Linear Algebra 2
Assignment # 4

Textbook Problems:

2C: 12,18
3A: 1,4

Additional Problems:

1. Suppose that V is a finite-dimensional vector space and $V_1, V_2, \ldots, V_r$ are all subspaces of V and $V = V_1 + V_2 + \ldots + V_r$. For each $1 \leq j \leq r$ let $S_j = (v_{1,j}, v_{2,j}, \ldots, v_{r_j,j})$ where $v_{i,j} \in V_j$. Finally let $S = (v_{1,1}, v_{2,1}, \ldots, v_{r_1,1}, v_{1,2}, \ldots, v_{r_2,2}, \ldots, v_{1,r}, \ldots, v_{r_r,r})$ be the concatenation of the S's. Show if each j, $V_i = \text{span}(S_j)$ then $V = \text{span}(S)$.

2. Let V, W be vector spaces. Show that $\mathscr{L}(V, W)$ is a vector space. (Hint you can use that $\mathscr{F}(V, W)$, the set of all functions from V to W is a vector space under function addition and scalar multiplication of functions.)