Math 254 Exam 4: 10/10/6

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 10/12; for details see the syllabus. Each problem is worth 10 points. You have approximately 30 minutes.

1. Consider the vector space $\mathbb{R}^2$, and set $u = (1, 2), v = (-2, 0)$. Determine whether or not $\{u, v\}$ is dependent (justify your answer).

2. Consider the vector space $\mathbb{R}^2$, and set $u = (1, 2), v = (-2, 0)$. Determine whether or not $\{u, v\}$ is a spanning set (justify your answer).

3. Set $U = \{(a, b, c) : a + b = 2c;\ a, b, c \text{ are real}\}$. U is a subset of $\mathbb{R}^3$. Give three vectors from U, and determine whether or not U is a vector space.

4. Set $V = \mathbb{R}^5$. Give any two subspaces U_1, U_2 such that $U_1 \oplus U_2 = V$.

5. There are eleven properties ("axioms") one needs to check for V to be a vector space. Carefully state eight of them.