WebAssign
CH 4.9 (Homework)

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MA 265 Spring 2013, section 132, Spring 2013
Instructor: Alexandre Eremenko

Current Score : 17.15 / 20 **Due :** Thursday, March 7 2013 11:40 PM EST

The due date for this assignment is past. Your work can be viewed below, but no changes can be made.

Important! Before you view the answer key, decide whether or not you plan to request an extension. Your Instructor may *not* grant you an extension if you have viewed the answer key. Automatic extensions are not granted if you have viewed the answer key.

Request Extension View Key

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1. 2.85/2.85 points | Previous Answers KolmanLinAlg9 4.9.001.

Find a basis for the subspace V of R^3 spanned by

$$S = \left\{ \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}, \begin{bmatrix} 2 \\ 1 \\ 4 \end{bmatrix}, \begin{bmatrix} -1 \\ -1 \\ 2 \end{bmatrix}, \begin{bmatrix} 0 \\ 1 \\ -8 \end{bmatrix}, \begin{bmatrix} 2 \\ 3 \\ 1 \end{bmatrix} \right\}$$

and write each of the following vectors in terms of the basis vectors. (Enter each answer in the form $a_1\mathbf{v}_1 + a_2\mathbf{v}_2 + \cdots$, where a_i is a scalar and $\mathbf{v}_i$ is a basis vector in the form $[x_1, x_2, \ldots]$.)

(a) $\begin{bmatrix} 3 \\ 4 \\ 10 \end{bmatrix}$

3[1,0,0] + 4[0,1,0] + 10[0,0,1]

(b) $\begin{bmatrix} 8 \\ 2 \\ 2 \end{bmatrix}$

8[1,0,0] + 2[0,1,0] + 2[0,0,1]

(c) $\begin{bmatrix} 1 \\ 5 \\ 6 \end{bmatrix}$

1[1,0,0] + 5[0,1,0] + 6[0,0,1]

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2. 0/2.85 points | Previous Answers KolmanLinAlg9 4.9.003.

Find a basis for the subspace of M_{22} spanned by the following. (Enter each matrix in the form [[row 1], [row 2], ...], where each row is a comma-separated list.)

$$S = \left\{ \begin{bmatrix} 1 & 3 \\ 1 & 1 \end{bmatrix}, \begin{bmatrix} 2 & 6 \\ 3 & 1 \end{bmatrix}, \begin{bmatrix} 0 & 7 \\ 1 & 2 \end{bmatrix}, \begin{bmatrix} 3 & 2 \\ 1 & 4 \end{bmatrix}, \begin{bmatrix} 5 & 0 \\ 0 & -1 \end{bmatrix} \right\}.$$

{ [1 3 1 1], [2 6 3 1], [0 7 1 2], [3 2 1 4], [5 0 0 -1] }

3. 2.85/2.85 points | Previous Answers KolmanLinAlg9 4.9.006.

Consider the following.

$$A = \begin{bmatrix} 1 & 2 & -1 & 3 \\ 3 & 5 & 2 & 0 \\ 0 & 1 & 2 & 1 \\ -1 & -1 & -4 & 6 \end{bmatrix}$$

(a) Find a basis for the row space of A consisting of vectors that are not necessarily row vectors of A.

1	0	0	-33/7
0	1	0	23/7
0	0	1	-8/7

(b) Find a basis for the row space of A consisting of vectors that are row vectors of A.

1	2	-1	3
3	5	2	0
0	1	2	1

4. 2.85/2.85 points | Previous Answers KolmanLinAlg9 4.9.008.

Consider the following.

$$A = \begin{bmatrix} -2 & 2 & 3 & 7 & 5 \\ -2 & 2 & 4 & 8 & 6 \\ -3 & 3 & 2 & 8 & 5 \\ 4 & -2 & 1 & -7 & -3 \end{bmatrix}$$

(a) Find a basis for the column space of A consisting of vectors that are not necessarily column vectors of A.

1	0	0
0	1	0
4	-2.5	0
0	0	1

(b) Find a basis for the column space of A consisting of vectors that are column vectors of A.

-2	2	3
-2	2	4
-3	3	2
4	-2	1

5. 2.85/2.85 points | Previous Answers KolmanLinAlg9 4.9.009.

Find the row and column ranks of the given matrices.

(a) $\begin{bmatrix} 2 & 4 & 6 & 4 & 2 \\ 3 & 1 & -5 & -2 & 7 \\ 7 & 8 & -1 & 2 & 8 \end{bmatrix}$

$\boxed{3}$ ✔

(b) $\begin{bmatrix} 2 & 6 & 4 & 0 & 0 & 2 \\ 2 & 1 & -5 & 1 & 2 & 0 \\ 3 & 2 & 5 & 1 & -2 & 9 \\ 5 & 8 & 9 & 1 & -2 & 7 \\ 9 & 9 & 4 & 2 & 0 & 7 \end{bmatrix}$

$\boxed{5}$ ✔

6. 2.85/2.85 points | Previous Answers KolmanLinAlg9 4.9.010.

Find the row and column ranks of the given matrices.

(a) $\begin{bmatrix} 3 & 6 & 9 & 6 & 9 \\ 0 & 5 & 4 & 0 & -3 \\ 2 & -1 & 2 & 4 & 9 \end{bmatrix}$

$\boxed{2}$ ✔

(b) $\begin{bmatrix} 1 & 1 & -1 & 2 & 0 \\ 2 & -4 & 0 & 1 & 3 \\ 5 & -1 & -3 & 7 & 3 \\ 3 & -9 & 1 & 0 & 6 \end{bmatrix}$

$\boxed{2}$ ✔

7. 2.9/2.9 points | Previous Answers KolmanLinAlg9 4.9.013.

Compute the rank and nullity of each given matrix and verify the following theorem.

If A is an $m \times n$ matrix, then rank A + nullity A = n.

(a) $$\begin{bmatrix} 1 & -1 & 2 & 3 \\ 2 & 6 & -8 & 1 \\ 5 & 3 & -2 & 10 \end{bmatrix}$$

rank $\boxed{2}$

nullity $\boxed{2}$

(b) $$\begin{bmatrix} 1 & 2 & 0 & 3 \\ 3 & 2 & -1 & 0 \\ 2 & -1 & 0 & 1 \end{bmatrix}$$

rank $\boxed{3}$

nullity $\boxed{1}$