

MAT267 Quiz 2

- Let points $A = (2,7,-3)$, $B = (-4,3,5)$ and $C = (1,9,2)$.
 - Find the cross product of vectors \mathbf{AB} and \mathbf{AC} . (5 pts, all or nothing, check your answer!)
 - Find the area of the triangle formed by the points A, B and C. Leave answer in exact (radical) form, although the radical does not need to be reduced. (2 pts)
- A force of 5 N is applied horizontally to an object moving up a ramp 2 m long at an angle of 20° . Find the work performed. (3 pts)

Key:

1. $\mathbf{AB} = \langle -6, -4, 8 \rangle$, $\mathbf{AC} = \langle -1, 2, 5 \rangle$. $\mathbf{AB} \times \mathbf{AC} = \begin{vmatrix} \mathbf{i} & \mathbf{j} & \mathbf{k} \\ -6 & -4 & 8 \\ -1 & 2 & 5 \end{vmatrix} = \begin{vmatrix} -4 & 8 \\ 2 & 5 \end{vmatrix} \mathbf{i} - \begin{vmatrix} -6 & 8 \\ -1 & 5 \end{vmatrix} \mathbf{j} + \begin{vmatrix} -6 & -4 \\ -1 & 2 \end{vmatrix} \mathbf{k}$.

Thus, $\mathbf{AB} \times \mathbf{AC} = \langle -36, 22, -16 \rangle$.

The area is $|\mathbf{AB} \times \mathbf{AC}| = \sqrt{(-36)^2 + (22)^2 + (-16)^2} = \frac{1}{2}\sqrt{2036}$.

2. $W = Fd = 3(2 \cos 20) = 5.638$ J. Using vectors, $\mathbf{F} = \langle 3, 0 \rangle$, $\mathbf{d} = \langle 2 \cos 20, 2 \sin 20 \rangle$, so $\mathbf{F} \cdot \mathbf{d} = 3(2 \cos 20)$.