

# Homework Week 5

MATH 204: Linear Algebra

Due September 28, 2018 by 1:55pm

Remember that although you may discuss this assignment with others, your write up should be your own. **Do not share your write-up, look at other's write-ups, discuss word for word how something should be proved, etc.** Be sure to note with whom you collaborate if you do collaborate. Complete these exercises on a separate paper.

1. Number 14 from Section 1.7, page 62. Be sure to show your work and justify your answer by quoting specific facts, theorems, and/or definitions.

2. Number 38 from Section 1.7, page 62. (Hint: Try proof by contraposition!)

3. Determine whether each of the following transformations is linear. Justify your conclusions.

(a)  $T : \mathbb{R}^2 \rightarrow \mathbb{R}^3$  defined by  $T\left(\begin{bmatrix} x_1 \\ x_2 \end{bmatrix}\right) = \begin{bmatrix} x_2 \\ x_1 \\ 7 + 2x_2 \end{bmatrix}$ .

(b)  $T : \mathbb{R}^3 \rightarrow \mathbb{R}^2$  defined by  $T\left(\begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}\right) = \begin{bmatrix} x_1 + 3x_2 \\ x_3 \end{bmatrix}$ .