PHY 472 Check-in/Questions

Topics we have discussed so far:

- Review of Chapters 1-3 (Spin and Formalism)
    - Spin 1/2
    - Spin 1
    - Finding Eigenvalues and Eigenstates
    - Changing Basis
    - Time evolution
- The Infinite Square Well
- Finite Square Well
- Matching Boundary Conditions
- Delta function potentials
- Free particle states
- Position and momentum space
- Fourier Transforms

Group 1

- Delta Function Potentials are still confusing, and how to go about solving their BC +3
- A little bit more detail on when the relationship between the momentum/energy eigenstates for a free particle is useful, and when to apply it +2

Group 2

- Changing basis is still a little confusing, it would be nice to have more practice or even better have more examples worked out so we can reference them
- Physical examples of the different types of wells (finite, infinite, delta functions, asymmetric), it's easier to understand the calculations we do if we can conceptualize physical things
- How to match boundary conditions in the case of all the different types of wells (when does the procedure vary)+1
- Are all of the potential wells we have studied unable to be solved analytically?
- Delta function potentials... How do we normalize with them? Are they a physical thing?+1
- When we went over orthogonal polynomials, are there certain applications to use a specific one? Do they all have a similar outcome? If not, how do we know which one to use?+2
- Will the bisection method be the general method to find roots in this class?

- What is the purpose for the infinite square well? When is it used? What is it's practical application?
- What is the purpose of the finite square well? When is it used? What is its practical application?

Group 3
- When to put *i* in exponential for a general solution vs when not to +2
- Is ket(psi) functionally the same as the position representation (psi(x)) form when solving eigenvalue problems? +2
- How are you today?
- If a finite potential barrier extends infinitely is tunneling possible, can the wavefunction then physically exist within the barrier? +2
- When solving for coefficients in the well problem are those normalization conditions are probability amplitudes (how to translate L.A. understanding to integral formalism) +2

Group 4
- What is your cat's name?
- Changing basis for time-dependent wave vectors +3
- Clarify meaning of stationary state? Sources define stationary states as equivalent to energy eigenstates. "Which basis gives rise to stationary states" =?= "which operator admits an eigenbasis which are simultaneous eigenstates of the Hamiltonian"+3

Group 5
- Spin-1 and calculation errors in Time-Dependencies +2
- The math intuition when solving for boundary conditions +1
- Matching boundary conditions/understanding the physical meaning of them +1
- Some have confidence and some have none; not intuitive and hard to grasp the physical understanding +1
- What's your dog's name?+3
- Go into free particle states a little more? +2
- More Fourier Transforms- physical meaning and applications+2

Group 6
- How do wavefunctions change when a delta function is used? +1
- How do the states of a particle differ between the infinite and finite square well? +2
- Is there any difference in the energy eigenstate and the position eigenstate in the position representation? +4
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Group 7
- Best way to make physical assumptions about unintuitive systems (delta functions, negative infinite potentials, etc.) +1
- Related, how to solve for systems of many boundary conditions using physical assumptions (where to start to make the process easiest) +1

- What is the physical meaning/manifestation of the envelope wave? What does ‘envelope’ mean? Why does an odd-looking form like this show up within a scenario with so few physical restrictions?+1

Group 8
- Going over delta functions and fourier transforms +2
- Going over constraints for wave functions and how to normalize efficiently.

Group 9
- Normalization for ugly wave functions
- What is the difference between a wave function and an eigenstate, and when are they the same or synonymous? +1

Group 10
- What is the point of momentum space wavefunctions? +1
- More practice with delta functions would be neat +1
- Practice with Fourier Transforms +1

Group 11
---- Setting up the first derivative continuity for delta potential wells and boundary conditions for these wells +1
---- Spherical harmonics and orthogonal functions
---- Evaluating Fourier Transforms +1
