This quiz has two sides. You have 15 minutes for the following problems. Calculators are NOT allowed. Please print your name and section number at the top-right corner before you start.

**Problem**  (20 points)
Given three points in the 3-space: $A = (4, 3, 2), B = (5, 3, 4)$ and $C = (2, 4, 3)$.
(1) Find the coordinates of the vectors $\vec{u} = \overrightarrow{AB}, \vec{v} = \overrightarrow{AC}$.

(2) Find the angle between $\vec{u}$ and $\vec{v}$.

(3) Find the projection of $\vec{v}$ onto $\vec{u}$.

(4) Write down the equation of the plane passing through the three points $A, B$ and $C$. 

(5) Find the area of the triangle $ABC$.

(6) Write down the line passing through $D = (7, 3, 4)$ having $\vec{v}$ as its direction.

(7) Find the volume of the parallelepiped determined by $\vec{u} = \overrightarrow{AB}$, $\vec{v} = \overrightarrow{AC}$ and $\vec{w} = \overrightarrow{AD}$.

(8) Which one of the following is correct:

A. $\vec{u} \times \vec{v} \times \vec{w} = 4$

B. $\vec{u} \cdot (\vec{v} \times \vec{w}) = (\vec{v} \cdot \vec{w}) \times (\vec{v} \cdot \vec{u})$

C. $\vec{u} \times \vec{v} = \vec{v} \times \vec{u}$

D. $\vec{u} \cdot \vec{v} = \vec{v} \cdot \vec{u}$

E. All the above are wrong!