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Midterm 1 Review

University of Colorado

Please type your name in the form: Last, First:

Required.

NOTE!! Please type in your CU userid (that's the username you use to log in to CULearn. We do NOT want your password. It probably looks like your last name, perhaps with a few extra characters. Note that it is definitely NOT your numerical (9 digit) student ID!!
This script cannot "error check", you have to be sure you type it in correctly! Thanks

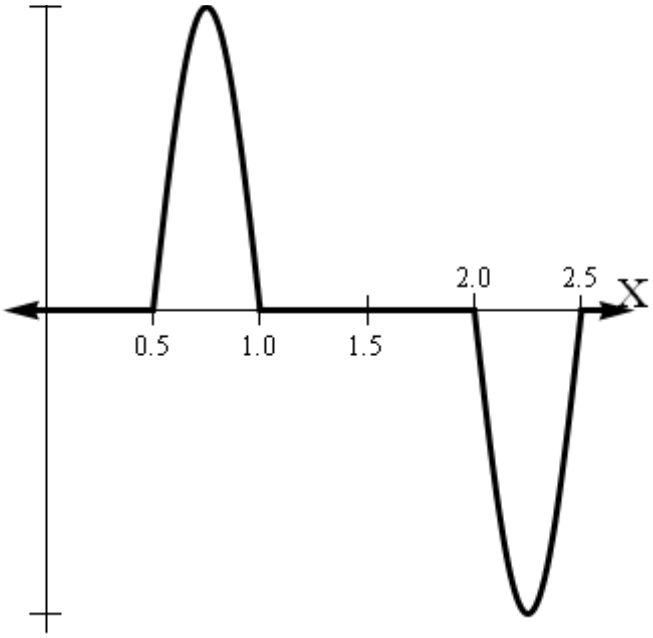
Please type your CU userid:

Required.

The first two questions, refer to the normalized wave function, $\Psi(x,t=0)$ which is shown at the right.

$$\Psi(x,t=0)$$

Q1: a) What, if anything, can we say about <x>?



Required.

- It must be zero
- It must be positive
- It depends on the size of the peaks
- It is not well defined because the wave function is not always positive.

b) Explain your answer:

Required.

Q2:
a) What, if anything can we say about the standard deviation of x, σ_x?

Required.

- It is exactly zero
- It must be less than 1
- It must be greater than 1
- It is not well defined

b) Explain your answer:

Required.

Time remaining: 0:14:41

Assume that a quantum mechanical system is prepared so that its initial state is given by:

$$\Psi_i = \Psi(x,0) = \frac{2}{\sqrt{5}}\psi_1 - i\sqrt{\frac{1}{5}}\psi_2$$

where ψ_1 and ψ_2 are two states which satisfy the time independent Schrödinger equation:

$$\hat{H}\psi_1 = E_1\psi_1$$

and

$$\hat{H}\psi_2 = E_2\psi_2$$

Q3:

a) Does the probability density associated with this state depend on time?

Required.

Select one...

b) If so, describe its time dependence. If not, explain why not.

Required.

Submit responses

Questions or Comments?

Contact the 123 tutorial pretest coordinator at uwttl123@u.washington.edu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