Physics 220
Homework #2
Spring 2017
Due Wednesday, 4/12/17

1. Griffith's 1.8
2. Griffith's 1.18
3. Griffith's 2.3
4. Griffith's 2.9

5. Consider a particle bound in a 1D potential with wave function given by

$$\psi(x)=\begin{cases} Ae^{5ikx}\cos\left(\frac{3\pi}{a}x\right) & -\frac{a}{2}\le x\le\frac{a}{2} \\ 0 & |x|>\frac{a}{2} \end{cases}$$

   a. What is the normalization constant A?
   b. What is the probability of finding the particle between $0\le x\le\frac{a}{4}$?
   c. What are the expectation values of $\langle x\rangle$, $\langle p\rangle$, $\langle x^2\rangle$, & $\langle p^2\rangle$?

6. Determine the odd solutions to the finite square well. Determine the energy of the single bound state with $E<V_0$. Normalize your solutions in each region to determine the unknown coefficient A in each region. Plot your solution for $\psi_2(x)$.

7. Determine the normalization coefficients for the second energy state of the even solutions to the finite square well. That is, renormalize the solutions and determine B in each region for E_3. Plot your solution for $\psi_3(x)$, along with the solutions for $\psi_2(x)$ from above and $\psi_1(x)$ from class.