#1.)

$$\hat{A} = \begin{pmatrix} r & 5 \\ \tau & u \end{pmatrix} \quad \hat{B} = \begin{pmatrix} a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \end{pmatrix}$$

$\hat{A}\hat{B} =$ $\hat{B}\hat{A} = ?$

#2.)

$$\hat{A} = \begin{pmatrix} 1 & -2 & 3 \\ 4 & 5 & -6 \end{pmatrix} \quad \hat{B} = \begin{pmatrix} -9 & 0 & 6 \\ 21 & -3 & -24 \end{pmatrix}$$

#3.)

$$\hat{A} = \begin{pmatrix} 13 & 5 \\ 6 & -7 & -8 \end{pmatrix} \quad \hat{A}^T = ?$$

#4.) $A = \begin{pmatrix} 1 & 2 & 0 \\ 3 & -1 & 4 \end{pmatrix}$ $\hat{A} \cdot \hat{A}^T = ,\ A^T A = ?$

#5.) Find determinate of

$$\begin{vmatrix} 1 & -2 & 3 \\ 2 & 4 & -1 \\ 1 & 5 & -2 \end{vmatrix}$$

#6.) construct $\vec{\nabla} \times \vec{v}$ explicitly

7.) calculate the adjoint of $\begin{pmatrix} 2 & i & 0 \\ 0 & 1 & -5i \\ 1 & 4i & 3 \end{pmatrix}$

8.) is the matrix $\frac{\hbar}{2}\begin{pmatrix} 0 & -i \\ i & c \end{pmatrix}$ hermetian?

how about $\hbar\begin{pmatrix} 0 & 1 \\ 0 & c \end{pmatrix}$. Which can represent an observable?

9.) Find the eigenvectors and eigen values of

$\frac{3}{4}\hbar^2\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

10.) A system evolves according to $\hat{H}|\psi\rangle = E|\psi\rangle$

where $\hat{H} = -\frac{\gamma B_z \hbar}{2}\begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$ Solve this remembering your eigen values ARE your energies, your normalized eigenvectors ARE your basis functions. include time dependence

NOT yet,

10.) Find the eigenvectors and eigenvalues of

$\begin{pmatrix} A & 0 & B \\ 0 & C & 0 \\ B & 0 & A \end{pmatrix}$