

Math 254 Exam 10: 12/5/6

Please read the exam instructions.

Notes, books, papers, calculators and electronic aids are all forbidden for this exam. Please write your answers on **separate paper**, indicate clearly what work goes with which problem, and put your name on every sheet. Cross out work you do not wish graded; incorrect work can lower your grade, even compared with no work at all. Keep this list of problems for your records. Show all necessary work in your solutions; if you are unsure, show it. Extra credit may be earned by handing in revised work in class on Thursday 12/7; for details see the syllabus. Each problem is worth 10 points.

1. Carefully define the term “linear mapping (transformation)”. Give two examples in \mathbb{R}^2 .

For the next three problems, consider the matrix $A = \begin{bmatrix} 2 & 1 & 3 \\ 1 & 1 & -1 \\ -1 & -2 & -3 \end{bmatrix}$.

2. Calculate $|A|$ by using the formula for 3×3 determinants.
3. Calculate $|A|$ by expanding on the second column.
4. Calculate $|A|$ by making A triangular with elementary operations.

5. Calculate $|B|$, for $B = \begin{bmatrix} 1 & 2 & 3 & 4 & 0 \\ 1 & 0 & 2 & 0 & -2 \\ 0 & -1 & 2 & 5 & 0 \\ -2 & 0 & 0 & 2 & 3 \\ 3 & 0 & 1 & 0 & 1 \end{bmatrix}$.