M341 (56140), Homework #9

Due: 11:00am, Thursday, Nov. 01

Instructions: Questions are from the book "Elementary Linear Algebra, 4th ed." by Andrilli & Hecker. Please show all your work, not only your final answer, to receive credit. Keep answers organized in the same order the problems have been assigned.

Span (4.3)

p. 236-239, #6, 10, 12, 14, 25

[Note: In all computational problems involving span, please use the methods discussed in lecture rather than the simplified span method described in the book. This will allow us to consider span and linear independence in a unified framework when we discuss basis and dimension.]

Linear independence (4.4)

p. 251-255, #2(d), 8, 12, 19

In addition:

A) Let $S = \{[1,4,1,-2],[-1,1,1,-1],[3,2,-1,0],[2,3,0,-1]\}$.

a) Show that S does not span $\mathbb{R}^4$.

b) Show that S is linearly dependent.

c) Find a maximal linearly independent subset B of S (that is, a linearly independent set B such that if $B \subset C \subseteq S$ and $B \neq C$, then C is linearly *dependent*).

d) Show that B is a minimal spanning subset of S (that is, $\text{span}(B) = \text{span}(S)$ and if $C \subset B \subseteq S$ with $C \neq B$, then $\text{span}(C) \neq \text{span}(S)$).