

MA 253 Homework Problems 7

Homework has both a “Reading” portion and a “Problems” portion. It is essential that you do the reading by the next class. The reading assignments are posted on a separate webpage. Don’t forget to do them!

All page numbers and section numbers refer to the 5th edition of Bretscher’s Linear Algebra. Note that most odd numbered problems have solutions in the back of the text. Problems without solutions are worth more points than those with solutions.

Remember to use *Mathematica* to do row operations!

(1) Section 6.1 (page 275)

(a) Problems 15, 16, 27, 30, 31 - 41 (odd only), 43, 44, 57

(2) Section 6.2 (page 289)

(a) Problem 3 (do this one by hand)

(b) Problem 30

(3) Suppose that $\mathbf{b}_1, \dots, \mathbf{b}_n$ and $\mathbf{c}_1, \dots, \mathbf{c}_n$ are bases for \mathbb{R}^n . Give a convincing explanation for why there is a linear transformation $T: \mathbb{R}^n \rightarrow \mathbb{R}^n$ which takes each \mathbf{b}_i to \mathbf{c}_i for $i = \{1, \dots, n\}$. Also show that:

(a) This transformation is unique. (That is, if $S: \mathbb{R}^n \rightarrow \mathbb{R}^n$ is any linear transformation which takes each \mathbf{b}_i to \mathbf{c}_i then $S(\mathbf{x}) = \mathbf{x}$ for each $\mathbf{x} \in \mathbb{R}^n$.)

(b) This transformation is invertible.

(4) Section 6.2 (page 289)

(a) Problems 1 - 8, 37