# MTH 510

Homework 3
Due: Feb. 7, 2019

Chapter 1: 14, 15

Additional homework:

1. For each of the following show that $U$ and $W$ are subspaces of $\mathbb{F}^3$ and determine whether $\mathbb{F}^3 = U \oplus W$.

   (a) $U = \{(x, x, 0) : x \in \mathbb{F}\}$ and $W = \{(0, y, y) : y \in \mathbb{F}\}$

   (b) $U = \{(x, x, 0) : x \in \mathbb{F}\}$ and $W = \{(0, y, z) : y, z \in \mathbb{F}\}$

2. Determine whether $\mathbb{F}^3 = U_1 \oplus U_2 \oplus U_3$ for each of the following subspaces:

   (a) $U_1 = \{(a, a, 0) : a \in \mathbb{F}\}$, $U_2 = \{(0, b, b) : b \in \mathbb{F}\}$, $U_3 = \{(0, b, 0) : b \in \mathbb{F}\}$

   (b) $U_1 = \{(a, a, 0) : a \in \mathbb{F}\}$, $U_2 = \{(0, b, b) : b \in \mathbb{F}\}$, $U_3 = \{(a, 0, -a) : a \in \mathbb{F}\}$