

Name: _____

PHYS 451: Quantum Mechanics I, Quiz #1

Consider the following wave function of a particle in 1D:

$$\psi(x, t) = \begin{cases} C e^{-\gamma x + i\delta t}, & x \geq 0 \\ 0, & x < 0 \end{cases}$$

where γ and δ are some real constants and $\gamma > 0$.

1. Determine the normalization factor, C .
2. Compute the expectation values $\langle x \rangle$ and $\langle x^2 \rangle$.
3. Find σ , the standard deviation of x .
4. What is the probability that the particle is found inside the range $[-\sigma, 0]$?
5. What is the probability that the particle is found inside the range $[0, \sigma]$?