Reading Questions 4

page 33: theorem 1.3.10

Page 42-44 excluding Example 1,2

1. If A is an $n \times m$ matrix, $\vec{x}, \vec{y} \in \mathbb{R}^m$, and k is a real number then $A(k\vec{x} + \vec{y}) = kA\vec{x} + A\vec{y}$.
2. All coding transformations don't have an inverse.
3. Suppose the position of my boat is 6° Eastern latitude and 10° Northern latitude. Use the following code to determine my encoded position.

$$\left| \begin{array}{rcl} x_1 + 2x_2 & = & y_1 \\ 2x_1 + x_2 & = & y_2 \end{array} \right|$$

Section 2.1 Linear Transformations and Their Inverse (Part 1)

Linear Transformations

P 1. Determine if the transformation $T(\begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}) = \begin{bmatrix} 2x_1 \\ 4x_2 \\ 2x_3 \end{bmatrix}$ is linear? If the transformation is linear find the matrix representation of it.

P 2. Write down two methods of showing that a transformation is a linear transformation.

P 3. Use the theorem discussed to show that the following transformation $T(\begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}) = \begin{bmatrix} 2x_1 \\ 3x_2 \\ x_3 \end{bmatrix}$. is linear.

Their Inverse

P 4. Find the inverse of the following matrix

$$\begin{bmatrix} 1 & 3 \\ 1 & 2 \end{bmatrix}.$$