Chhetri Academy

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GCSE MATHS

Geometry and measures

Edexcel 1MA1 | Subtopic collection Topic 50

Bearings and scale drawings

Higher tier

Past paper question booklet

41	2003-2024	Higher
question groups	available papers	tier

Before you begin

1. Show working and use units where appropriate.
2. Use extra paper if you need more space.
3. Print at actual size (100%) for measurement questions.

Name _____ **Date** _____

Whole questions are retained for context; some parts cover other points. Legacy sources are labelled.

5.

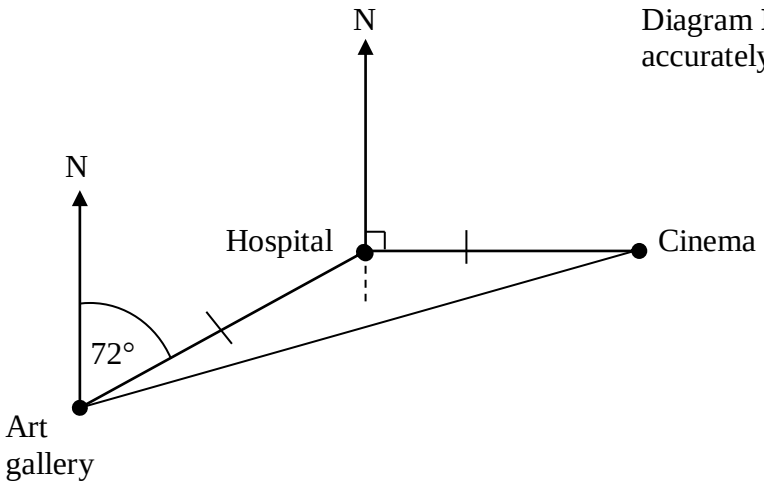


Diagram **NOT** accurately drawn

The diagram shows the position of each of three buildings in a town.
The bearing of the Hospital from the Art gallery is 072°.
The Cinema is due East of the Hospital.
The distance from the Hospital to the Art gallery is equal to the distance from the Hospital to the Cinema.

Work out the bearing of the Cinema from the Art gallery.

.....°

(3)

10. A lighthouse, L, is 3.2 km due West of a port, P.
A ship, S, is 1.9 km due North of the lighthouse, L.

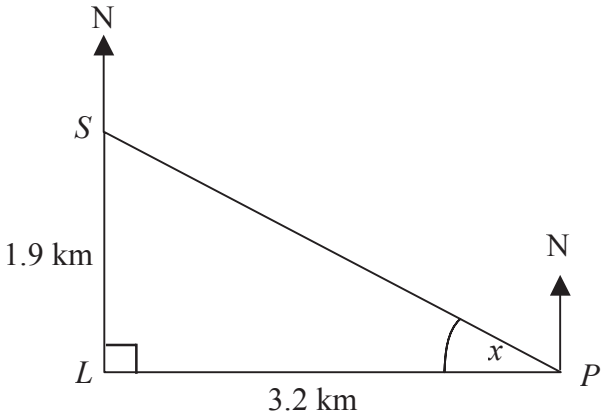


Diagram **NOT** accurately drawn

(a) Calculate the size of the angle marked x.
Give your answer correct to 3 significant figures.

$x =$ ..... °

(3)

(b) Find the bearing of the port, P, from the ship, S.
Give your answer correct to 3 significant figures.

