

Name: \_\_\_\_\_

## Math 254 Fall 2011 Exam 2a

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 9/23; for details see the syllabus. You will find this exam on the instructor's webpage later today.

1. Carefully state the definition of "linear function". Give two examples.

2. Solve the following system, using back-substitution. Show your work.

$$\begin{array}{rccccrcr} 2x_1 & + & 3x_2 & + & 7x_3 & + & x_4 & = & 11 \\ & & - & 5x_2 & - & 5x_3 & + & 2x_4 & = & 4 \\ & & & & 3x_3 & + & x_4 & = & 7 \\ & & & & & & 3x_4 & = & 21 \end{array}$$

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3. Compare slope-intercept form and standard form for lines in the plane, giving one advantage of each as compared to the other. Write the same line twice, once in each form.

4. Find the line of best fit for the following set of points:  $\{(0, 0), (2, 1), (1, 2), (3, 5)\}$ .

5. Consider the system of equations  $\{2x - 3y = 4, kx + 6y = 5\}$ . For which values of  $k$  does this have exactly one solution (and what is it)? For which values of  $k$  does this have no solution? For which values of  $k$  does this have infinitely many solutions?