GCSE MATHEMATICS
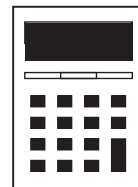# Bearings

AQA These questions have been taken or modified from previous AQA GCSE Mathematics Papers.

Instructions
- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Answer **all** questions.
- You must answer the questions in the spaces provided.
- If your calculator does not have a π button, take the value of π to be 3.14 unless another value is given in the question.

Information
- The marks for questions are shown in brackets.
- The quality of your written communication is specifically assessed in questions that are indicated with an asterisk (*).

Advice
- Read each question carefully before you start to answer it.
- In all calculations, show clearly how you work out your answer.
- Use the number of marks for the question as a guide to the amount of time you need to spend.
- Look at previous parts of the question, e.g. a), b), c) i) as there may be information there you need to answer later parts.
- Check your answer is realistic and appropriate.
- For calculator decimal numbers always write your full calculator display in the working out area and then, if you need to, round the answer on the answer line.

www.thecalculatorguide.com

1 Here is a map.
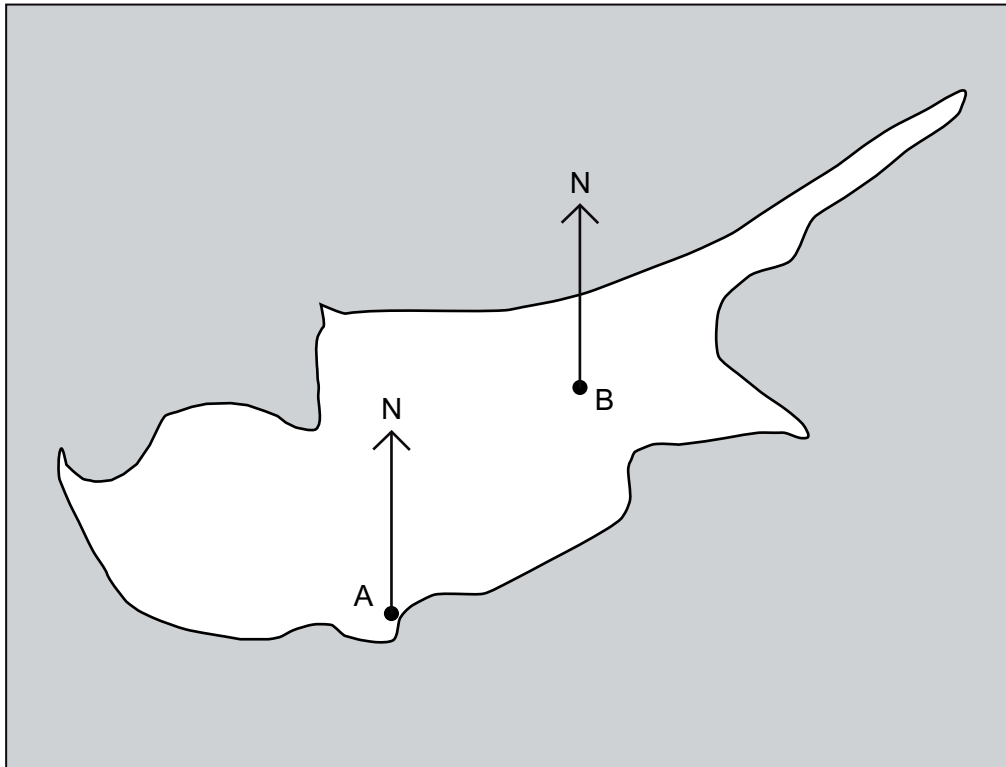
Measure and write down the three-figure bearing of B from A.

[2 marks]

Answer .... °

2 The diagram shows a map of Poland.

N

● Gdansk

● Poznan   ● Warsaw

● Krakow

Choose one of the following three-figure bearings to complete each sentence correctly.

045º   090º   035º   180º

225º   270º   315º   360º

2 (a) The bearing of Krakow from Gdansk is ....

[1 mark]

2 (b) The bearing of Gdansk from Poznan is ....

[1 mark]

3
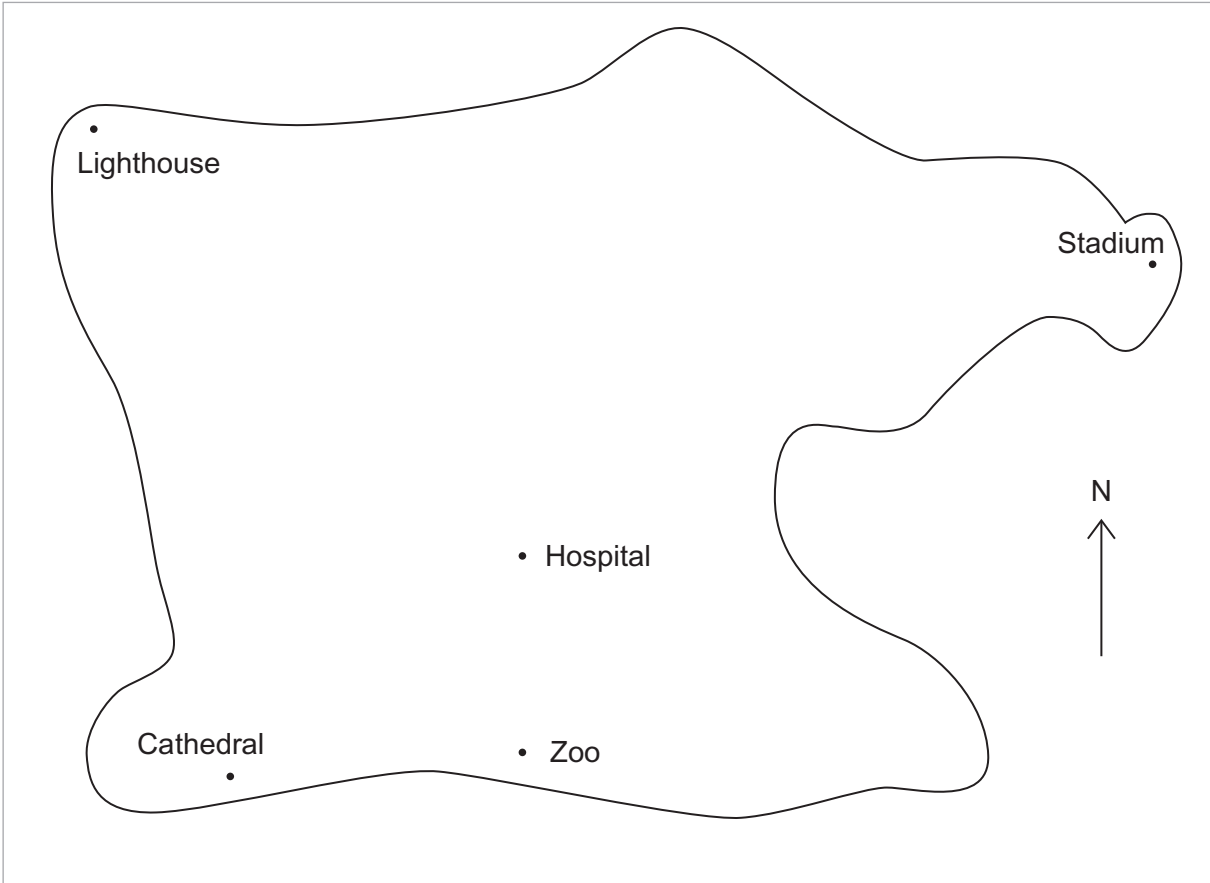
3 (a)   What is South of the Hospital?

