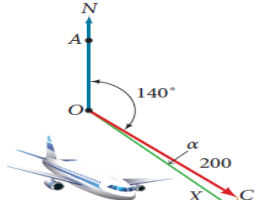


1. Goals



By the end of this unit, students will:

- understand the concepts and techniques in vectors, complex numbers, functions and graph sketching
- apply reasoning skills and solve problems in vectors, complex numbers, functions and graph sketching
- communicate their arguments and strategies when solving problems
- construct proofs of results
- interpret mathematical information and ascertain the reasonableness of their solutions to problems.

This week:

Vectors in three dimensions

The algebra of vectors in three dimensions:

- Scalar and Vector Products
- prove geometric results in the plane and construct simple proofs in three-dimensions.

2. Theoretical Components

Notes and examples are in Google Classroom – check the WK11 folder.

Vector Products – notes/examples:

<https://bit.ly/3UdqP4p>

Cross Product:

<https://bit.ly/3KBXe1k>

Video on Cross Product:

<https://bit.ly/3nJJeJX>

<https://bit.ly/3m7il2g>

3. Practical Components

Ex 15H: 2, 3, 5.

Ex 15I: 5.

Ex 15J.1: 4, 5(c,d), 7, 9, 12

Ex15K.1: 1,2,5,9,13

4. Investigation

A: Investigate how vector products can be used to calculate the volume of a parallelepiped. Then prove that volume of a tetrahedron is 1/3 times the volume of a parallelepiped?

B: If $|\mathbf{a}| = 3$, $|\mathbf{b}| = \sqrt{7}$ and $\mathbf{a} \times \mathbf{b} = \mathbf{i} + 2\mathbf{j} - 3\mathbf{k}$ find:

- $\mathbf{a} \cdot \mathbf{b}$
- The area of the triangle AOB given that $\overrightarrow{OA} = \mathbf{a}$ and $\overrightarrow{OB} = \mathbf{b}$
- the volume of the tetrahedron OABC if C is the point (1, -1, 2)

20 marks

5.QFO

Quiz/Forum/Other

Vectors in aviation:

<https://www.youtube.com/watch?v=7tWOyOu-QG4>