December 18,2012

QUIZ♯5 Math102-sec12.

Net Time Allowed: 20 minutes

Name: **ID ♯ :** **Serial ♯:**

Exercise1: (03pts)

Determine whether the series $\sum_{n=1}^{\infty} n \sin \frac{1}{n}$, is convergent or divergent. If it is convergent, find its sum.

Let $a_n = n \sin \frac{1}{n}$.

We have $\lim_{n \to +\infty} a_n = \lim_{n \to \infty} n \sin \frac{1}{n} \overset{(01)}{=} \lim_{n \to \infty} \frac{\sin \frac{1}{n}}{\frac{1}{n}} \overset{(01)}{=} 1 \neq 0$

Hence The series is divergent, By divergence Test. (01)

Exercise2: (07pts)

Is the series $\sum_{n=1}^{\infty} \frac{\cos(\frac{n}{5})}{5^n}$ conditionally convergent? Justify your answer.

$\sum_{n=1}^{\infty} \left| \frac{\cos(\frac{n}{5})}{5^n} \right| \overset{(02)}{\leq} \sum_{n=1}^{\infty} \left(\frac{1}{5}\right)^n$ or $\sum_{n=1}^{\infty} \left(\frac{1}{5}\right)^n$ is a Geometric (01)

Series which is Convergent (01) (since $r = \frac{1}{5} < 1$) (01)

Therefore $\sum_{n=1}^{\infty} \frac{\cos(\frac{n}{5})}{5^n}$ (01) is Absolutely Convergent and

Hence it is not Conditionally Convergent. (01)