Answer ....   *(1 mark)*

3 (b)   What is South-East of the Lighthouse?

Answer ....   *(1 mark)*

3 (c)   Measure the three-figure bearing of the Stadium from the Hospital.

Answer .... °   *(2 marks)*

3 (d)   The airport is on a bearing of 040º from the Hospital and 270º from the Stadium.

Mark the position of the Airport on the map.

(3 marks)

4 The map shows the cities Coventry (*C*), Gloucester (*G*) and Exeter (*E*).
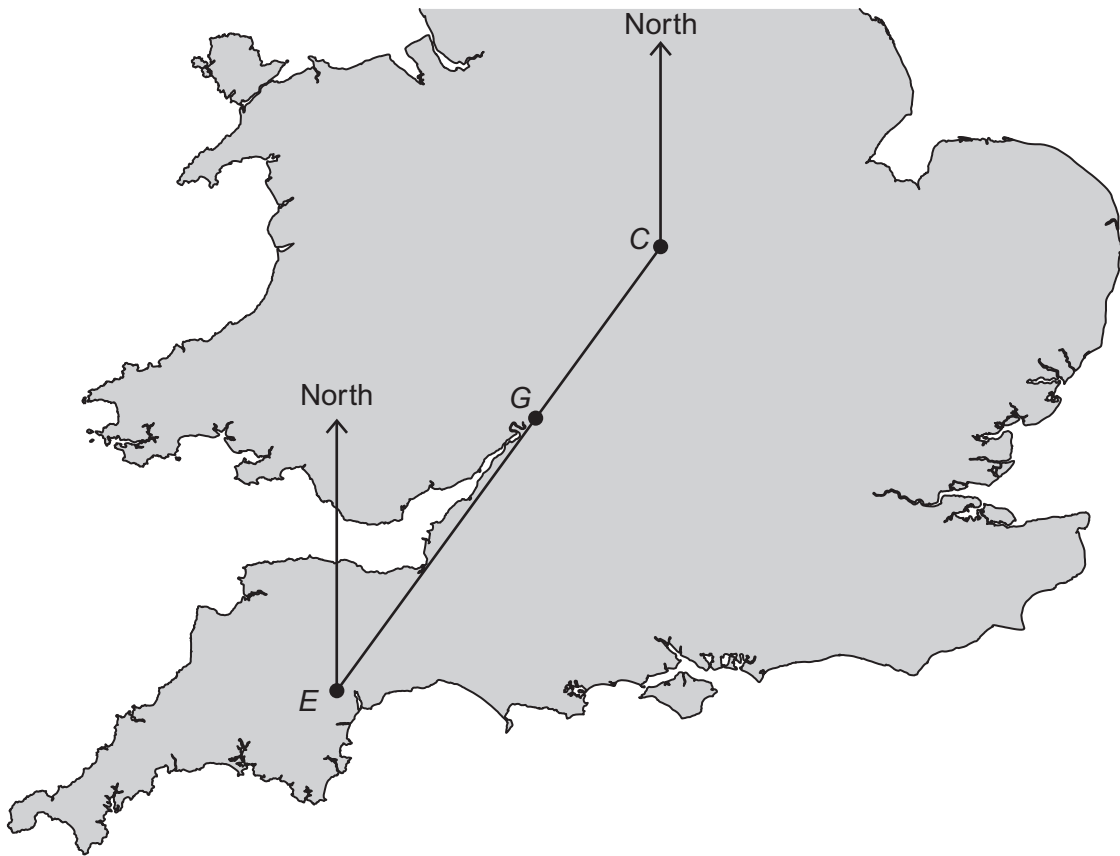
EGC is a straight line.
The bearing from Exeter to Coventry is 036°

4 (a) What is the bearing from Gloucester to Coventry?

[1 mark]

Answer .... °

4 (b) Work out the bearing from Coventry to Exeter.

[2 marks]

....

....

Answer .... °

5   The diagram shows the positions of six chairs in a classroom.
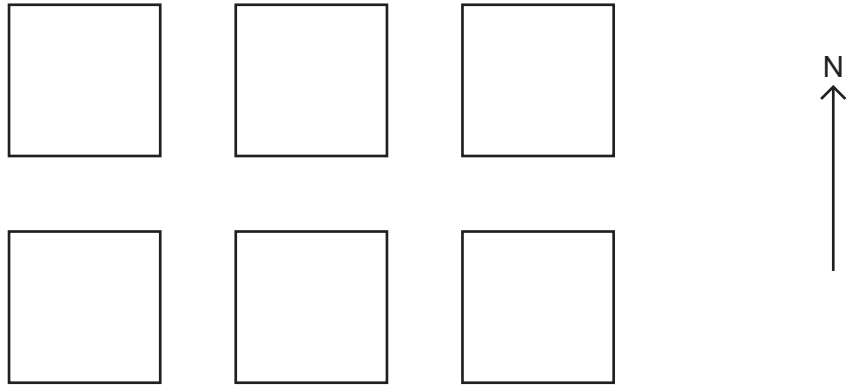
Five students are sitting on the chairs so that

    Ben is on a bearing of 045º from Adam

    Cath is on a bearing of 090º from Ben

    Darren is on a bearing of 135º from Emily.

On the plan below, show where each student is sitting.

[3 marks]

Answer
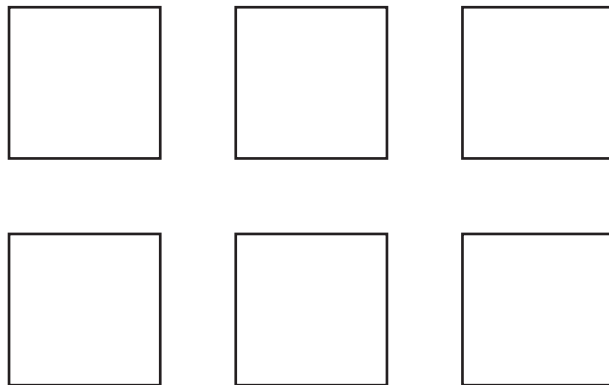
6   The diagram shows two aircraft, *A* and *B*, travelling in opposite directions.

