

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

$$a) \langle 1, 1, 1 \rangle \cdot \langle 3, -2, -1 \rangle = 3 + (-2) + (-1) = 0$$

They are orthogonal.

$$b) \langle 4, 3 \rangle \cdot \langle 2, -4 \rangle = 8 + (-12) = -4 \quad \text{Not orthogonal.}$$

$$\cos(\theta) = \frac{-4}{|\langle 4, 3 \rangle| |\langle 2, -4 \rangle|}$$

$$\cos(\theta) = \frac{-4}{5 \cdot \sqrt{20}} \quad \theta \approx 100.3^\circ \quad \text{Obtuse since } \theta > 90^\circ$$

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

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

$$\begin{aligned} \mathbf{v} \times \mathbf{w} &= \langle 1 \cdot 0 - (-1) \cdot (-1), -(0 \cdot 0 - (-1) \cdot 1), 0 \cdot (-1) - 1 \cdot 1 \rangle \\ &= \langle -1, -1, -1 \rangle \end{aligned}$$