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## Math 254 Fall 2014 Exam 2b

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 Wednesday 9/24; for details see the syllabus. You will find this exam on the instructor’s webpage later today.

1. Carefully state the definition of the standard vector space  $\mathbb{R}^n$ . Give an independent set of two vectors, drawn from  $\mathbb{R}^3$ .

2. Prove or disprove the following statement:

For all  $2 \times 2$  matrices  $A, B$ , each in echelon form, their sum  $A + B$  must be in echelon form.

The remaining three problems concern the matrix  $A = \begin{bmatrix} 1 & 3 & -3 & 0 & -4 \\ 0 & 0 & 1 & 3 & -1 \\ 3 & 9 & -2 & 5 & -3 \\ 2 & 6 & 3 & -1 & 11 \\ 5 & 15 & 0 & -7 & 17 \end{bmatrix}$ .

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3. Place  $A$  in echelon form. Be sure to justify each step.

4. Place  $A$  in row canonical form. Be sure to justify each step. You should begin with your answer from (3).

5. Write down a linear system for which  $A$  is an augmented matrix, and interpret your answer from (4) to write down the general solution for your system.