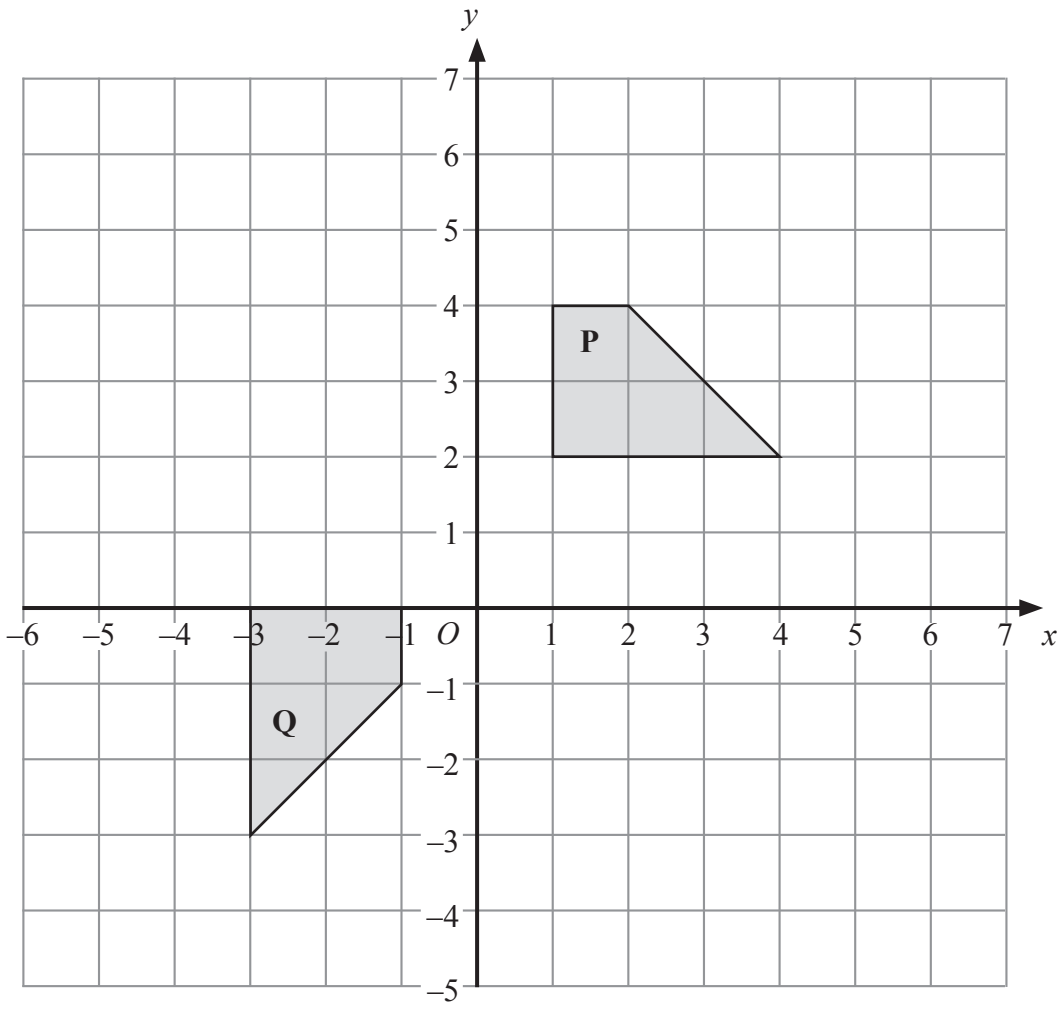
..... °

(1)

Q10

(Total 4 marks)

4.



Describe fully the single transformation that will map shape **P** onto shape **Q**.

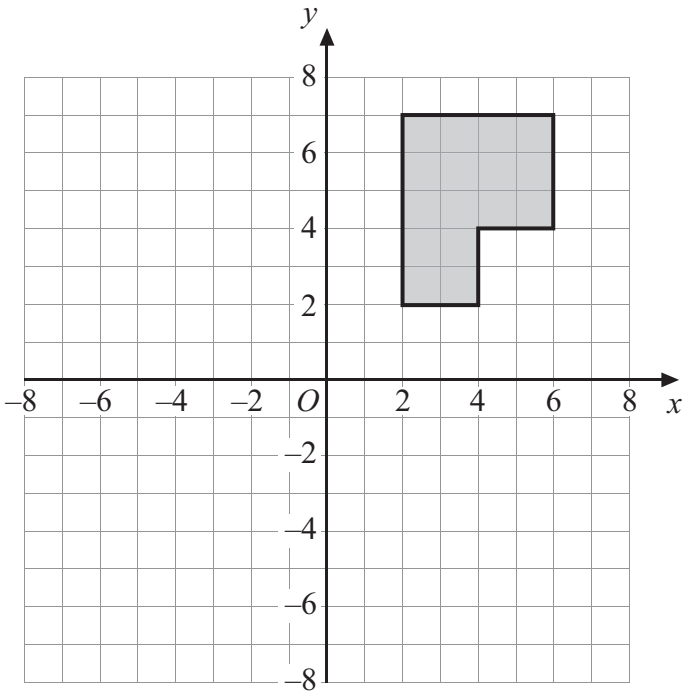
.....

