

Math 2586 sample midterm 1

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September 2017

Show your work!

Problems

1. Give examples of matrices A, B such that the matrix product AB makes sense, but not BA .
2. Solve the following system of linear equations:

$$\begin{aligned}x - y + z &= 1, \\2x - 3y + 4z &= 2, \\7x + 8y - 9z &= 10.\end{aligned}$$

3. Determine whether the following vectors in \mathbb{R}^4 are linear independent or not:

$$v_1 = (3, 5, 0, 1), \quad v_2 = (6, 4, 2, 3), \quad v_3 = (7, 4, 7, 7).$$

4. Determine whether the following matrix is nonsingular or singular:

$$A = \begin{pmatrix} 1 & -1 & -1 \\ -1 & 1 & -1 \\ -1 & -1 & 1 \end{pmatrix}.$$

5. Determine the reduced row echelon form of the following matrix:

$$A = \begin{pmatrix} 1 & -2 & -3 \\ -4 & 5 & -6 \\ -9 & -8 & 7 \\ 10 & -11 & 12 \end{pmatrix}.$$