

Math 2415

Sample Concept Quiz with Solutions

LAST NAME <i>Newton</i>	FIRST NAME <i>Isaac</i>	SECTION <i>304</i>
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1. Complete the following sentence: A vector is a quantity

with magnitude and direction.

2. Write down an algebraic formula for $\mathbf{v} + \mathbf{w}$ in terms of the components of \mathbf{v} and \mathbf{w} .

Suppose that $\mathbf{v} = (v_1, v_2, v_3)$ and $\mathbf{w} = (w_1, w_2, w_3)$. Then

$$\mathbf{v} + \mathbf{w} = (v_1 + w_1, v_2 + w_2, v_3 + w_3).$$

3. State a formula relating the dot product of two vectors to the angle between them.

Let θ be the angle between the vectors, \mathbf{v} and \mathbf{w} . Then

$$\cos(\theta) = \frac{\mathbf{v} \cdot \mathbf{w}}{\|\mathbf{v}\| \|\mathbf{w}\|},$$

where the length $\|\mathbf{v}\|$ of \mathbf{v} is also given in terms of dot products by $\|\mathbf{v}\| = \sqrt{\mathbf{v} \cdot \mathbf{v}}$.