

1. (12 points)

a. Given that $\vec{a} = \langle 2, -1 \rangle$ and $\vec{b} = \langle 1, 2 \rangle$, find $\|2\vec{a} - \vec{b}\|$.

b. Find a vector perpendicular to the vector $\vec{c} = \langle 6, 4 \rangle$.

c. Find the work done by the constant force $\vec{F} = \langle 2, 3 \rangle$ in moving an object along the line segment from the point $P = (1, 2)$ to the point $Q = (-1, 5)$.

2. (8 points)

a. Find the area of the triangle with vertices $P = (1, 2, 3)$, $Q = (2, 1, -1)$ and $R = (3, -1, 2)$.

b. Find the volume of the parallelepiped determined by the vectors

$$\vec{a} = \langle 1, 2, 3 \rangle, \quad \vec{b} = \langle 2, 1, -1 \rangle, \quad \vec{c} = \langle 3, 2, 1 \rangle.$$