Homework 8

Due in class Nov. 7

From Shankar: Exercises 17.2.1, 17.3.2, 18.2.1, 18.2.4.

Note that the spin matrices needed for 17.3.2 are

$$S_x = \frac{\hbar}{\sqrt{2}} \begin{pmatrix} 0 & 1 & 0 \\ 1 & 0 & 1 \\ 0 & 1 & 0 \end{pmatrix} \quad S_y = i\frac{\hbar}{\sqrt{2}} \begin{pmatrix} 0 & -1 & 0 \\ 1 & 0 & -1 \\ 0 & 1 & 0 \end{pmatrix} \quad S_z = \hbar \begin{pmatrix} 1 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & -1 \end{pmatrix}.$$

Don't worry about the spin aspect of this problem, you need only construct the 3×3 Hamiltonian matrices H_0 and H_1. Also, the language "stable under the perturbation" just means to do degenerate perturbation theory if you need to.