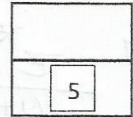




Take-Home Quiz 5

MATH 172 Lab: Sections 7 and 8

Lab Instructor (TA): Mohammed Kaabar

Due: Tuesday November 3rd, 2015Student's Name: Mohammed K A KaabarStudent's ID: -Solution-*Note: This quiz covers tests of convergence.***Show your work and circle your answers. Neatness and organization count!****Question 1:** (2 points) Determine if the series diverges or converges. Be sure to explain which test you use:

$$\sum_{w=1}^{\infty} \frac{2w^2 + 3w}{\sqrt{5+w^5}}$$

Compare $\sum_{w=1}^{\infty} \frac{2w^2 + 3w}{\sqrt{5+w^5}}$ with $\sum_{w=1}^{\infty} \frac{2w^2}{w^{5/2}} = 2 \sum_{w=1}^{\infty} \frac{w^2}{w^{5/2}} =$

$= 2 \sum_{w=1}^{\infty} \frac{1}{w^{1/2}}$ by p-series test $\Rightarrow p = 1/2 < 1$ diverges.

OR $\lim_{n \rightarrow \infty} \left[\frac{(2w^2 + 3w)}{\sqrt{5+w^5}} \cdot \frac{\sqrt{w^5}}{2w^2} \right] = \frac{2w^2 \cdot \sqrt{w^5}}{\sqrt{w^5} \cdot 2w^2} = 1 > 0$ diverges.

by Limit Comparison Test (LCT), \square

Question 2: (3 points) Determine if the series diverges or converges. Be sure to explain which test you use:

$$\sum_{z=1}^{\infty} \frac{z^z}{3^{(1+3z)}}$$

$$\sum_{z=1}^{\infty} \frac{z^z}{3^{(1+3z)}} = \sum_{z=1}^{\infty} \frac{z^z}{3^1 \cdot 3^{3z}} = \frac{1}{3} \sum_{z=1}^{\infty} \frac{z^z}{3^{3z}}$$

$$\frac{1}{3} \lim_{z \rightarrow \infty} \sqrt[z]{\frac{z^z}{3^{3z}}}$$

$$\Rightarrow \frac{1}{3} \left[\frac{z}{3^3} \right] = \frac{z}{3 \cdot 27} = \frac{\infty}{3 \cdot 27} = \infty > 1$$

diverges.