

Math 2210Q-004 Applied Linear Algebra
E-Mail Assignments
on the readings in the textbook

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Submit by E-Mail by 7:00 am on the date due (before class)
to dgross@math.uconn.edu.

Due for Tuesday, February 3

Section 1.8 Introduction to Linear Transformations Section

Section 1.9 The Matrix of a Linear Transformation

To read: All

To Do: Homework from section 1.7

Be sure sure to understand: Example 1 in section 1.8; The definition of a linear transformation; The definition of one-to-one and onto; Theorems 11 and 12 in section 1.9.

Email Subject Line: 2210EA 02/03 YourLastName

Questions:

1. Let $T : \mathbb{R}^2 \rightarrow \mathbb{R}^2$ be a linear transformation defined by

$$T \left(\begin{bmatrix} x_1 \\ x_2 \end{bmatrix} \right) = \begin{bmatrix} 2x_1 \\ x_2 + 1 \end{bmatrix}.$$

Is T a linear transformation? (Hint: Look at Property (3))

2. If $T : \mathbb{R}^4 \rightarrow \mathbb{R}^7$ is a linear transformation where $T(\vec{x}) = A\vec{x}$, what is the size of the matrix A ?

3. If $T : \mathbb{R}^3 \rightarrow \mathbb{R}^3$ is a linear transformation where

$$T(\vec{u}) = \begin{bmatrix} 1 \\ 2 \end{bmatrix} \text{ and } T(\vec{v}) = \begin{bmatrix} 3 \\ 4 \end{bmatrix}, \text{ find } T(\vec{u} + \vec{v}).$$

4. Find the matrix A for the linear transformation $T : \mathbb{R}^2 \rightarrow \mathbb{R}^2$ that expands vertically by a factor of 3.
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