B

A
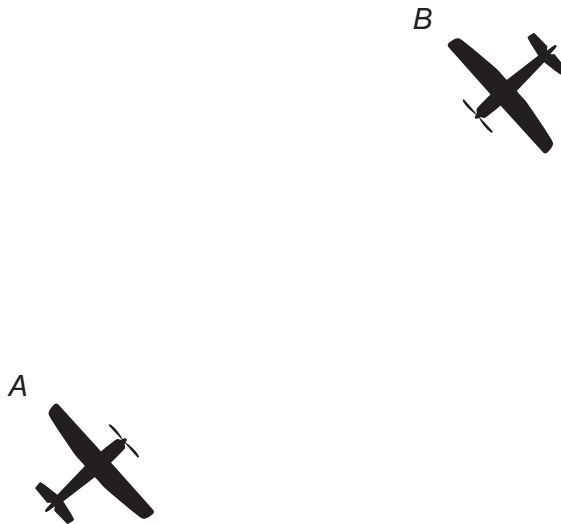
Aircraft *B* is on a bearing of 225º

6 (a)   Work out the three-figure bearing of aircraft *A*.

[2 marks]

....

....

            Answer .... º

6 (b)   Aircraft *B* turns 60º clockwise.

Work out the new three-figure bearing of aircraft *B*.
Circle your answer.

[1 mark]

           105º   165º   285º   345º

7 A and B are two towns.
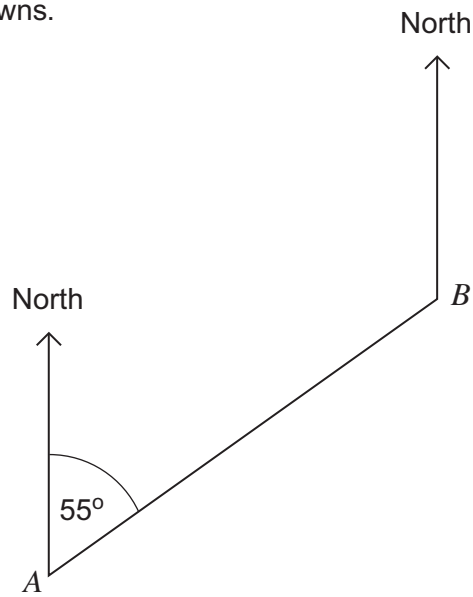
Here is a formula for working out the bearing of A from B.

$$T = F + 180º$$

where T is the bearing of A from B

and F is the bearing of B from A

7 (a)   Use the diagram and the formula to work out the bearing of A from B.

....

....

Answer .... º   *(2 marks)*

7 (b)   Give a reason why the formula can only be used for $0º < F \leqslant 180º$

....

....
    (1 mark)

7 (c)   The bearing of C from D is 342°.
    Work out the bearing of D from C.

....

....

Answer .... º   *(2 marks)*

8   A ship leaves port A and travels 9 km on a bearing of 120° to point B.
The ship then turns and travels 12 km on a bearing of 030° to point C.
This journey is shown on the scale drawing below.

Scale: 1cm represents 1km
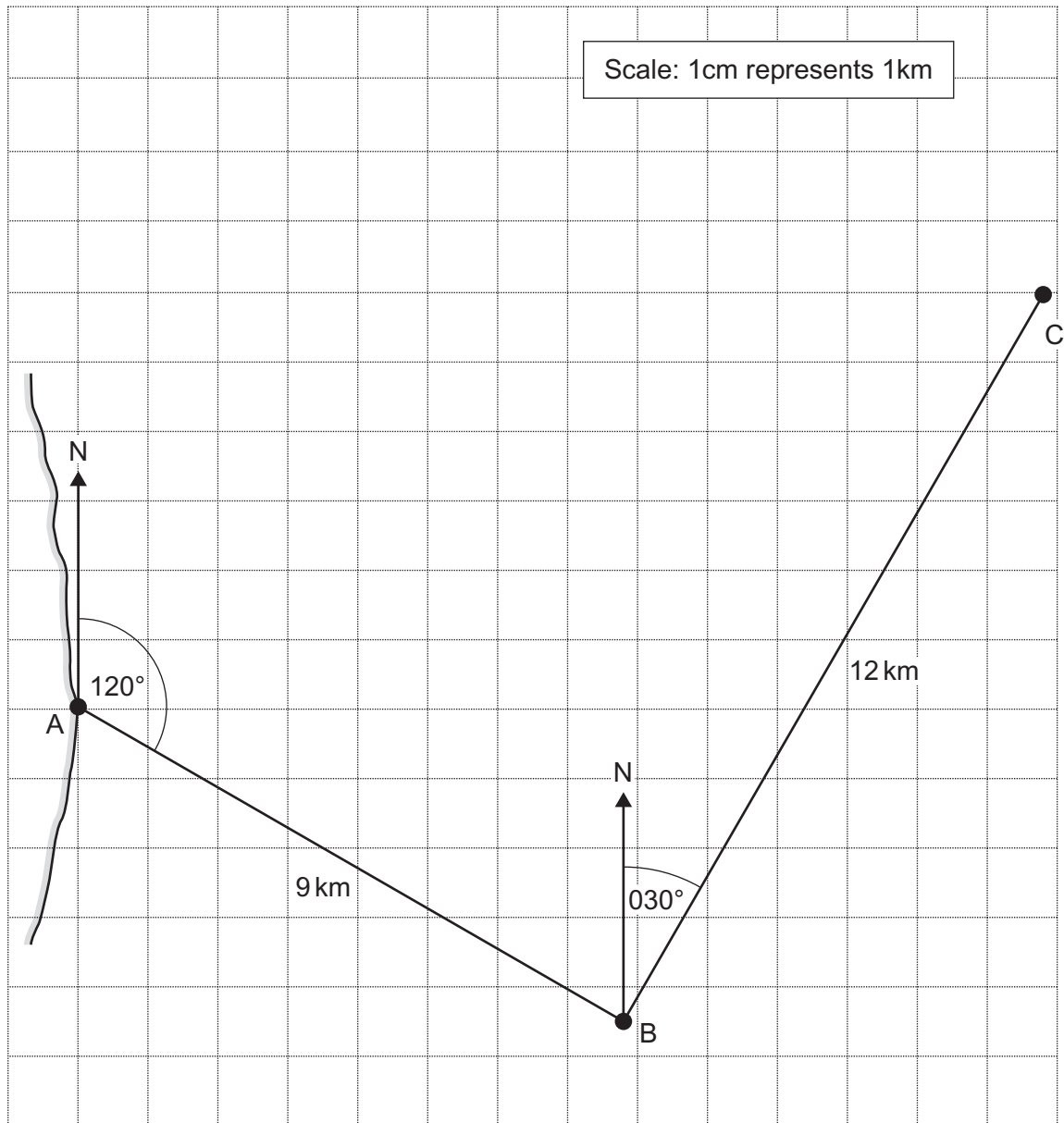
The ship then turns and travels directly back from C to A.

