



COMSATS Institute of Information Technology Attock campus

Department of Mathematics

Assignment # 02

Class: MSc-IV

Subject: Real Analysis II

Instructor: Dr. Atiq ur Rehman

Due Date: 02-11-2016

Course Code: MTH322

Marks: 6

Question # 1:

Consider $\Gamma(p) = \int_0^{\infty} e^{-x} x^{p-1} dx$, $p > 0$. Prove that the given integral is convergent.

Question # 2:

If f and g be two positive functions in $(a, b]$ (having point of infinite discontinuity at a)

and assume that $f, g \in R(\alpha; x, b)$ for every $x \in (a, b]$ such that $\lim_{x \rightarrow a+0} \frac{f(x)}{g(x)} = l$, where l is a

non-zero finite number, then the two integrals $\int_a^b f dx$ and $\int_a^b g dx$ converges or diverges together.

Question # 3:

Test the convergence of following integrals:

(A) $\int_0^1 \frac{dx}{\sqrt{1-x^3}}$

(B) $\int_0^{\infty} e^{-x^3} dx$

Question # 4:

Find the value of p for which $\int_0^{\pi/2} \frac{\sin x}{x^p} dx$ is convergent and divergent.

Academic Honesty Requirements:

You are encouraged to work with others in the completion of assignments but it doesn't include copying. However, in the spirit of Academic Honesty, which includes crediting others for their contribution to your work, please include one of the following statements with every submitted assignment on title page:

1. I worked alone on this assignment.
2. I worked with the following: List their full names. Include their relationship to you if they are not also a member of this class.