Homework 1: (due Fri. Aug. 31)

The Pauli matrices are defined as

$$\sigma_x = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}, \quad \sigma_y = \begin{pmatrix} 0 & -i \\ i & 0 \end{pmatrix}, \quad \sigma_z = \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$$

1.) Compute all nine products $\sigma_\alpha \sigma_\beta$ for $\alpha = x, y, z$ and $\beta = x, y, z$. Are any of the products related to the Pauli matrices?

2) Determine the eigenvalues & eigenvectors for each of the Pauli matrices.

Note: We will use both of these results in Chpt. IV.