WebAssign
CH 6.1 (Homework)

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

Current Score : 18.75 / 20 **Due :** Thursday, April 11 2013 11:40 PM EDT

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

1. 1.25/2.5 points | Previous Answers KolmanLinAlg9 6.1.001.

Which of the following functions are linear transformations?

(a) $L: R_2 \to R_3$ defined by

$L([u_1 \quad u_2]) = [u_1 + 4 \quad u_2 \quad u_1 + u_2]$

- (•) linear transformation
- ( ) not a linear transformation

✗

(b) $L: R_2 \to R_3$ defined by

$L([u_1 \quad u_2]) = [u_1 + u_2 \quad u_2 \quad u_1 - u_2]$

- (•) linear transformation
- ( ) not a linear transformation

✓

2. 2.5/2.5 points | Previous Answers KolmanLinAlg9 6.1.002.

Which of the following functions are linear transformations?

(a) $L: R_3 \rightarrow R_3$ defined by

$L([u_1 \quad u_2 \quad u_3]) = [u_1 \quad 2u_2 + 2u_3 \quad 2u_3]$

- (•) linear transformation
- ( ) not a linear transformation

(b) $L: R_3 \rightarrow R_3$ defined by

$L([u_1 \quad u_2 \quad u_3]) = [7 \quad u_2 \quad u_3]$

- ( ) linear transformation
- (•) not a linear transformation

(c) $L: R_2 \rightarrow R_3$ defined by

$L([u_1 \quad u_2 \quad u_3]) = [0 \quad u_2 \quad u_2]$

- (•) linear transformation
- ( ) not a linear transformation

3. 2.5/2.5 points | Previous Answers KolmanLinAlg9 6.1.007.

Find the standard matrix representing each given linear transformation.

(a) $L: R^2 \to R^2$ defined by $L\left(\begin{bmatrix} u_1 \\ u_2 \end{bmatrix}\right) = \begin{bmatrix} u_1 \\ -u_2 \end{bmatrix}$

1	0
0	-1

(b) $L: R^2 \to R^2$ defined by $L\left(\begin{bmatrix} u_1 \\ u_2 \end{bmatrix}\right) = \begin{bmatrix} u_2 \\ -u_1 \end{bmatrix}$

0	1
-1	0

(c) $L: R^3 \to R^3$ defined by $L\left(\begin{bmatrix} u_1 \\ u_2 \\ u_3 \end{bmatrix}\right) = \begin{bmatrix} u_1 \\ 0 \\ 0 \end{bmatrix}$

1	0	0
0	0	0
0	0	0

4. 2.5/2.5 points | Previous Answers KolmanLinAlg9 6.1.010.

Find the standard matrix representing each given linear transformation. (Use r for any needed variable.)

(a) Projection mapping R^3 into the xy-plane

1	0	0
0	1	0

(b) Dilation mapping R^3 into R^3

r	0	0
0	r	0
0	0	r

(c) Reflection with respect to the y-axis mapping R^2 into R^2

−1	0
0	1

5. 2.5/2.5 points | Previous Answers KolmanLinAlg9 6.1.011.

Find the standard matrix representing each given linear transformation.

(a) $L\colon R^2 \to R^2$ defined by $L\left(\begin{bmatrix} u_1 \\ u_2 \end{bmatrix}\right) = \begin{bmatrix} u_2 \\ u_1 \end{bmatrix}$

0	1
1	0

(b) $L\colon R^2 \to R^3$ defined by $L\left(\begin{bmatrix} u_1 \\ u_2 \end{bmatrix}\right) = \begin{bmatrix} u_1 - 2u_2 \\ 5u_1 - u_2 \\ 4u_2 \end{bmatrix}$

1	−2
5	−1
0	4

(c) $L\colon R^3 \to R^3$ defined by $L\left(\begin{bmatrix} u_1 \\ u_2 \\ u_3 \end{bmatrix}\right) = \begin{bmatrix} u_1 + 4u_2 \\ -u_2 \\ u_2 + u_3 \end{bmatrix}$

1	4	0
0	−1	0
0	1	1

6. 2.5/2.5 points | Previous Answers KolmanLinAlg9 6.1.012.

Let $A = \begin{bmatrix} 10 & -3 & -6 \\ -3 & 1 & 2 \\ -9 & 3 & 7 \end{bmatrix}$ be the standard matrix representing the linear transformation $L: R^3 \rightarrow R^3$.

(a) Find $L\left(\begin{bmatrix} 2 \\ -3 \\ 1 \end{bmatrix}\right)$.

23

−7

−20

(b) Find $L\left(\begin{bmatrix} u \\ v \\ w \end{bmatrix}\right)$.

$$\begin{bmatrix} \\ \\ \end{bmatrix}$$

7. 2.5/2.5 points | Previous Answers KolmanLinAlg9 6.1.013.

Let $L: R^3 \to R^2$ be a linear transformation for which we know that

$$L\left(\begin{bmatrix}1\\0\\0\end{bmatrix}\right)=\begin{bmatrix}4\\0\end{bmatrix},\quad L\left(\begin{bmatrix}0\\1\\0\end{bmatrix}\right)=\begin{bmatrix}-1\\-2\end{bmatrix},\quad L\left(\begin{bmatrix}0\\0\\1\end{bmatrix}\right)=\begin{bmatrix}3\\5\end{bmatrix}.$$

(a) What is $L\left(\begin{bmatrix}1\\-2\\3\end{bmatrix}\right)$?

15

19

(b) What is $L\left(\begin{bmatrix}u\\v\\w\end{bmatrix}\right)$?

$$\begin{bmatrix}\\\\\end{bmatrix}$$

8. 2.5/2.5 points | Previous Answers KolmanLinAlg9 6.1.014.

Let $L: R_2 \to R_2$ be a linear transformation for which we know that

$$L\left(\begin{bmatrix}1 & 1\end{bmatrix}\right)=\begin{bmatrix}-1 & 2\end{bmatrix},$$
$$L\left(\begin{bmatrix}-1 & 1\end{bmatrix}\right)=\begin{bmatrix}4 & 3\end{bmatrix}.$$

(a) What is $L\left(\begin{bmatrix}-1 & 5\end{bmatrix}\right)$?

10 13

(b) What is $L\left(\begin{bmatrix}u & v\end{bmatrix}\right)$?

$$\begin{bmatrix}\\\\\end{bmatrix}$$