

### APPLICATIONS HOMEWORK 3

#### Non Calculator:

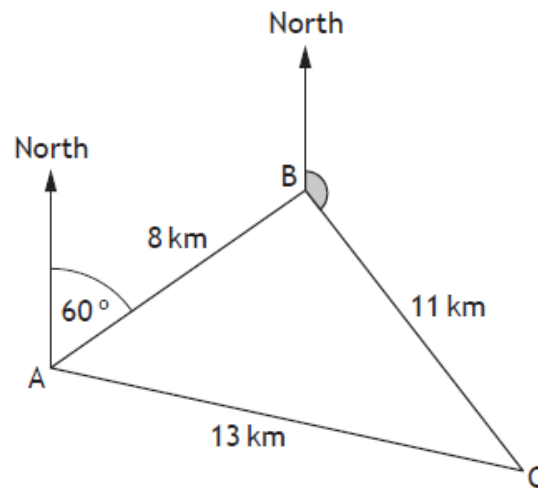
Find the resultant vector  $2\mathbf{u} - \mathbf{v}$  when  $\mathbf{u} = \begin{pmatrix} -2 \\ 3 \\ 5 \end{pmatrix}$  and  $\mathbf{v} = \begin{pmatrix} 0 \\ -4 \\ 7 \end{pmatrix}$ .

Express your answer in component form.

2

#### Calculator:

In a race, boats sail round three buoys represented by A, B, and C in the diagram below.



B is 8 kilometres from A on a bearing of  $060^\circ$ .

C is 11 kilometres from B.

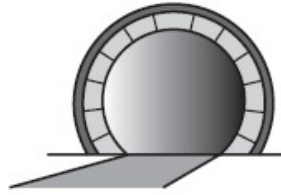
A is 13 kilometres from C.

(a) Calculate the size of angle ABC.

3

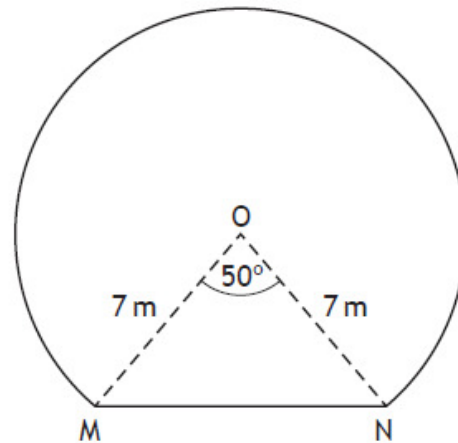
**Challenge Question:**

The picture shows the entrance to a tunnel which is in the shape of part of a circle.



The diagram below represents the cross-section of the tunnel.

- The centre of the circle is O.
- MN is a chord of the circle.
- Angle MON is  $50^\circ$ .
- The radius of the circle is 7 metres.



Calculate the area of the cross-section of the tunnel.

5