

# Math 4133 - Linear Algebra

Quiz #9 - 2014.02.26

Solutions

---

Consider the vectors:  $\vec{u} = \langle 1, 2, -1 \rangle$ ,  $\vec{v} = \langle 1, 0, 1 \rangle$  for the following problems.

1. Compute  $\vec{u} \times \vec{v}$ .

$$\begin{aligned}\vec{u} \times \vec{v} &= \det \left( \begin{bmatrix} \vec{i} & \vec{j} & \vec{k} \\ 1 & 2 & -1 \\ 1 & 0 & 1 \end{bmatrix} \right) \\ &= (2 - 0)\vec{i} - (1 + 1)\vec{j} + (0 - 2)\vec{k} \\ &= \langle 2, -2, -2 \rangle\end{aligned}$$

2. Compute  $\vec{v} \times \vec{u}$ .

$$\vec{v} \times \vec{u} = -\vec{u} \times \vec{v} = \langle -2, 2, 2 \rangle$$

3. Compute  $|\vec{u} \times \vec{v}|$ .

$$|\vec{u} \times \vec{v}| = \sqrt{2^2 + (-2)^2 + (-2)^2} = \sqrt{12}$$

4. Compute  $5\vec{u} \times 3\vec{v}$ .

$$5\vec{u} \times 3\vec{v} = 15(\vec{u} \times \vec{v}) = \langle 30, -30, -30 \rangle$$