Use a ruler and protractor to work out the distance and bearing of the journey
from C to A

Distance .... km

Bearing.. °   *(3 marks)*

9 Here is a map of Sardinia.

Scale: 1 cm represents 25 km
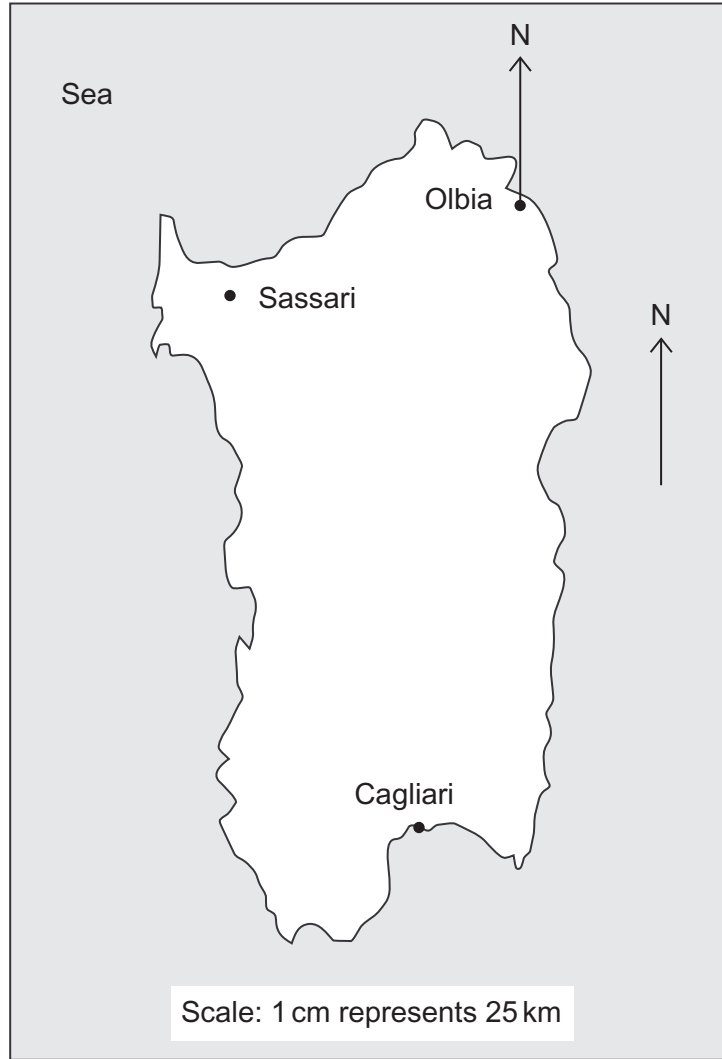
9 (a) Work out the **actual** distance between Cagliari and Sassari. **[3 marks]**

....

....

....

Answer .... km

9 (b) Mario's favourite beach is on a bearing of 165° from Olbia.

Draw this bearing and mark with a cross the position of the beach.

[2 marks]

10 The scale diagram shows the positions of ship A and ship B at 9 am

Scale 1 cm represents 5 km

North
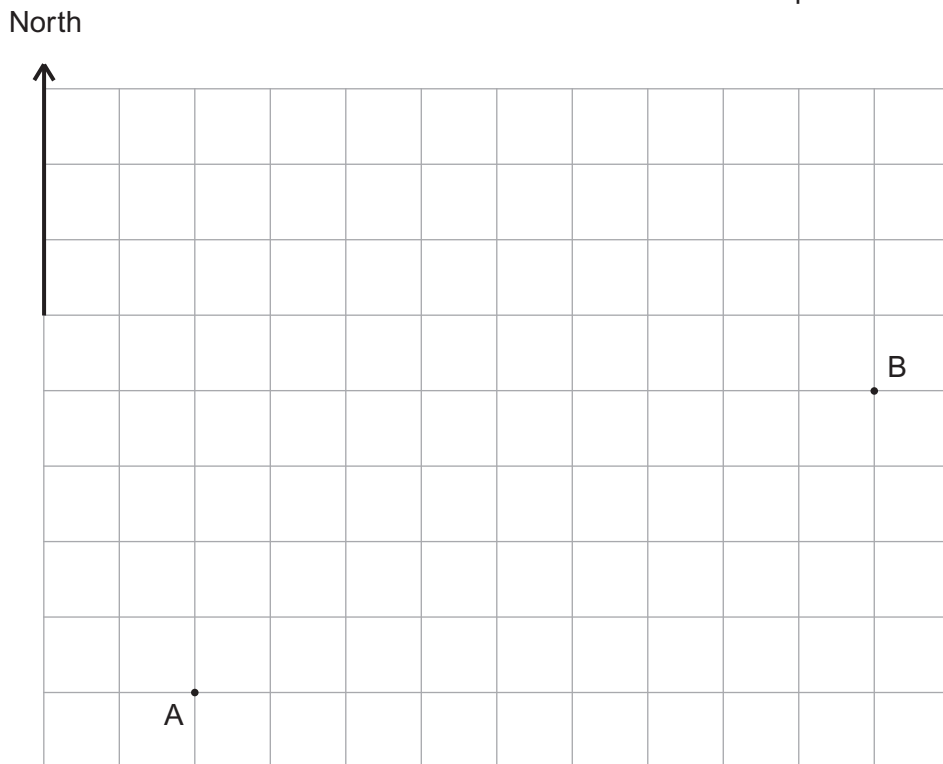
Ship A is travelling on a bearing of 045°

Ship B is travelling on a bearing of 270°

10 **(a)** On the diagram, show the point where the paths of the ships cross.
Label the point P.
You **must** show the path of each ship.

[2 marks]

10 **(b)** A lighthouse is

- 35 km from where ship A is at 9 am
- 40 km from where ship B is at 9 am

Using compasses, show the position of the lighthouse on the diagram.
Label the point L.

[2 marks]

11   Use a protractor, a ruler and compasses in this question.

A ship starts at *P* and sails directly to an island on a bearing of 115º
The island is 30 kilometres from *Q*.

On the scale drawing, show the **two** possible positions of the island.

