

Math 254 Exam 7b: 11/7/6

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 11/9; for details see the syllabus. Each problem is worth 10 points. You have approximately 30 minutes.

1. Carefully define the Linear Algebra term “dependent”. Give two examples in \mathbb{R}^2 .
2. Carefully define the term “orthonormal”. Give two examples in \mathbb{R}^2 .
3. Let $u = (2, 0, -3)$, a vector in \mathbb{R}^3 . Find $\|u\|_1, \|u\|_2, \|u\|_3, \|u\|_\infty$.
4. For the vector space \mathbb{R}^4 , set $v_1 = (1, 1, 1, 1), v_2 = (1, 1, 2, 4), v_3 = (1, 2, -4, -3), S = \text{span}\{v_1, v_2, v_3\}$. Find an orthogonal basis for S .
5. For the vector space \mathbb{R}^3 , set $T = \text{span}\{(1, 2, 3)\}$. Find an orthogonal basis for T^\perp .