Last name _____

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LARSON—MATH 610—CLASSROOM WORKSHEET 27
Real Spectral Theorem.

Concepts & Notation

- (Chp. 6) *dot product*, *inner product*, *inner product space*, *norm*, *orthogonal representation*, *Cauchy-Schwartz*, *orthonormal list*, *Gram-Schmidt*, *orthogonal complement*, *orthogonal projection*.
- (Chp. 7) *adjoint*, *conjugate transpose*.

1. What is the *conjugate transpose* A^* of an $m \times n$ matrix?

2. (**Claim**) If V, W are finite-dimensional inner-product spaces with orthonormal bases $e_1, \ldots, e_n$ and $f_1, \ldots, f_m$ and $T \in \mathcal{L}(V, W)$, then the matrix of T^* equals the conjugate transpose of the matrix of T.

3. What is a *self-adjoint* linear operator (on an inner product space)?

4. (**Claim**) Eigenvalues of self-adjoint operators are real.

5. What is the *real spectral theorem*?