

Worksheet #4

⑤ (c) [Easier proof!]

$$\text{If } \vec{u} \cdot \vec{w} = \vec{v} \cdot \vec{w}, \text{ then } \vec{u} \cdot \vec{w} - \vec{v} \cdot \vec{w} = 0$$

$$(\vec{u} - \vec{v}) \cdot \vec{w} = 0, \text{ so } \vec{w} \perp (\vec{u} - \vec{v})$$

$$\text{If } \vec{u} \times \vec{w} = \vec{v} \times \vec{w}, \text{ then } \vec{u} \times \vec{w} - \vec{v} \times \vec{w} = 0$$

$$(\vec{u} - \vec{v}) \times \vec{w} = 0, \text{ so}$$

\vec{w} is in the same direction as $\vec{u} - \vec{v}$.

But \vec{w} can't be both \perp & in same direction as a vector, so $\vec{u} - \vec{v} = 0$, and $\vec{u} = \vec{v}$.