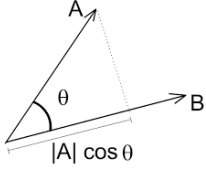


1. Goals



By the end of this unit, students:

- understand the concepts and techniques in combinatorics, geometry and vectors
- apply reasoning skills and solve problems in combinatorics, geometry and vectors
- communicate their arguments and strategies when solving problems
- construct proofs in a variety of contexts including algebraic and geometric
- interpret mathematical information and ascertain the reasonableness of their solutions to problems.

This week's focus:

- Geometric proof using vectors

2. Theoretical Components

STEP 1:

Readings:

Examples: <https://bit.ly/3GvOEOg>

Video examples:

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

<https://bit.ly/3GmdOi0>

<https://bit.ly/3z2n9dw>

3. Practical Components

STEP 2:

Ex. 6A: attempt all the odd numbered questions.

Optional: you may also attempt the even numbered questions for additional fun!

4. Investigation

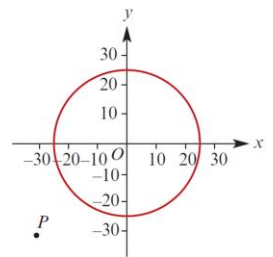
This is a short week so there is no Investigation problem. You will enjoy this problem though:

Let $\begin{bmatrix} 1 \\ 0 \end{bmatrix}$ represent a displacement 1 km due east.

Let $\begin{bmatrix} 0 \\ 1 \end{bmatrix}$ represent a displacement 1 km due north.

The diagram shows a circle of radius 25 km with centre at $O(0,0)$. A lighthouse entirely surrounded by sea is located at O . The lighthouse is not visible from points outside the circle.

A ship is initially at point P , which is 31 km west and 32 km south of the lighthouse.



a Write down the vector \vec{OP} .

The ship is travelling in the direction of vector $\mathbf{u} = \begin{bmatrix} 4 \\ 3 \end{bmatrix}$ with speed 20 km/h.

An hour after leaving P , the ship is at point R .

b Show that $\vec{PR} = \begin{bmatrix} 16 \\ 12 \end{bmatrix}$ and hence find the vector \vec{OR} .

c Show that the lighthouse first becomes visible when the ship reaches R .

5. QFO

Quiz/Forum/Other

Review: <https://bit.ly/3arSVGr>