Name:

Math 254 Spring 2014 Exam 6

Please read the following directions:
Please print your name in the space provided, using large letters, as "First LAST". Books, notes, calculators, and other aids are not permitted on this exam. Please write legibly, with plenty of white space. Please put your answers in the designated areas. Show all necessary work in your solutions; if you are unsure, show it. Cross out work you do not wish graded; incorrect work can lower your grade. All problems are worth 5-10 points; your total will be scaled to the standard 100 point scale. You have approximately 30 minutes.

Extra credit may be earned by handing in revised work in class on Monday 3/24; for details see the syllabus. You will find this exam on the instructor's webpage later today.

1. Carefully state the definition of "dependent". Give two dependent sets, drawn from $M_{2,3}$.

2. Set $V = \mathbb{R}^3$. Consider all subspaces of V. What are the possible dimensions of these subspaces? Give an example subspace, for each possible dimension.

3. Set $V = \mathbb{R}^2$, and consider the basis $B = \{(1,2),(4,7)\}$. Find the change-of-basis matrix Q_{BE}, and use this to find $[(2,1)]_B$.

The remaining problems are both in the polynomial vector space $V = Span(B)$, whose basis is $B = \{x^2, y^2, z^2, xy, xz, yz\}$. Consider $U = Span((x+y)^2, (x-z)^2, (y-z)^2)$, a subspace of V.

4. Find the dimension of U.

5. Determine whether or not $(x+y+z)^2$ is in U.