

Notes:

In these questions, you have to either insert the diagram or make up a question based on the diagram and then solve it. Question 4 is left blank for you to make one up yourself.

Question: 1

Two ships, A and B, set out from a port O simultaneously. A travels due north at 16kmh^{-1} , B due east at 13kmh^{-1} . Find the magnitude and direction of \overrightarrow{BA} after 1 hour.

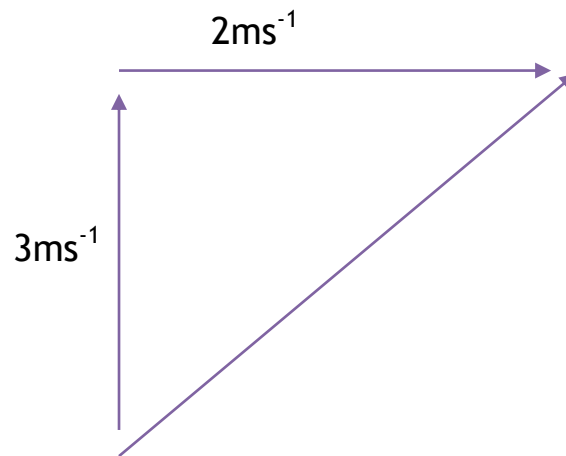
Diagram:

Finding the distance, magnitude:

Find the direction:

Question: 2

Diagram:

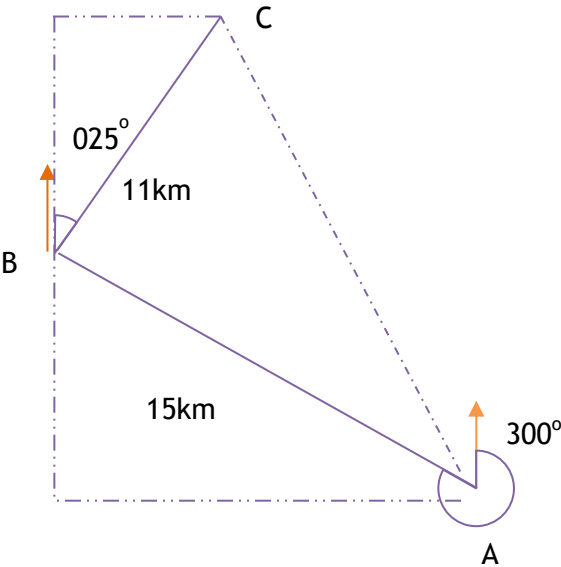


Finding the distance, magnitude:

Find the direction:

Question: 3

Diagram:



Finding the speed, magnitude:

Find the direction:

Question: 4

Diagram:

Finding the magnitude:

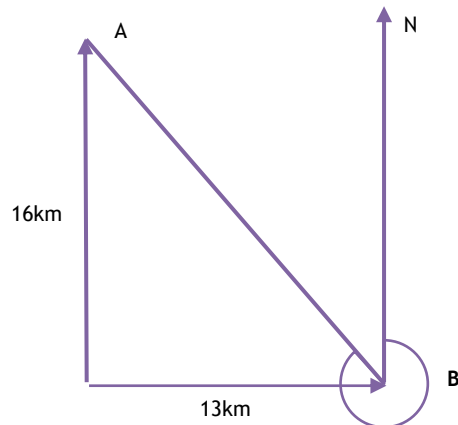
Find the direction:

Answers (various possibilities for 2 and 3)

Question: 1

Two ships, A and B, set out from a port O simultaneously. A travels due north at 16kmh^{-1} , B due east at 13kmh^{-1} . Find the magnitude and direction of \overrightarrow{BA} after 1 hour.

Diagram:



Finding the distance, magnitude:

$$\sqrt{16^2 + 13^2} = 20.61 \dots \approx 20.6\text{km}$$

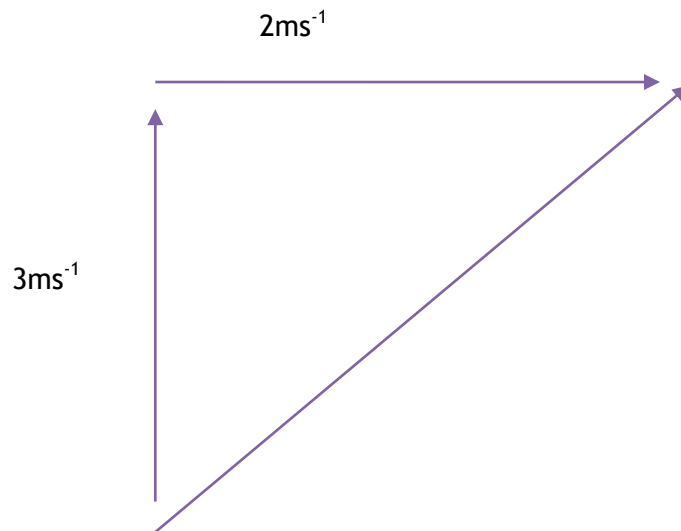
Find the direction:

$$\tan^{-1}\left(\frac{13}{16}\right) \approx 39.09^\circ$$

So bearing $\approx 321^\circ$

Question: 2

A bird flies at 3ms^{-1} in a northerly direction but there is a wind blowing from the west at 2ms^{-1} . What is the actual speed and direction of the bird's travel?

Diagram:**Finding the speed, magnitude:**

$$\sqrt{3^2 + 2^2} = 3.605 \dots \approx 3.61\text{ms}^{-1}$$

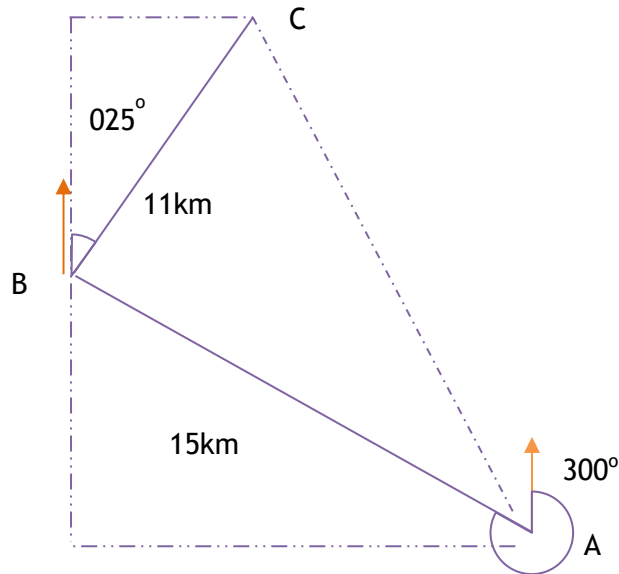
Find the direction:

$$\tan^{-1}\left(\frac{2}{3}\right) \approx 33.69 \dots^\circ$$

So bearing $\approx 034^\circ$

Question: 3

B is 15km from A on a bearing of 300° . C is 11km from B on a bearing of 025° . What is the distance and bearing of C from A?



Finding the distance, magnitude:

$$ABC = 180 - 60 - 25 = 95^\circ$$

$$\text{So } AC = \sqrt{15^2 + 11^2 - 2 \times 15 \times 11 \cos 95^\circ}$$

$$= 19.35 \dots \approx 19.4 \text{ km}$$

Find the direction:

$$25 + 95 = 120^\circ$$