

Math 307, Section A1
Professor Lieberman
February 18, 2005

PRACTICE FIRST IN-CLASS EXAM

Directions: To receive full credit, you must show all work. You may use a calculator to do the arithmetic, but you must show all steps in the calculations.

Warning: This test only indicates the number and approximate difficulty of problems on the actual exam. The topics included in this exam cannot be used to determine what topics will be on the in-class exam

1. (25 points) Solve the system of linear equations

$$\begin{aligned}x_2 + 4x_3 &= -5, \\x_1 + 3x_2 + 5x_3 &= -2, \\3x_1 + 7x_2 + 7x_3 &= 6\end{aligned}$$

using elimination.

2. (30 points) Decide whether the matrix

$$\begin{bmatrix} 1 & 0 & -2 \\ -3 & 1 & 4 \\ 2 & -3 & 4 \end{bmatrix}$$

is invertible. If it is, find the inverse.

3. (15 points) True or false? If $T: \mathbb{R}^2 \rightarrow \mathbb{R}^2$ rotates vectors through an angle φ , then T is a linear transformation. Justify your answer.
4. (30 points) Find an LU factorization of the matrix

$$\begin{bmatrix} 6 & 9 \\ 4 & 5 \end{bmatrix}.$$