

"QUIZ" for Lecture 2

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Section: 23

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

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

They are orthogonal

$$\langle 4, 3 \rangle \cdot \langle 2, -4 \rangle = (4 \cdot 2) + (3 \cdot -4) = 8 - 12 = -4$$

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

$$\cos^{-1}(-4 / \sqrt{500}) = 100.3^\circ$$

They are obtuse

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

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

$$\begin{aligned} &= [(1 \cdot 0) - (-1 \cdot -1)]\mathbf{i} - [(0 \cdot 0) - (1 \cdot -1)]\mathbf{j} + [(0 \cdot -1) - (1 \cdot 1)]\mathbf{k} \\ &= (0 - 1)\mathbf{i} - (0 + 1)\mathbf{j} + (0 - 1)\mathbf{k} = \langle -1, -1, -1 \rangle \end{aligned}$$

$\mathbf{v} \times \mathbf{w} = \langle -1, -1, -1 \rangle$