UH - Math 4377/6308 - Dr. Heier - Spring 2020
HW 6
Due 02/27, at the beginning of class.

Use regular sheets of paper, stapled together.
Don't forget to write your name on page 1.

1. (1 point) Prove explicitly that $T : \mathbb{R}^3 \to \mathbb{R}^3,\ T(a_1, a_2, a_3) = (0, a_1 + 7a_2 - a_3, a_2 + 3a_3)$ is a linear transformation.

2. (1 point) Prove explicitly that $T : \mathbb{R}^2 \to \mathbb{R}^2,\ T(a_1, a_2) = (a_1, a_1^2 + a_2^2)$ is not a linear transformation.

3. (1 point) Let $T : \mathbb{R}^5 \to \mathbb{R}^4,\ T(a_1, a_2, a_3, a_4, a_5) = (a_1 + a_2 - a_5, a_2 - a_4, a_1 + 2a_2 - a_4 - a_5, a_1 + a_4 - a_5)$. Find bases for the kernel and range of T.

4. (1 point) Section 2.1, Problem 10

5. (1 point) Determine explicitly the linear transformation $T : \mathbb{R}^2 \to \mathbb{R}^3$ such that $T(1, 1) = (1, 1, 2)$ and $T(0, 1) = (1, 1, 1)$.

6. (2 points) Section 2.1, Problem 13

7. (2 points) Section 2.1, Problem 14

8. (1 point) Section 2.1, Problem 17