.....

Q4

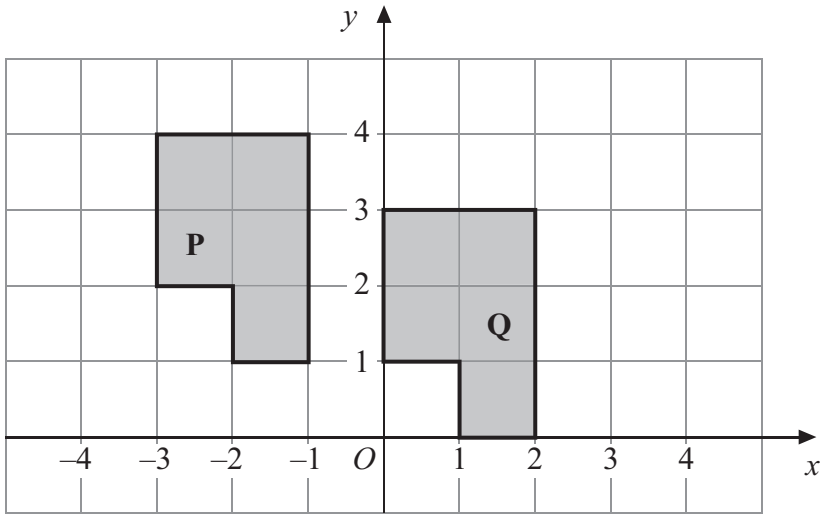
(Total 3 marks)

5.



(a) Rotate the shaded shape 90° clockwise about the point O.

(2)



(b) Describe fully the single transformation that will map shape **P** onto shape **Q**.

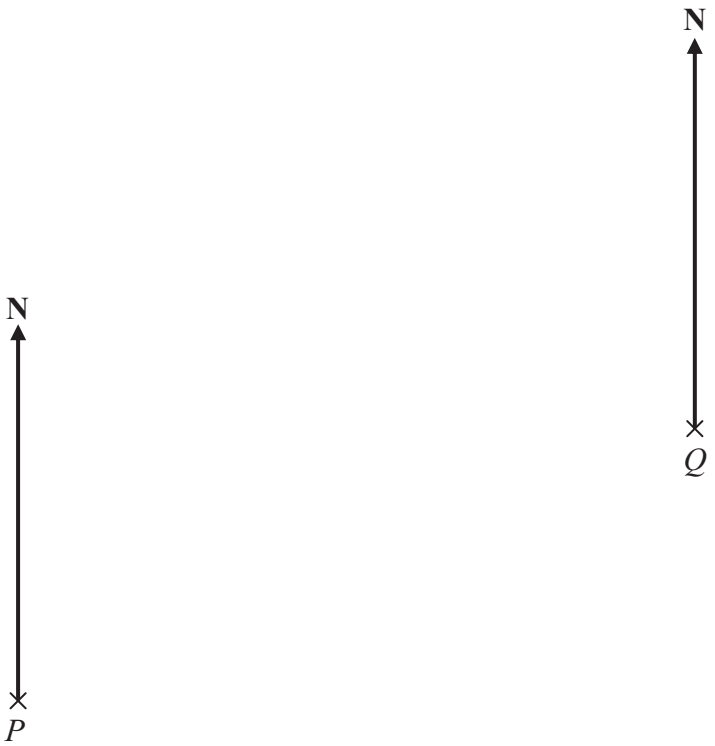
.....