Scale   1 cm represents 5 km
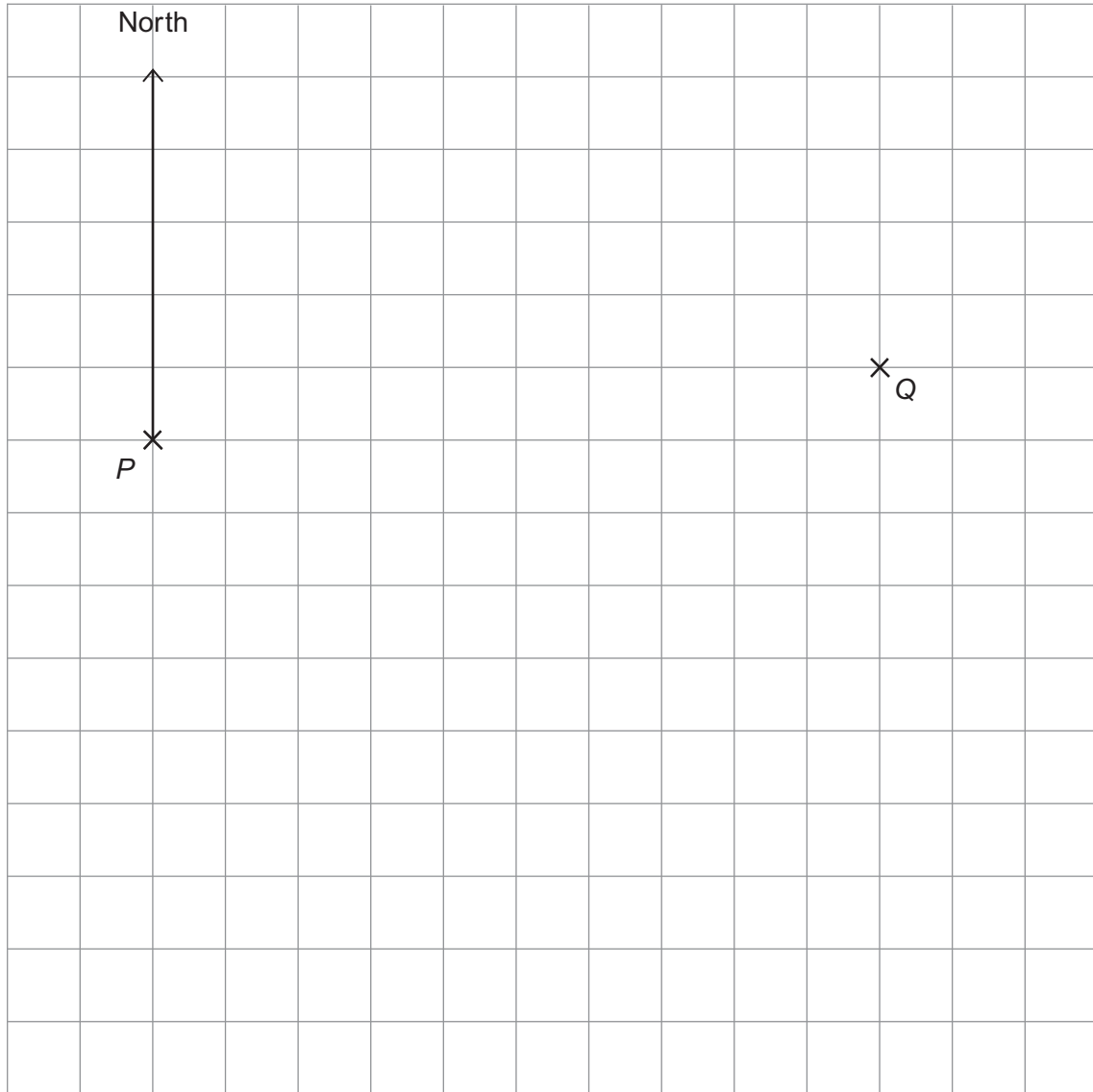
[3 marks]

12 (a) Ship *A* and Ship *B* are both travelling to port *C*.
The positions of the ships are shown.

Ship *A* travels on a bearing of 142º.
Ship *B* travels on a bearing of 255º.

Show the position of *C* on the diagram.

North

A ✕

✕ B
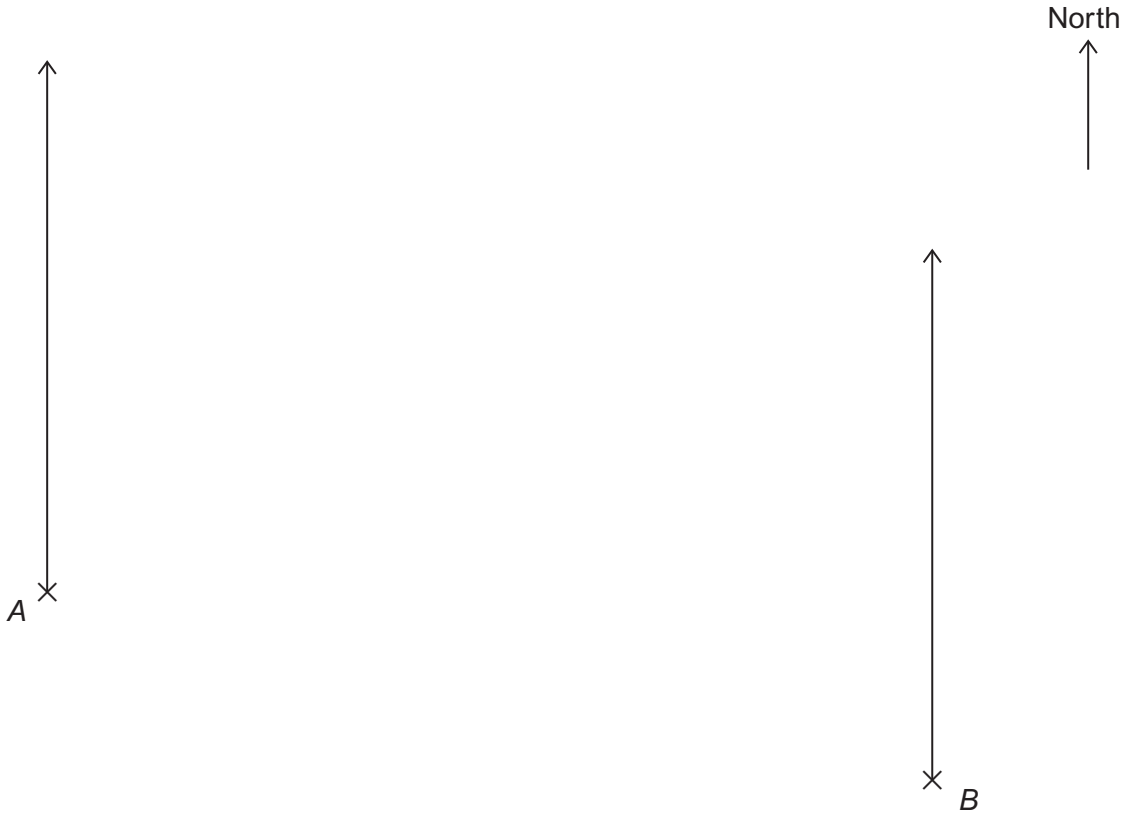
(3 marks)

