***Assignment #9*** ***Math 260*** ***Name***

1. Using the standard inner product in $R^n$ to determine the angle between vectors:

a) $\overrightarrow{v} = \langle 0,-2,1,4,1 \rangle$ *and* $\overrightarrow{u} = \langle -3,1,-1,0,3 \rangle$

b) $\overrightarrow{v} = \langle 2,-2,0,4 \rangle$ *and* $\overrightarrow{u} = \langle 1,2,-2,0 \rangle$

2. Given $A=\begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix}$ $and\ B=\begin{bmatrix} b_{11} & b_{12} \\ b_{21} & b_{22} \end{bmatrix}$ $from\ B=M_2(R)$. Prove / disprove if the following is an inner product vector space (IPVS)

a) $\langle A,B\rangle = a_{11}b_{11}+a_{12}b_{12}+a_{21}b_{21}+a_{22}b_{22}$

b) $\langle A,B\rangle = a_{11}b_{11}$

3. Given $f_1(x) = a_1x^2 + b_1x + c_1$ *and* $f_2(x) = a_2x^2 + b_2x + c_2$ *from* $V = P_2$

a) $\langle f_1(x), f_2(x) \rangle = a_1a_2 + b_1b_2 + c_1c_2$

b) $\langle f_1(x), f_2(x) \rangle = \int_0^1 x f_1(x) f_2(x) dx$

4. Let $A=\begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix}$ *and* $B=\begin{bmatrix} b_{11} & b_{12} \\ b_{21} & b_{22} \end{bmatrix}$ *from* $B=M_2(R)$. Define

$\langle A,B\rangle = 2a_{11}b_{11}+a_{12}b_{12}+a_{21}b_{21}+2a_{22}b_{22}$ Determine $\langle A,B\rangle$; $\|A\|$; $\|B\|$ and angle between A and B.

a) $A=\begin{bmatrix} 2 & -4 \\ -3 & 1 \end{bmatrix}$ *and* $B=\begin{bmatrix} -2 & 1 \\ 1 & 0 \end{bmatrix}$

b) $A=\begin{bmatrix} 3 & 1 \\ -2 & 5 \end{bmatrix}$ *and* $B=\begin{bmatrix} -6 & 2 \\ 4 & -10 \end{bmatrix}$