Homework: Due 9-26
Math 513

If parts of a problem are specified, only those parts are assigned. If no parts are specified, you should do all the parts.

Problems from textbook: §3.4 - 1 (a), 1(c), 6 (a)-(b), 7 (a)-(b), 12 (a)-(c) §3.6 - 1 §3.7 - 4, 7

Question 1. (a) Let $V, W, Z$ be vector spaces over $F$. Let $T : V \rightarrow W$, $S : W \rightarrow Z$ be linear transformations. Prove that

$$(S \circ T)^t = T^t \circ S^t.$$  

(b) Using part (a), deduce that if $A$ is an $n \times m$ matrix and $B$ is an $m \times k$ matrix, then

$$(AB)^t = B^t A^t.$$  

(c) Let $A, B$ be $n \times n$ matrices. Prove that the trace (sum of diagonal entries) of $AB - BA$ is 0. (Hint: First prove that for any $n \times n$-matrix $M$, the trace of $M$ is equal to the trace of $M^t$.)