(2)

Q5

(Total 4 marks)

7. The diagram shows the position of two boats, P and Q.



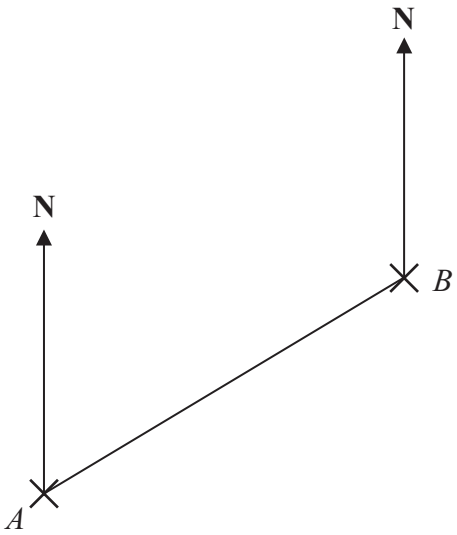
The bearing of a boat R from boat P is 060°
The bearing of boat R from boat Q is 310°

In the space above, draw an accurate diagram to show the position of boat R.
Mark the position of boat R with a cross (×). Label it R.

Q7

(Total 3 marks)

11. The diagram shows the positions of two telephone masts, A and B, on a map.



(a) Measure the bearing of B from A.

..... °

(1)

Another mast C is on a bearing of 160° from B.
On the map, C is 4 cm from B.

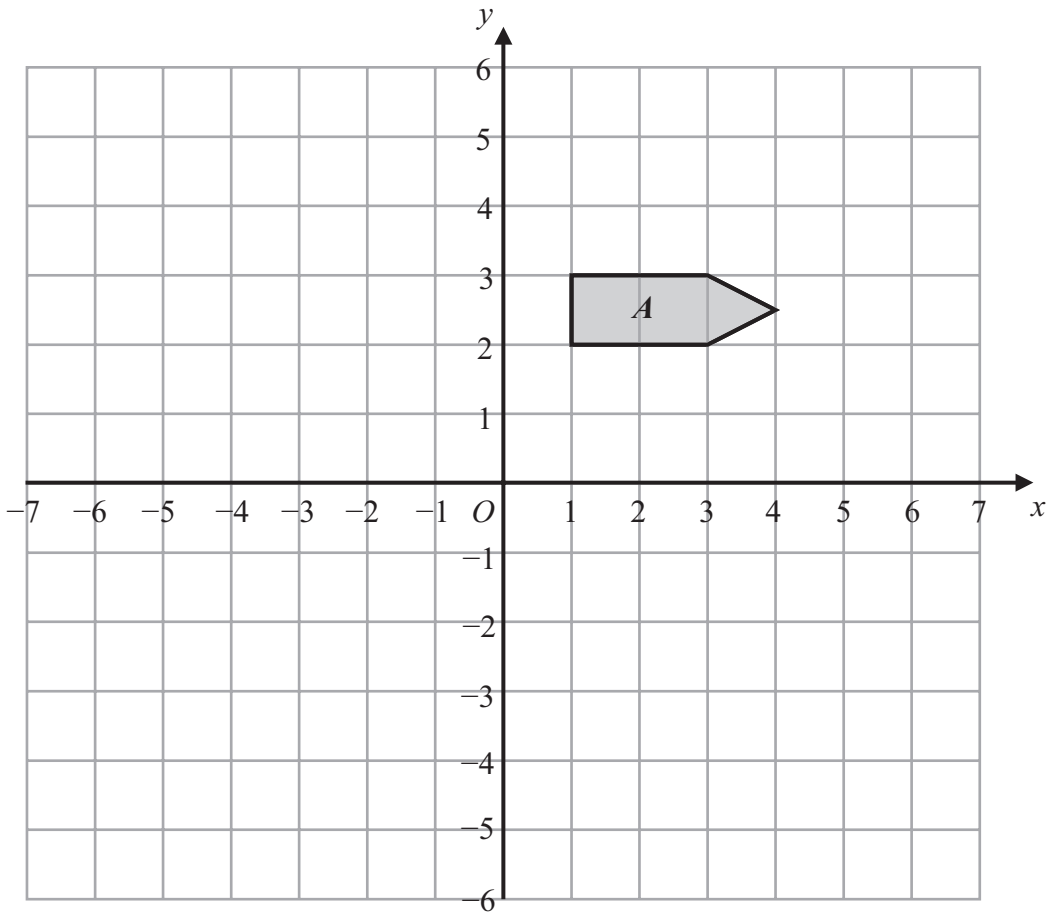
(b) Mark the position of C with a cross (×) and label it C.

