

Physics 451- Fall 2012

Homework #13

Due Tuesday, Oct 16, by 7pm

Please place your assignment in the “Physics 451” slot across from N373 ESC.
We will have help sessions twice a week: **T Th 3-6pm**

List of problems (from the textbook):

3.3

3.5

A18

A19

A23

A25

Hints

For Pb 3.3: develop the inner product in both forms for $h = f+g$ and for $h = f+ ig$ and then combine the resulting equations.

Pb 3.5: Any operator has an hermitian conjugate, but the operator itself is called “Hermitian” only if $Q^\dagger = Q$. To find the hermitian conjugate use the integral form of

$$\langle g | Qf \rangle = \langle Q^\dagger g | f \rangle$$

For the raising operator, express a_+ in terms of operators p and x

For Pb A19: check how many eigenvalues and eigenvectors could be found for M and conclude if the matrix M is diagonalizable or not

For Pb A23: A matrix M is “normal” when: $[M, M^\dagger] = 0$

A matrix is diagonalizable when normal, but does not have to be normal to be diagonalizable.