Math 254 Fall 2011 Exam 10

Please read the following directions:
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 Friday 12/2; for details see the syllabus. You will find this exam on the instructor's webpage later today.

1. Carefully state the definition of "dimension". Give two subspaces from $\mathbb{R}^3$, a zero-dimensional one and a one-dimensional one.

2. Let A be a square matrix whose first row consists entirely of zeroes. Prove that every such matrix A has zero determinant.

The remaining problems all concern the matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ -2 & 0 & 4 \\ 4 & 1 & 5 \end{bmatrix}$.

3. Calculate $|A|$ using the formula for 3×3 determinants.

4. Calculate $|A|$ by expanding on the second column.

5. Calculate $|A|$ by making A triangular with elementary row operations.