(2)

(Total 3 marks)

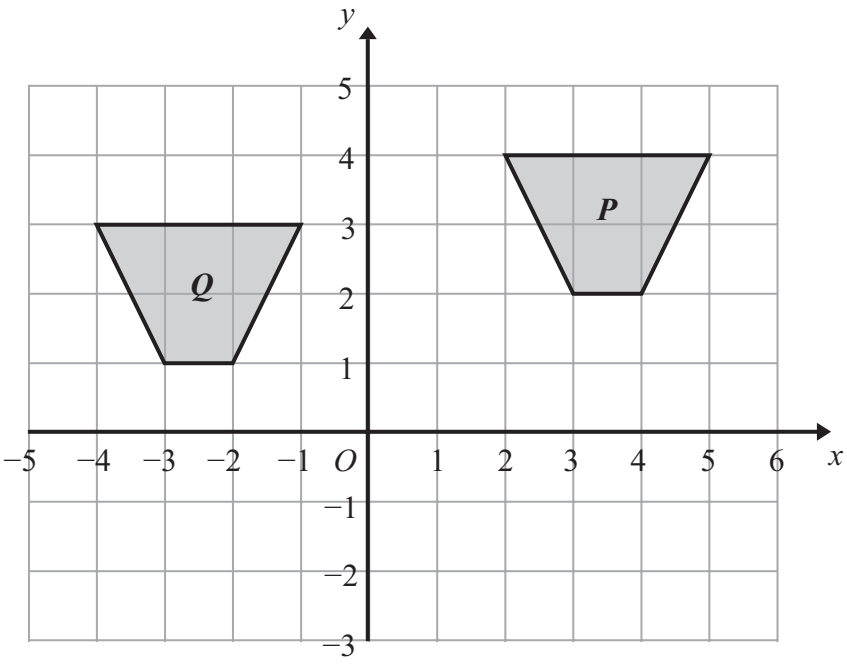
Q11

7.



(a) On the grid above, reflect shape ***A*** in the line $x = -1$

(2)



(b) Describe fully the single transformation that will map shape ***P*** onto shape ***Q***.

.....

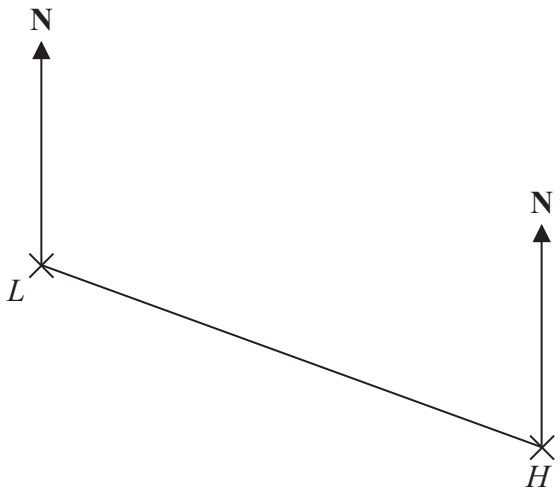
.....

Q7

(2)

(Total 4 marks)

14 The diagram shows the position of a lighthouse L and a harbour H.



The scale of the diagram is 1 cm represents 5 km.

(a) Work out the real distance between L and H.

..... km

(1)

(b) Measure the bearing of H from L.

..... °

(1)

