1) Express the following matrices as the product of elementary matrices.

a) $\begin{pmatrix} 1 & 4 \\ -2 & 2 \end{pmatrix}$

b) $\begin{pmatrix} 1 & 0 & -1 \\ 2 & 1 & 0 \\ 0 & -1 & 2 \end{pmatrix}$

2) Express the following matrices in problem (1) into echelon form and find their row rank.
3) Express the following matrices in problem (1) into row reduced echelon form and what does it mean if a square matrix has full rank?
4) Identify which of the following matrices is in echelon form? If not, then use the row operations to transform the following matrices in echelon form.

a) $\begin{bmatrix} 1 & -1 & 1 & 0 \\ 0 & 1 & 0 & 1 \\ 1 & 0 & 1 & 1 \\ 0 & 0 & 1 & 1 \end{bmatrix}$

b) $\begin{bmatrix} 1 & 2 & 4 \\ 0 & 1 & 5 \\ 0 & 0 & 0 \end{bmatrix}$

5) State true or false and justify your answers.
   a) Is identity matrix an elementary matrix?
   b) Can zero matrix be represented as a product of elementary matrices?
   c) Let A be $m \times n$ matrix then $\rho(A) > \max\{m, n\}$.
   d) Every matrix is row equivalent to unique row reduced echelon matrix.