Cover Sheet for 2014-2015 Fall Semester MATH 3200/5200 (Barsamian) Homework 1
(Due at the start of class on Friday, August 29, 2014. Staple this cover sheet to the front of your work.)

Problem:	1	2	3	4	5	Total	Rescaled
Your Score:							
Possible:	20	20	20	20	20	100	10

Reading: In Chapter One, read Sections One.I.1 and One.I.2, pages 1 – 22.

Suggested Exercises: (These seventeen exercises are not to be turned in and are not graded, but you should do as many of them as possible and keep your solutions in a notebook for study. Note that detailed solutions to all of the Suggested Exercises are available in the solutions manual provided for free on the author's web site.)
    Section One.I.1 Exercises # 18, 20, 23, 29, 30, 32, 33, 35 (from pages 9 – 12)
    Section One.I.2 Exercises # 18, 20, 21, 22, 23, 24, 26, 27, 30 (from pages 19 – 22)

Assigned Exercises: Turn in your solutions to the following five exercises, with this cover sheet stapled to the front of your work.

[1] (20 points) (Similar to One.I.1#18) Use Gauss's method to solve each system or conclude 'no solution' or 'many solutions'. Show all steps clearly.

(a) $\begin{cases} 2x + 3y = 3 \\ x - y = 4 \end{cases}$ (b) $\begin{cases} 2x + 3y = 3 \\ 4x + 6y = 5 \end{cases}$ (c) $\begin{cases} x - y - z = 1 \\ 4x - 2y - z = 5 \end{cases}$ (d) $\begin{cases} 2x + z = 3 \\ x - y - z = 1 \\ 3x - y = 4 \end{cases}$

[2] (20 points) (Similar to One.I.1#23) True or False: A system with four unknowns and three equations always has many solutions. You must justify your answer with a proof or a counterexample!

[3] (20 points) (Similar to One.I.2#18) Solve each system using matrix notation. Express the solution set using vectors. Show all steps clearly.

(a) $\begin{cases} x + y = 0 \\ 2x - y + 3z = 3 \\ x - 2y - z = 3 \end{cases}$ (b) $\begin{cases} x + z = 1 \\ 2x - y + 3z = 3 \\ 3x - y + 4z = 4 \end{cases}$ (c) $\begin{cases} x + z = 1 \\ 2x - y + 3z = 3 \\ 3x - y + 4z = 5 \end{cases}$

[4] (20 points) (Similar to One.I.2#21) Decide if the vector is in the set. Justify your answers.

(a) Is the vector $\begin{pmatrix} 2 \\ -3 \end{pmatrix}$ in the set $\left\{ \begin{pmatrix} 4 \\ -6 \end{pmatrix} k \mid k \in \mathbb{R} \right\}$?

(b) Is the vector $\begin{pmatrix} 2 \\ 5 \end{pmatrix}$ in the set $\left\{ \begin{pmatrix} -6 \\ 15 \end{pmatrix} j \mid j \in \mathbb{R} \right\}$?

(c) Is the vector $\begin{pmatrix} -5 \\ -3 \\ 1 \end{pmatrix}$ in the set $\left\{ \begin{pmatrix} 1 \\ 0 \\ -2 \end{pmatrix} + \begin{pmatrix} 2 \\ 1 \\ -1 \end{pmatrix} r \mid r \in \mathbb{R} \right\}$?

(d) Is the vector $\begin{pmatrix} 1 \\ -2 \\ 4 \end{pmatrix}$ in the set $\left\{ \begin{pmatrix} 2 \\ 0 \\ 1 \end{pmatrix} j + \begin{pmatrix} 3 \\ 1 \\ 0 \end{pmatrix} k \mid j, k \in \mathbb{R} \right\}$?

[5] (20 points) (Similar to One.I.2#30) Make up a three equations / three unknowns system having
    (a) no solutions.
    (b) exactly one solution.
    (c) a one-parameter solution set.
    (d) a two-parameter solution set.
Either explain your answers, or provide answers that are so clear that they do not need explanations.