12 (b)   The distance-time graphs show the journeys of two ships, *P* and *Q*.
Both ships start their journeys at 1.00 pm.
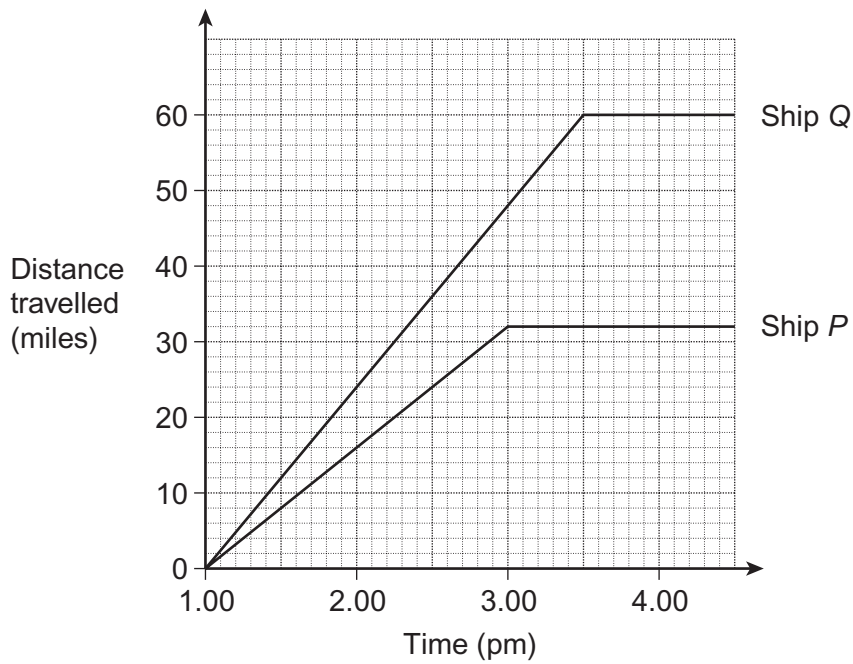
Which ship travels faster?
Work out how many miles per hour faster.

....

....

....

Ship .... travels .... miles per hour faster

(2 marks)

13 The diagram shows the routes of two ships, the Liberty and the Odyssey, between three ports *A*, *B* and *C*.

Scale: 1 cm represents 10 km
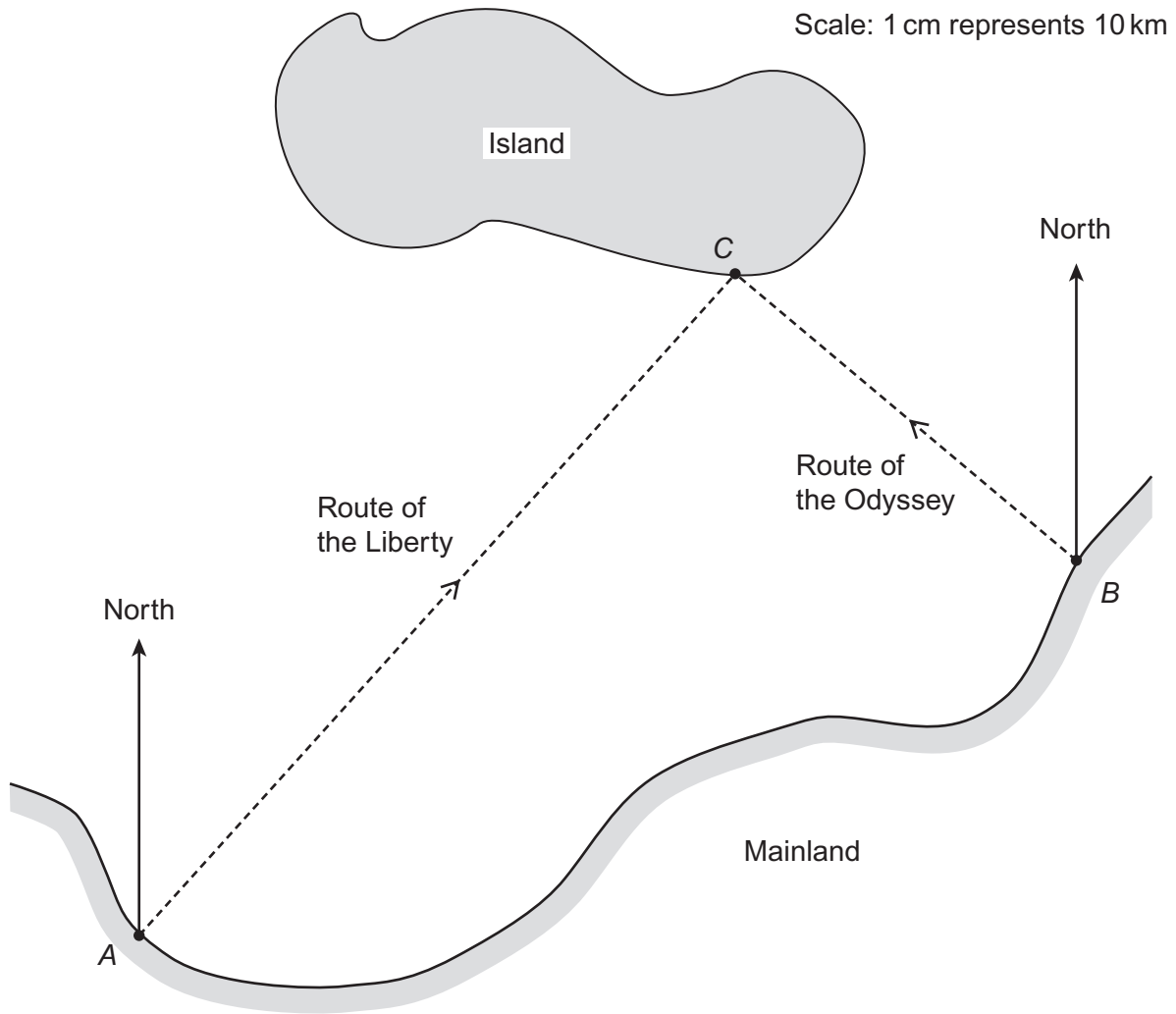
13 (a) On what bearing does Liberty sail to port *C* from port *A*?

....

