

1. Goals

By the end of this unit, students will:

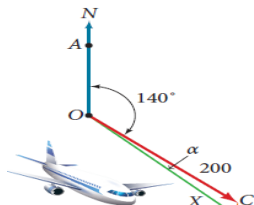
- understand the concepts and techniques in vectors, complex numbers, functions and graph sketching
- apply reasoning skills and solve problems in vectors, complex numbers, functions and graph sketching
- communicate their arguments and strategies when solving problems
- construct proofs of results
- 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:

- review the concepts of vectors from Unit 1 and extend to three dimensions including introducing the unit vectors i , j and k .
- 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 WK09 folder.

Vectors in 3D: <https://goo.gl/eWD1E>

<https://goo.gl/HDI3yr>

Look at this site and [land the Cessna](http://www.intmath.com/vectors/4-adding-vectors-2-dimensions.php)
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3D Cartesian Coordinate System:

- <https://goo.gl/QjSnxr>

Position Vectors (3D):

- <https://goo.gl/a0rp9j>

Scalar Product (3D):

- <https://goo.gl/dIbb7S>

Distance between 2 points (3D):

- <https://goo.gl/b3cQej>

Geometric Proofs:

- <https://goo.gl/waQKvb>

3. Practical Components

To review your work on Vectors:

Attempt a few questions

- C7 Vectors Review
- Vectors Intro 2D_3D
- Vectors Booklet

Then, attempt questions from:

- Vectors in Geometry
- Ex3C Vectors in 3D

4. Investigation

See next page!

20 marks

5.QFO

Quiz/Forum/Other

Do you vectors in use here? <https://www.youtube.com/watch?v=PHXLj-5z2EU>

PART A:

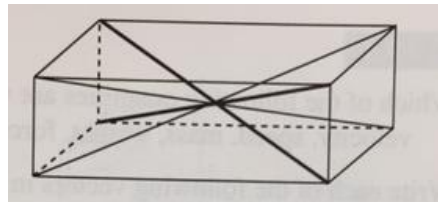
Laura is leading a group for two hiking parties that have been lost for a week. She locates one party 27 km east of their starting point and recognises the unconscious leader, Rob. All members of the party are unconscious. Laura finds these two notes on Rob.



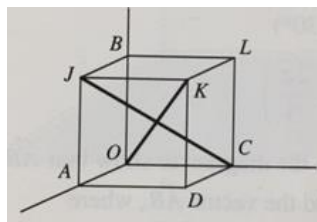
Where should Laura search for Mark's party?

PART B

For any rectangular prism a space diagonal is a line from one vertex to the vertex opposite. There are four space diagonals.



Toby investigated the relationships between the space diagonals of a cube and was surprised to find that the diagonals OK and JC were not perpendicular to one another.



Under what conditions will the space diagonals OK and JC be perpendicular to one another? Working out must be clear and logical.

