frac{3}{x^2}\right]} = ?$

$\frac{-8+8}{-12+12} = \frac{0}{0} \rightarrow \frac{16x+8}{24x+12} = \frac{8(2x+1)}{12(2x+1)} = \boxed{\frac{2}{3}}$

۵) $\lim_{x \to 2^+} \frac{x^2-4}{x^3-[x^3]} = ?$

$\frac{x^2-4}{x^3-8} = \frac{(x-2)(x+2)}{(x-2)(x^2+2x+4)} \xrightarrow{x=2} \frac{4}{12} = \boxed{\frac{1}{3}}$

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

$x^2+10x+16 = 0$

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

$= \frac{-6 \times 0}{6} = \boxed{0}$

۷) $\lim_{x \to 0} \frac{\sqrt{4+2x} - \sqrt{2-x}}{\sqrt{1-6x}} = ?$

$\frac{\sqrt{2+2x} - \sqrt{2-x}}{\sqrt{1-6x}} \times \frac{\sqrt{4+2x} + \sqrt{2-x}}{\sqrt{2+2x} + \sqrt{6-x}} \times \frac{\sqrt{1+6x}}{\sqrt{1+6x}}$

$\frac{2+2x-2+x}{\sqrt{1-6x^2}\,(\sqrt{2+2x} + \sqrt{6-x})} = \frac{3x(\sqrt{1+6x})}{(2\sqrt{2}) \times (-6x)} = \boxed{0}$

$\sqrt{2+2} + \sqrt{6} = 2\sqrt{2}$

$2\sqrt{2} \times -1 = -2\sqrt{2}$