Answer .... degrees   *(1 mark)*

13 (b) Liberty leaves port *A* at 2 pm and arrives at port *C* at 4 pm.
Odyssey sails at twice the speed of Liberty.
Both ships arrive at port *C* at the same time.

At what time does Odyssey leave port *B*?

....

....

....

....

Answer ....   *(4 marks)*

14 The scale diagram shows the positions of Ship A and Ship B at 10:00

North
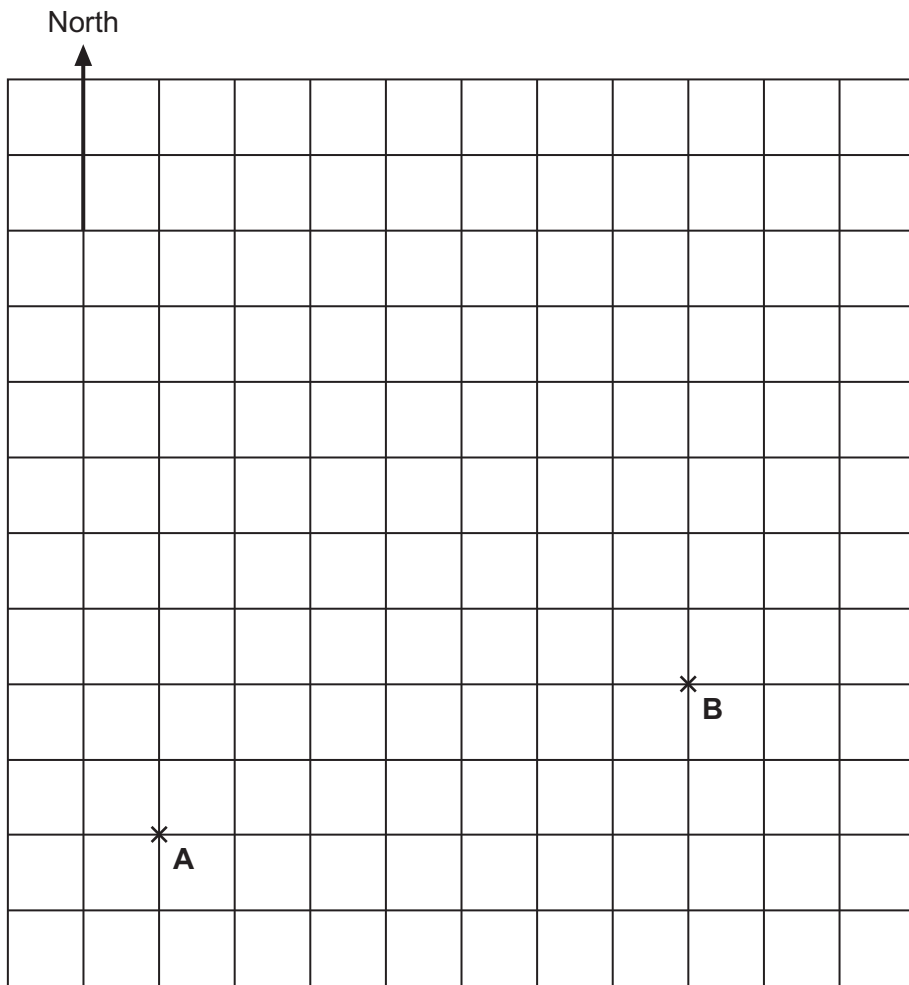
Scale: 1 centimetre represents 2 kilometres

14 (a) Ship A is travelling on a bearing 060º
Ship B is travelling on a bearing of 315º
The ships are travelling at the same speed.

Draw accurate lines on the grid to show the movement of the ships.

Will the ships hit each other?
Give a reason for your answer.

....

....

....

(3 marks)

14 (b)   The scale diagram is redrawn below showing the positions of the ships at 10:00
A lighthouse is 20 km from Ship A and 12 km from Ship B.

Use a ruler and compasses to find the position of the lighthouse.
Label the lighthouse, *L*.

Scale: 1 centimetre represents 2 kilometres
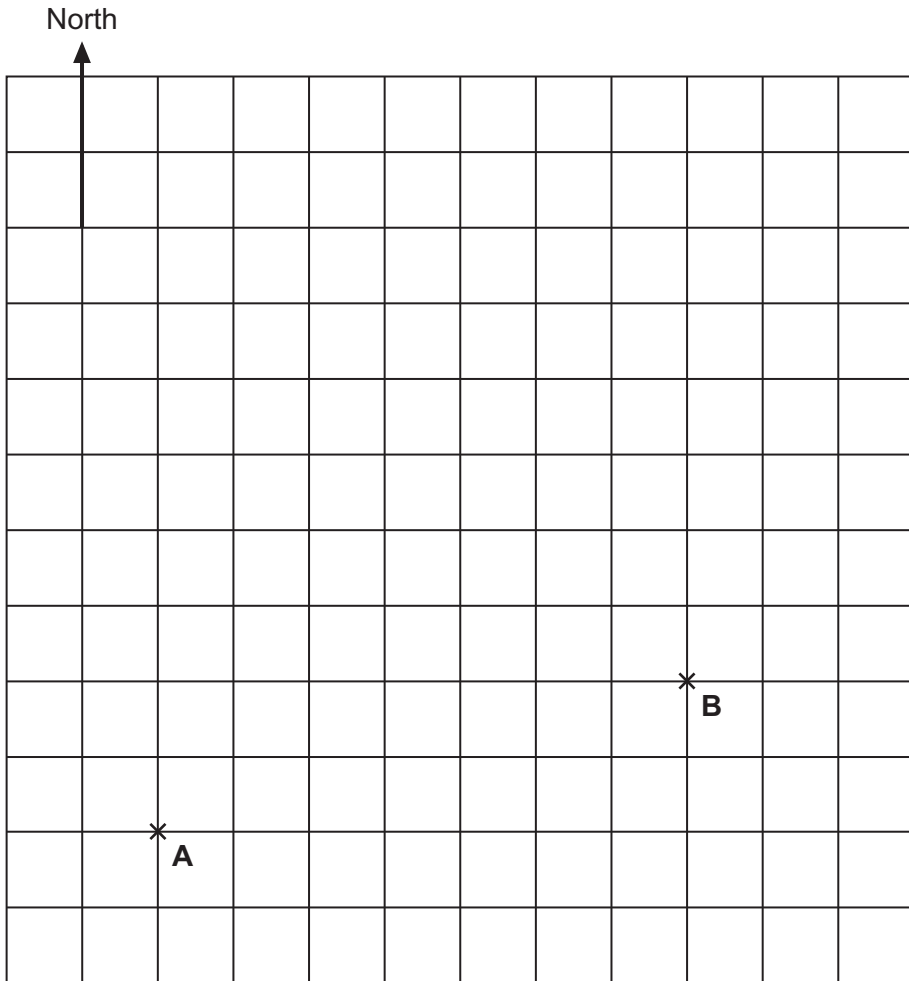
North

(3 marks)

15   At 9 am two ships, *A* and *B*, leave port *P*.

Ship *A* travels due East.

