

"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. $\langle 1, 1, 1 \rangle \cdot \langle 3, -2, -1 \rangle = 1 \cdot 3 + 1 \cdot (-2) + 1 \cdot (-1) = 3 - 2 - 1 = \underline{0}$

The two vectors $\langle 1, 1, 1 \rangle$ and $\langle 3, -2, -1 \rangle$ are orthogonal.

b. $\langle 4, 3 \rangle \cdot \langle 2, -4 \rangle = 4 \cdot 2 + 3 \cdot (-4) = 8 - 12 = \underline{-4}$

$$\cos \theta = \frac{A \cdot B}{|A| |B|} \Rightarrow \cos \theta = \frac{-4}{(\sqrt{25} \cdot \sqrt{20})} \Rightarrow \cos \theta = \frac{-4}{\sqrt{500}}$$

$$\theta = \cos^{-1}\left(\frac{-4}{\sqrt{500}}\right) \Rightarrow \underline{\theta = 100.3^\circ}$$

The two vectors $\langle 4, 3 \rangle$ and $\langle 2, -4 \rangle$ are obtuse.

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

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

$$\begin{bmatrix} i & j & k \\ 0 & 1 & -1 \\ 1 & -1 & 0 \end{bmatrix} \rightarrow \left[\cancel{(1 \cdot 0)} - (-1 \cdot -1) \right] i - \left[\cancel{(0 \cdot 0)} - (1 \cdot -1) \right] j + \left[\cancel{(0 \cdot -1)} - (1 \cdot 1) \right] = \underline{-i - j - k}$$

The cross product of \mathbf{v} and \mathbf{w} is $\langle -1, -1, -1 \rangle$.