Reading Questions 12

page 150: example 2

1. The vectors $\begin{bmatrix}4\\1\end{bmatrix}$ and $\begin{bmatrix}-1\\3\end{bmatrix}$ form a basis for $\mathbb{R}^2$.
2. If the columns of A form a basis $\mathfrak{B}$ then $[\vec{b}]_{\mathfrak{B}}$ is the solution to $A\vec{x} = \vec{b}$.
3. What is the vector $[\vec{x}]_{\mathfrak{B}}$ called?

Section 3.4 Coordinates (Part 1)

The coordinate vector

P 1. Write down a way to find the $\mathfrak{B}$-coordinates to a vector $\vec{x}$.

P 2. Find $[\vec{x}]_{\mathfrak{B}}$ where $\mathfrak{B} = \{\begin{bmatrix}1\\2\end{bmatrix}, \begin{bmatrix}5\\6\end{bmatrix}\}$ and $\vec{x} = \begin{bmatrix}-4\\4\end{bmatrix}$.

P 3. Find $[\vec{x}]_{\mathfrak{B}}$ given that $[\vec{v}]_{\mathfrak{B}} = \begin{bmatrix}4\\12\end{bmatrix}$ and $2\vec{v} = \vec{x}$.

P 4. Find the $\mathfrak{B}$-matrix for the linear transformation $T(\vec{x}) = A\vec{x}$, where

$$A = \begin{bmatrix}0 & 1\\2 & 3\end{bmatrix}$$

and $\mathfrak{B} = \{\begin{bmatrix}1\\2\end{bmatrix}, \begin{bmatrix}1\\1\end{bmatrix}\}$.