Ship *B* travels on a bearing of 129º at a constant speed.

At 11.30 am Ship *A* is 60 km from *P* and due North of Ship *B*, as shown on the diagram.

Work out the speed of Ship *B*.

[4 marks]

....

....

....

....

....

....

....

Answer .... km/h

16   The diagram shows ports *A* and *B* and the paths of two ships, *X* and *Y*.

North

120°

B

Path of ship *Y*

Not drawn
accurately

55 miles

Path of ship *X*

60°

A
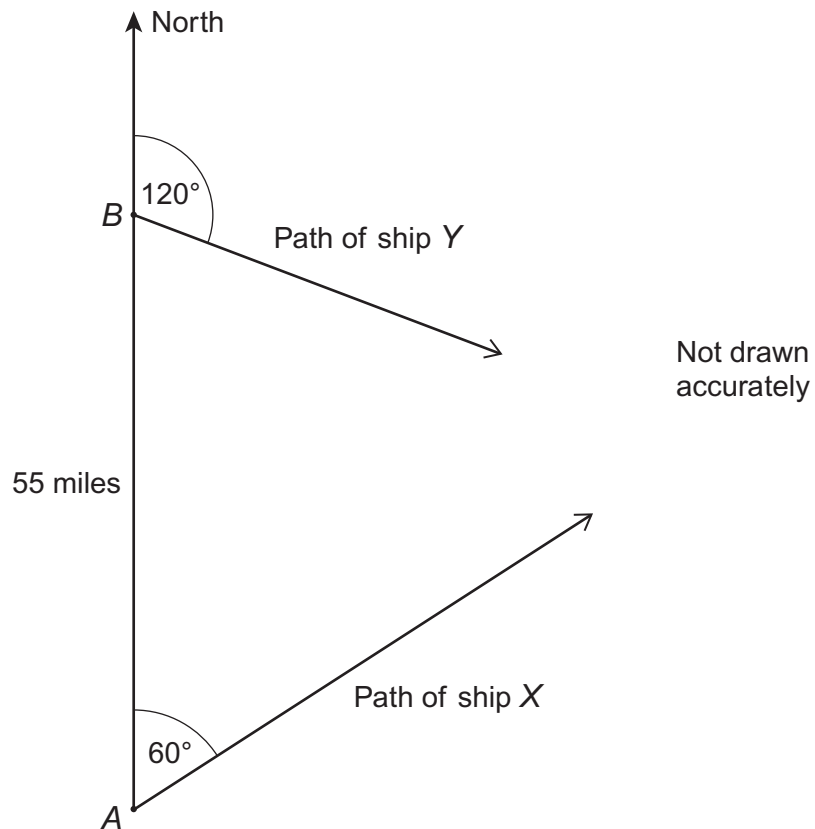
Port *A* is South of port *B*.
The distance from *A* to *B* is 55 miles.

16 (a)   Ship *X* leaves port *A* at 3.00 pm.
It sails on a bearing of 060º at a speed of 25 miles per hour.
This sketch shows where ship *X* is at 5.00 pm.

North

Distance East

X

Not drawn accurately

Distance North

60°

A
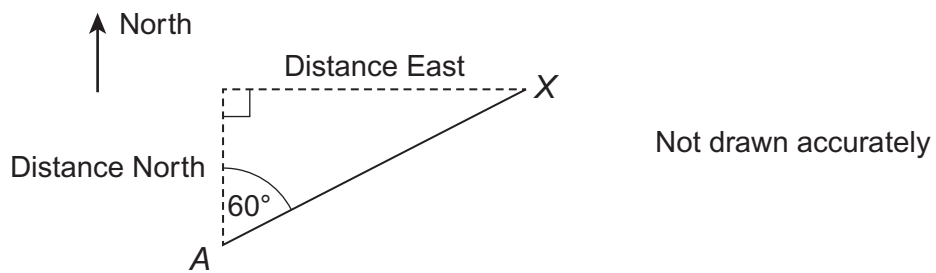
16 (a) (i)   How far is ship *X* from port *A* at 5.00 pm?

....

....

Answer... miles   *(2 marks)*

16 (a) (ii) How far East and how far North is ship *X* from port *A* at 5.00 pm?

....

....

....

....

....

....

Answer   Distance East = ... miles

Answer   Distance North = ... miles   *(4 marks)*

16 (b) Ship *Y* leaves port *B* at 3.30 pm.
It sails on a bearing of 120º at a speed of 28 miles per hour.

How far apart are the two ships at 5.00 pm?

....

....

....

....

....

....

....

....

....

....

....

Answer .... miles   *(7 marks)*

17 The diagram shows two points *A* and *B*.

40 m

A ×————————————□

N
↑
|
|
|

55 m

×
B
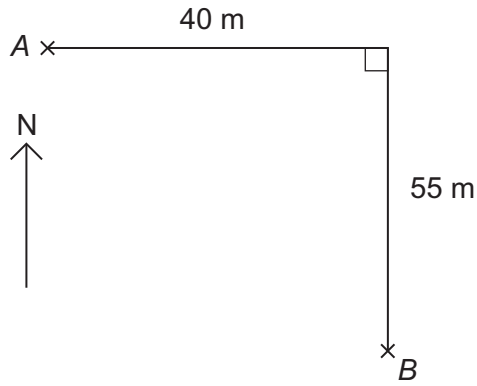
Not drawn
accurately

Work out the bearing of *B* from *A*.

[4 marks]

....

....

....

....

....

....

Answer .... °

18 You are given that   1 knot = 1 nautical mile per hour.

Two ships leave a port at the same time.

Ship A sails at 10 knots on a bearing of 035º
Ship B sails at 15 knots on a bearing of 270º

Calculate the distance between the ships after **2 hours**.
Do **not** use a scale drawing.

Not drawn
accurately

N

Ship A

Ship B   Port

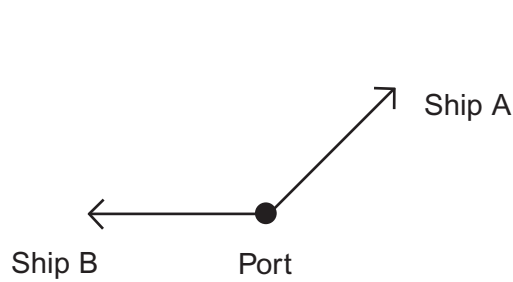...

....

....

....

....

....

        Answer .... nautical miles   *(5 marks)*