Name:

Quiz #2

In class. 25 minutes. No textbook or notes or calculator. 30 points total.

1. **(a)** (*6 pts*)   Find $\mathbf{a} \cdot \mathbf{b}$ if $\mathbf{a} = 4\mathbf{i} - 3\mathbf{j} + \mathbf{k}$ and $\mathbf{b} = 2\mathbf{i} - \mathbf{k}$.

(b) (*6 pts*)   Find the angle between the vectors $\mathbf{a}$ and $\mathbf{b}$ from part **(a)**. (*Give a concrete expression even if you cannot simplify it.*)

2. (*6 pts*)   Find the work done by force $\mathbf{F} = 8\mathbf{i} - 6\mathbf{j} + 9\mathbf{k}$ Newtons that moves an object from the point $(0, 10, 8)$ to the point $(3, 12, 10)$ along a straight line. Assume distances are in meters.

3. (*6 pts*) Find $\mathbf{a} \times \mathbf{b}$ if $\mathbf{a} = \langle 1, -t, 1 \rangle$ and $\mathbf{b} = \langle 2, 0, t^2 \rangle$.

4. (*6 pts*) Find the area of the triangle formed by the points $P(1, 0, 1)$, $Q(2, 1, 0)$, $R(0, 2, 4)$.