**Homework 10**
(due Friday, Nov 14)

**New rule:** from now on, if a 'full-solution' type problem requires row reducing a matrix, then do not show all the steps involved. Just write down the starting matrix and what you end up with. Of course, it's often important to explain how you arrived at this matrix and how you're interpreting the matrix you end up with to answer the question at hand.

**Warmup (don't turn in).**

**4.3:** 2abf, 12ab, 13a, 14bd
**4.4:** 3adf, 9

**Turn in answers only.**

**4.3:** 13bc, 14ac (in # 14, don't worry about verifying that the given set is a basis)

**4.4:** 3bce (don't worry about $\mathbf{N}(A^T)$), 4b

**Turn in full solutions.**

**4.3:** 1, 2cd, 3, 5, 9, 12cd, 19 (Ignore the book suggestion: just use that linearly independent sets in a subspace never have more elements than spanning sets)

**4.4:** 5a, 12, 13ac

**Problem 1.** In class I showed that any two bases for the same subspace of $\mathbf{R}^n$ have the same dimension. Use the same sorts of arguments to prove the following:

If $V, W \subset \mathbf{R}^n$ are subspaces such that $V \subset W$, then $\dim V \leq \dim W$. Moreover, $\dim V = \dim W$ if and only if $V = W$.