"QUIZ" for Lecture 2

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E-MAIL ADDRESS SCANNED .pdf OF COMPLETED QUIZ to DrZcalc3@gmail.com (Attachment: q2FirstLast.pdf) ASAP BUT NO LATER THAN FRIDAY Sept. 11, 8:00pm

1. Determine whether the two vectors are orthogonal and if not, whether the angle between them is acute or obtuse. **a.** $\langle 1,1,1\rangle$, $\langle 3,-2,-1\rangle$.

b. $\langle 4,3\rangle$, $\langle 2,-4\rangle$.

a. $\langle 1,1,1\rangle \bullet \langle 3,-2,-1\rangle$

$1(3)+(1)(-2)+(1)(-1)$

$= 3-2-1 = 0$

yes, since the dot product is 0, they are orthogonal

b. $\langle 4,3\rangle \bullet \langle 2,-4\rangle$

$4(2)+3(-4) = 8-12 = -4$

NO, the vectors are not orthogonal

$\cos\theta = \frac{-4}{\sqrt{4^2+3^2}\cdot\sqrt{2^2+(-4)^2}}$

$\cos\theta = \frac{-4}{5(\sqrt{20})}$

$\cos\theta^{-1}\left(\frac{-4}{5\sqrt{20}}\right) = 1.75°$

The angle between the vectors is acute.

2. Calculate $\mathbf{v}\times\mathbf{w}$, if

$$\mathbf{v} = \langle 0,1,-1\rangle \quad , \quad \mathbf{w} = \langle 1,-1,0\rangle \quad .$$

$$\begin{vmatrix} i & j & k \\ 0 & 1 & -1 \\ 1 & -1 & 0 \end{vmatrix} = i\begin{vmatrix} 1 & -1 \\ -1 & 0 \end{vmatrix} - j\begin{vmatrix} 0 & -1 \\ 1 & 0 \end{vmatrix} + k\begin{vmatrix} 0 & 1 \\ 1 & -1 \end{vmatrix}$$

$= i(0-1) - j(0+1) + k(0-1)$

$= -i-j-k = \langle -1,-1,-1\rangle$