SECTION: A

1. Prove that $\|u+v\|=\|u-v\|$ if and only if u and v are orthogonal to each other.
2. Show that $\|u+v\|^2=\|u\|^2+\|v\|^2+2<u,v>$
3. Show that $<u+v,u-v>=\|u\|^2-\|v\|^2$
4. Show that $d(u,v)=\sqrt{\|u\|^2+\|v\|^2}$ if and only if u and v are orthogonal to each other.
5. Prove that $\|u\|^2+\|v\|^2=(1/2)\|u+v\|^2+(1/2)\|u-v\|^2$ [2+2+2+2+2=10]

[Here $<u,v>$]

SECTION: B

1. Use Gauss Jordan Method to find the inverse of the matrix

$$\begin{pmatrix} 0 & -1 & 1 & 0 \\ 2 & 1 & 0 & 2 \\ 1 & -1 & 3 & 0 \\ 0 & 1 & 1 & -1 \end{pmatrix}$$

2. Using induction, prove that for all $n\geq 1$, $(A_1+A_2+\dots+A_n)^T=A_1^T+A_2^T+\dots+A_n^T$
3. Express M= $\begin{pmatrix} b & c \\ 1 & 0 \end{pmatrix}$, $(b\neq 0, c\neq 0)$ as a product of elementary matrices

[5+5+5=15]

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