Quiz(2) 30.10.2014

Name : Model Answer Calculus (1)

Question (1) : Find the limits **SHOW ALL WORK**

1. $\lim_{x\to\infty} \dfrac{\sqrt{3x^4+x}}{x^2-8}$ Divide by x^2

$$\lim_{x\to\infty} \frac{\sqrt{3x^4+x}/x^2}{(x^2-8)/x^2} = \lim_{x\to\infty} \frac{\sqrt{\frac{3x^4}{x^4}+\frac{x}{x^4}}}{\frac{x^2}{x^2}-\frac{8}{x^2}} = \lim_{x\to\infty} \frac{\sqrt{3+\frac{1}{x^3}}}{1-\frac{8}{x^2}}$$

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

2. $\lim_{x\to 0} \dfrac{x^2 + x\tan x}{\sin^2 x + 3\tan^2 x}$ $= \frac{0}{0}$ ✕ Divide by x^2

$$\lim_{x\to 0} \frac{\frac{x^2}{x^2}+\frac{x\cdot\tan x}{x^2}}{\frac{\sin^2 x}{x^2}+\frac{3\tan^2 x}{x^2}} = \frac{1+1}{1+3} = \frac{2}{4} = \frac{1}{2}$$

Question (2) : Find the discontinuous points of the following

$$f(x) = \begin{cases} \dfrac{3}{x-1} & , \ x \geq 0 \\ x^2 + \sqrt[3]{x-1} & , \ x < 0 \end{cases}$$

① at zero $\Rightarrow \lim_{x\to 0^+} \neq \lim_{x\to 0^-}$

dis Continous

② at zero of denominator of $\frac{3}{x-1}$

$\frac{3}{x-1}$ dis cont at $x = 1$

Func discontinous at $x = 0$ and $x = 1$