HOMEWORK 9.
Due Wednesday, November 23, in class.

1. Let $V$ be a finite dimensional inner product space, and let $T$ be a positive semidefinite linear operator on $V$ (see p. 377). Prove that $T$ has a unique positive semidefinite square root. ($A$ is a square root of $B$ if $B^2 = A$.) What happens if the assumption that $T$ is positive is dropped? Find the square root of $T = \begin{pmatrix} 1 & 1 \\ 1 & 1 \end{pmatrix}$.

2. Prove: if $\begin{pmatrix} A & B \\ B^* & C \end{pmatrix}$ is positive definite then so is $C - B^*A^{-1}B$.

3. Do Problem 2 (b), (d), and (f) in Section 6.4.

4. Do Problem 3 in Section 6.4.

5. Do Problem 11 in Section 6.4.