HOMEWORK DUE MONDAY, FEBRUARY 21

MATH 309, SECTION 6

(1) Find a basis for $V = \{(x_1, x_2, x_3, x_4) \in \mathbb{R}^4 \mid x_1 + 3x_2 - 2x_3 + x_4 = 0 \text{ and } x_1 + 2x_2 - 2x_3 = 0\}$.
(2) Is $\{p_1, p_2\}$ a basis for $\mathbb{P}_2$, where $p_1(x) = x^2 + 1$ and $p_2(x) = x^2 + x + 2$? If not, add or remove polynomials to form a basis.
(3) Show $\{(2, 4, -2), (3, 2, 0), (1, -2, -2)\}$ is a basis for $\mathbb{R}^3$.
(4) Find a basis for

$$V = \left\{ \begin{bmatrix} 2a & 2a - b \\ b + c & c - a \end{bmatrix} \in \mathbb{M}(2, 2) \mid a, b, c \in \mathbb{R} \right\}.$$

(5) Let $\{\mathbf{v}_1, \mathbf{v}_2, \ldots, \mathbf{v}_n\}$ be a set of linearly independent vectors in the vector space V. Show that $\{\mathbf{v}_2, \ldots, \mathbf{v}_n\}$ cannot span V.
(6) 3.5: 5, 6, 17