BRAC UNIVERSITY
Inspiring Excellence

Linear Algebra & Fourier Analysis
Quiz-02

June 5, 2025

Total - 30 Marks

(You need to answer any Two questions)

Name:

ID:

Section:

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1. Find the Fourier cosine transform of $e^{-x}, x \geq 0$, Hence show that,

$$\int_0^\infty \frac{\cos(mx)}{x^2+1}dx = \frac{\pi}{2}e^{-m}, m > 0$$

(10 Marks)

2. Find the Fourier Sine series of $f(x) = \cos(x), [0, \pi]$. (10 Marks)

3. Find the following integral using the function $f(x) = \begin{cases} 1 & |x| \leq 1 \\ -1 & |x| > 1 \end{cases}$

$$\int_0^\infty \frac{\sin x}{x}dx$$

(10 Marks)

Best of Luck!