



COMSATS University Islamabad

Attock Campus

Department of Mathematics

Assignment # 01

Class: BSM-VI
Subject: Real Analysis II
Instructor: Dr. Atiq ur Rehman

Due Date: 07-10-2021
Course Code: MTH322
Marks: 10

Note: Please follow the due date & time strictly.
Student must submit the hard copy of the assignment during office time.

Question # 1

Suppose $f(x)$ and $g(x)$ are positive integrable functions for $x > a$. If

$\lim_{x \rightarrow \infty} \frac{f(x)}{g(x)} = \infty$, then convergence of $\int_a^{\infty} f(x)dx$ implies convergence of $\int_a^{\infty} g(x)dx$.

Question # 2

Give an example of improper integral for which we can use above result (i.e. stated in Q # 1) to prove its convergence.

Question # 3

Prove that $\lim_{x \rightarrow \infty} \frac{x^p}{e^x} = 0$, where $p \in \mathbb{R}$. (Hint: Use L'Hospital Rule)

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.