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Cover Sheet for 2014-2015 Spring Semester MATH 3210/5210 (Barsamian) Homework 2
(Due at the start of class Monday, January 26, 2015. 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 I.3, pages 22 – 32 and II.1, pages 34 – 40 and II.2, pages 41 - 46

Suggested Exercises: On the course syllabus and on the course web page, you will find thirteen suggested exercises from Chapter OneSections I.3, II.1, and II.2. These 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 online. Also note that the exams are based on the Suggested and Assigned Exercises.

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.3#14) On Homework 1, you solved the four systems below. Now, express the solution set for each system using vectors. Identify the particular solution and the solution set of the homogeneous system. (You don't have to solve the systems again. Just rewrite the solution set.

(a) $\begin{cases} 2x + 3y = 3 \\ x - y = 4 \end{cases}$ (b) $\begin{cases} 2x + 6y = 3 \\ 4x + 12y = 5 \end{cases}$ (c) $\begin{cases} x - y - 2z = 2 \\ 4x - 2y - 2z = 10 \end{cases}$ (d) $\begin{cases} 2x + 2z = 6 \\ x - y - 2z = 2 \\ 3x - y = 8 \end{cases}$

[2] (20 points) (Similar to One.I.3#16) For the system $\begin{cases} \mathrm{x} + 2\mathrm{y} - \mathrm{z} + 3\mathrm{w} = 1 \\ 2x + 4y - z + 6w = -2 \\ y + 2w = -3 \end{cases}$

which of the vectors shown at right can be used as the particular solution part of some general solution?
Show all steps clearly and explain clearly.

(a) $\begin{pmatrix} 3 \\ -3 \\ -4 \\ 0 \end{pmatrix}$ (b) $\begin{pmatrix} -1 \\ -1 \\ 1 \\ 3 \end{pmatrix}$ (c) $\begin{pmatrix} 2 \\ -1 \\ -4 \\ -1 \end{pmatrix}$

[3] (20 points) (Similar to One.I.3#17) Lemma 3.7 says that we can use any particular solution for $\vec{p}$.

Find, if possible, a general solution to the system $\begin{cases} \mathrm{x} - \mathrm{y} + 2\mathrm{z} = -5 \\ 3\mathrm{x} + \mathrm{y} + 2\mathrm{z} = -3 \\ 2\mathrm{x} + \mathrm{y} + \mathrm{z} = -1 \end{cases}$

that uses the given vector at right as its particular solution.
Show all steps clearly and explain clearly.

(a) $\begin{pmatrix} -3 \\ 4 \\ 1 \end{pmatrix}$ (b) $\begin{pmatrix} -1 \\ 2 \\ -1 \end{pmatrix}$ (c) $\begin{pmatrix} 1 \\ -2 \\ 3 \end{pmatrix}$

[4] (20 points) (Similar to One.I.3#19) Singular or nonsingular? Show all steps clearly and explain clearly.

(a) $\begin{pmatrix} 1 & 2 \\ 2 & 1 \end{pmatrix}$ (b) $\begin{pmatrix} 1 & 2 \\ 3 & 6 \\ 5 & 10 \end{pmatrix}$ (c) $\begin{pmatrix} 1 & 2 \\ 0 & 0 \end{pmatrix}$ (d) $\begin{pmatrix} 4 & 5 & 1 \\ 1 & 0 & 5 \\ -1 & 1 & 2 \end{pmatrix}$ (e) $\begin{pmatrix} 2 & -1 & 3 \\ -1 & 4 & 2 \\ 0 & 7 & 7 \end{pmatrix}$

[5] (20 points) (Similar to One.I.3#20) Is the vector $\begin{pmatrix} 12 \\ -7 \\ 5 \end{pmatrix}$ in the set generated by the set $\left\{ \begin{pmatrix} 2 \\ 0 \\ 3 \end{pmatrix}, \begin{pmatrix} 1 \\ -5 \\ 7 \end{pmatrix} \begin{pmatrix} 4 \\ 1 \\ -2 \end{pmatrix} \right\}$?

Show all steps clearly and explain clearly.