# Reflective Homework

(1) Consider the following statement (where $A$ is a normalization constant):

At time $t = 0$, "$\Psi(x, t = 0) = A sin^3(n\pi x/a)$" is not a possible solution to the Time-independent Schroedinger equation for a 1D infinite square well ($0 \leq x \leq a$) because this function is not linear and hence cannot be written as a linear superposition of stationary states.

Explain why you agree or disagree with this statement.

(2) A person says that any possible wave function of a system should satisfy $\hat{H}\psi(x) = E\psi(x)$ where $\hat{H}$ is the Hamiltonian for the system. Explain why you agree or disagree with the person.

(3) Explain why the following statement is correct or incorrect:

$\hat{p} = d\hat{x}/dt$ where $\hat{p}$ is the momentum operator and $\hat{x}$ is the position operator.

(4) Consider the following statement:

At time $t = 0$, any normalized function that is continuous and smooth (continuous derivative) and satisfies the boundary conditions for a given system is a possible wave function for that system because it can be written as a linear superposition of stationary states for that system.

Explain why you agree or disagree with this statement.