

# Math 2550

## HW 7 - Part 2

### Spanning, Linear Independence, Bases

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1. In HW 6 you showed that the following are subspaces of  $V = \mathbb{R}^3$  over  $F = \mathbb{R}$ . Find a basis for each subspace and state the dimension of the subspace.

(a)  $W = \{\langle a, 0, 0 \rangle \mid a \in \mathbb{R}\}$

(b)  $W = \{\langle a, b, c \rangle \mid b = a + c \text{ where } a, b, c \in \mathbb{R}\}$

2. One can show that the subset

$$W = \left\{ \begin{pmatrix} a & b \\ c & d \end{pmatrix} \mid a + b + c = 0 \text{ where } a, b, c, d \in \mathbb{R} \right\}$$

is a subspace of  $V = M_{2,2}$  over  $F = \mathbb{R}$ . You don't need to show this. Find a basis for  $W$  and state the dimension of  $W$ .

3. In HW 6 you showed that

$$W = \{a_0 + a_1x + a_2x^2 + a_3x^3 \mid a_0 + a_1 + a_2 + a_3 = 0 \text{ where } a_0, a_1, a_2, a_3 \in \mathbb{R}\}$$

is a subspace of  $V = P_3$  over  $F = \mathbb{R}$ . Find a basis for  $W$  and state the dimension of  $W$ .