For Monday 10/15 – Wednesday 10/17, Physics appreciation, read Griffiths 3.5 and turn in:

1. Due via e-mail by 9:30 am on 10/17: Any questions about the mathematical derivations in this section. Are there steps that didn't make sense?
2. Math: Construct the uncertainty relation for Energy and position.
3. Write $\begin{bmatrix} a \\ b \end{bmatrix}$ in terms of |+x> and |-x>.
4. Math: Consider three observables, A, B, and C. We know that [B, C] = A and [A, C] = B. Show that $\sigma_{AB}\sigma_C \geq \frac{1}{2i}\langle A^2 + B^2 \rangle$.
5. Math: Griffiths Problem 3.15
6. Math: Show that the expectation value of any observable in a stationary state does not change with time, provided the time rate of change of the operator for the observable is zero.

"For realz" weekly homework due 9:30 am on Friday 10/19 is math problems from 10/12, 10/15, and 10/17, but only ONE GROUP assignment is to be turned in.

For Friday 10/19, read Griffiths' section 3.6 and Q5.6 and turn in by 9:30 am:

1. Easy Math: Compute $<u|w>, <w|u>,$ and $|<w|u>|^2$ for the following vectors:
    a. |u> = [1,-i], |w>=[2i,3]
    b. |u> = [1,-2], |w>=[i,-5]
    c. |u> = [1+i,-2+i], |w>=[i,2-i]
2. Conceptual/Easy Math: Let operator $\hat{A}$, representing observable A, have 2 normalized eigenstates ψ_1 and ψ_2, with eigenvalues a_1 and a_2. Operator $\hat{B}$, representing observable B, has 3 normalized eigenstates ϕ_1, ϕ_2, and ϕ_3, with eigenvalues b_1, b_2, and b_3. The eigenstates are related by $\psi_1 = C(2\phi_1 + \phi_2 + 3\phi_3)$ and $\psi_2 = D(3\phi_1 + 2\phi_2 + \phi_3)$.
    a. Can we always write eigenstates of one operator as linear combinations of another eigenstate? Explain.
    b. If observable A is measured to be a_1, what is the state of the system (immediately) after the measurement?
    c. If B is now measured, what are the possible results and what are their probabilities?
    d. Do A and B commute? Explain.
3. Math: Q6A.2 (due "for reelz" next week)