Quiz 2

MATH 210, CALCULUS III, SUMMER 2015

NAME:

Problem 1. Calculate the dot product $\mathbf{u} \cdot \mathbf{v}$ for $\mathbf{u} = 2\mathbf{i} - 3\mathbf{k}$ and $\mathbf{v} = \mathbf{i} + 4\mathbf{j} + 2\mathbf{k}$.

$$\vec{u} \cdot \vec{v} = 2(1) + 0(4) + (-3)(2)$$
$$= 2 + 0 - 6$$
$$= -4$$

Problem 2. A force $\mathbf{F} = \langle 2, 1, 2 \rangle$ (in newtons) moves an object along a line segment $P(1, 2, 0)$ to $Q(2, 4, 0)$ (in meters). What is the work done by the force?

$$\vec{d} = \vec{PQ} = Q - P = \langle 2-1, 4-2, 0-0 \rangle = \langle 1, 2, 0 \rangle$$

$$W = \vec{F} \cdot \vec{d} = \langle 2, 1, 2 \rangle \cdot \langle 1, 2, 0 \rangle$$
$$= 1(2) + 2(1) + 0(2)$$
$$= 2 + 2 + 0$$
$$= 4 \text{ (joules)}$$