1. Read Griffiths sections 2-5 and 2-6. Did you read all the pages?

2. A wavefunction at time zero for the infinite square well is prepared as a linear superposition of the ground state and the first excited state.

$$\Psi(x,0) = \frac{1}{\sqrt{2}}|1> + \frac{i}{\sqrt{2}}|2>$$

   Note that the coefficient of the second term is imaginary.

   (a) Is $\Psi(x,0)$ normalized?
   (b) Find the wavefunction at later times $\Psi(x,t)$.
   (c) Does $\Psi(x,t)$ remain normalized for all times?
   (d) Find the expectation value $< x >$ as a function of time.
   (e) Find the expectation value $< H >$ as a function of time.
   (f) If you measure the energy of the particle, what possible values could you get and with what probability?

3. A particle in an infinite square well has the initial wavefunction

$$\Psi(x,0) = \begin{cases} Ax, & 0 \le x \le \frac{a}{2} \\ A(a-x), & \frac{a}{2} \le x \le a \\ 0, & \text{elsewhere} \end{cases}$$

   (a) Find the constant A.
   (b) Sketch the wavefunction $\Psi(x,0)$.
   (c) Find the Fourier expansion coefficients c_n. List the first five non-zero coefficients.
   (d) What is the wavefunction at later times $\Psi(x,t)$?
   (e) What is the probability that a measurement of the energy will result in the value E_1?
   (f) What is the probability that a measurement of the energy will result in the value E_2?
   (g) Do the two answers above for probability change with time?