

MATH 231: Calculus of Several Variables
Section 1, 107 Ag Sc & Ind Bldg,
TR 9:05 AM - 9:55 AM

Homework 4: Due Thursday, Sept 12

1. Read the notes titled "The Cross Product"

2. Find the cross product $\vec{a} \times \vec{b}$ for the following:

(a) $\vec{a} = \langle 1, 1, 2 \rangle$, $\vec{b} = \langle 0, 0, 1 \rangle$

(b) $\vec{a} = \langle t, \cos t, \sin t \rangle$, $\vec{b} = \langle 1, -\sin t, \cos t \rangle$

3. Determine if the following expressions make mathematical sense:

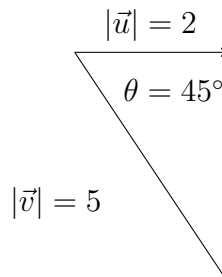
(a) $(\vec{a} \cdot \vec{b}) \times (\vec{c} \cdot \vec{d})$

(b) $(\vec{a} \times \vec{b}) \times (\vec{c} \times \vec{d})$

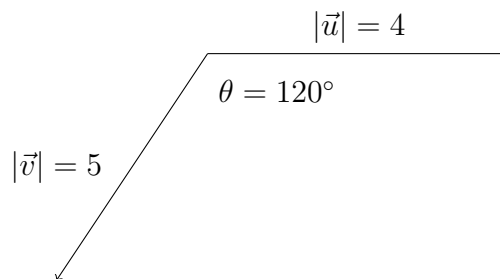
(c) $(\vec{a} \times \vec{b}) \cdot (\vec{c} \times \vec{d})$

4. Find $|\vec{u} \times \vec{v}|$ and determine if the vector is going into the page or out of the page for the following pictures

(a) **Picture 1:**



(b) **Picture 2:**



5. Find the volume of the parallelepiped determined by the points $P(3, 0, 1)$, $Q(-1, 2, 5)$, $R(5, 1, -1)$, and $S(0, 4, 2)$.