**MTL101**
**LINEAR ALGEBRA AND DIFFERENTIAL EQUATIONS**
**QUIZ 1**

**Total Marks: 10** **Time: 30 Minutes**

**Question 1: (4 Marks)** If $A$ and $B$ are two $n \times n$ invertible matrices, such that $A^{-1}B^{-1}AB = cI_{n\times n}$ where $c$ is a complex number and $I_{n\times n}$ is the identity matrix. What is the value of $c^n$?

**Question 2: (3 Marks)** What is the value of the determinant

$$\det\left(\begin{bmatrix} 2a+4b & 2a+5b & 2a+6b \\ 2a+5b & 2a+6b & 2a+7b \\ 2a+6b & 2a+7b & 2a+8b \end{bmatrix}\right)$$

**Question 3: (3 Marks)** Prove that $W = \{(x, y, z) \in \mathbb{R}^3 \mid ax + by + cz = d\}$ is a subspace of $\mathbb{R}^3$ if and only if $d = 0$.