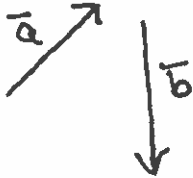


Show all work. Incomplete answers may receive little or no credit.

1. The vectors \mathbf{a} and \mathbf{b} are shown. Suppose $|\mathbf{a}| = 5$, $|\mathbf{b}| = 8$, and the angle between them is $\theta = 2\pi/3$. Find $|\mathbf{a} \times \mathbf{b}|$ and determine whether $\mathbf{a} \times \mathbf{b}$ is directed into the page or out of the page.



2. Suppose \mathbf{u} , \mathbf{v} , and \mathbf{w} are nonzero vectors, while c is a nonzero real number. For each of the following expressions does it make sense (Yes or No)? If not, state briefly why not.

(a) $\mathbf{u} \cdot (\mathbf{v} \cdot \mathbf{w})$ Yes No

(b) $\mathbf{u} \cdot (\mathbf{v} \times c)$ Yes No

(c) $c\mathbf{u} \times c\mathbf{w}$ Yes No

3. (a) Find parametric equations of the line containing the points $P(1, -2, 3)$ and $Q(2, 1, 1)$.

(b) Find the (x, y, z) point at which the line from part (a) intersects the xy -plane.