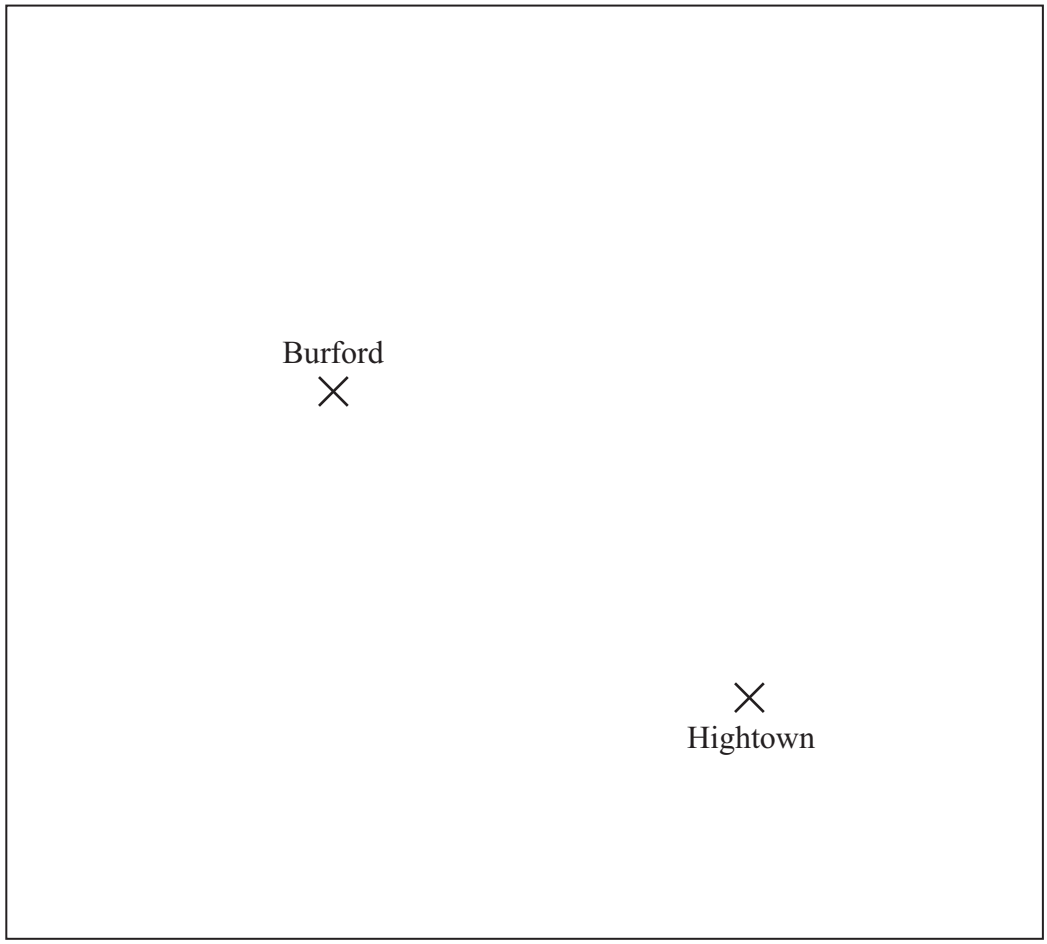
A boat B is 20 km from H on a bearing of 040°.

(c) On the diagram, mark the position of boat B with a cross (×).
Label it B.

(2)

(Total for Question 14 is 4 marks)

10 Here is a map.
The map shows two towns, Burford and Hightown.



Scale: 1 cm represents 10 km

A company is going to build a warehouse.

The warehouse will be less than 30 km from Burford **and** less than 50 km from Hightown.

Shade the region on the map where the company can build the warehouse.

(Total for Question 10 is 3 marks)

14 The bearing of a ship from a lighthouse is 050°

Work out the bearing of the lighthouse from the ship.

.....°

(Total for Question 14 is 2 marks)

19 Rob is learning about the planets.

Rob makes a model of the Sun.
He also makes a model of the planet Jupiter.

Rob is going to hang the two models in the school hall.

Rob wants a distance of 16 m between the two models.
The real distance between the planet Jupiter and the Sun is 8×10^8 km.

Work out the scale Rob should use.
Give your answer in the form $1 : n$

.....

(Total for Question 19 is 3 marks)

5 The diagram shows the position of town A.



Scale: 1 cm represents 10 km

Town B is 64 km from town A on a bearing of 070°.

Mark the position of town B, with a cross (×).
Use a scale of 1 cm represents 10 km.

(Total for Question 5 is 2 marks)

15 Here is a scale drawing of a rectangular garden $ABCD$.



Scale: 1 cm represents 1 metre.

Jane wants to plant a tree in the garden

at least 5 m from point C,
nearer to AB than to AD
and less than 3 m from DC.

On the diagram, shade the region where Jane can plant the tree.

(Total for Question 15 is 4 marks)

3 Here is a scale drawing of Gilda's garden.



Scale: 1 cm represents 1 m

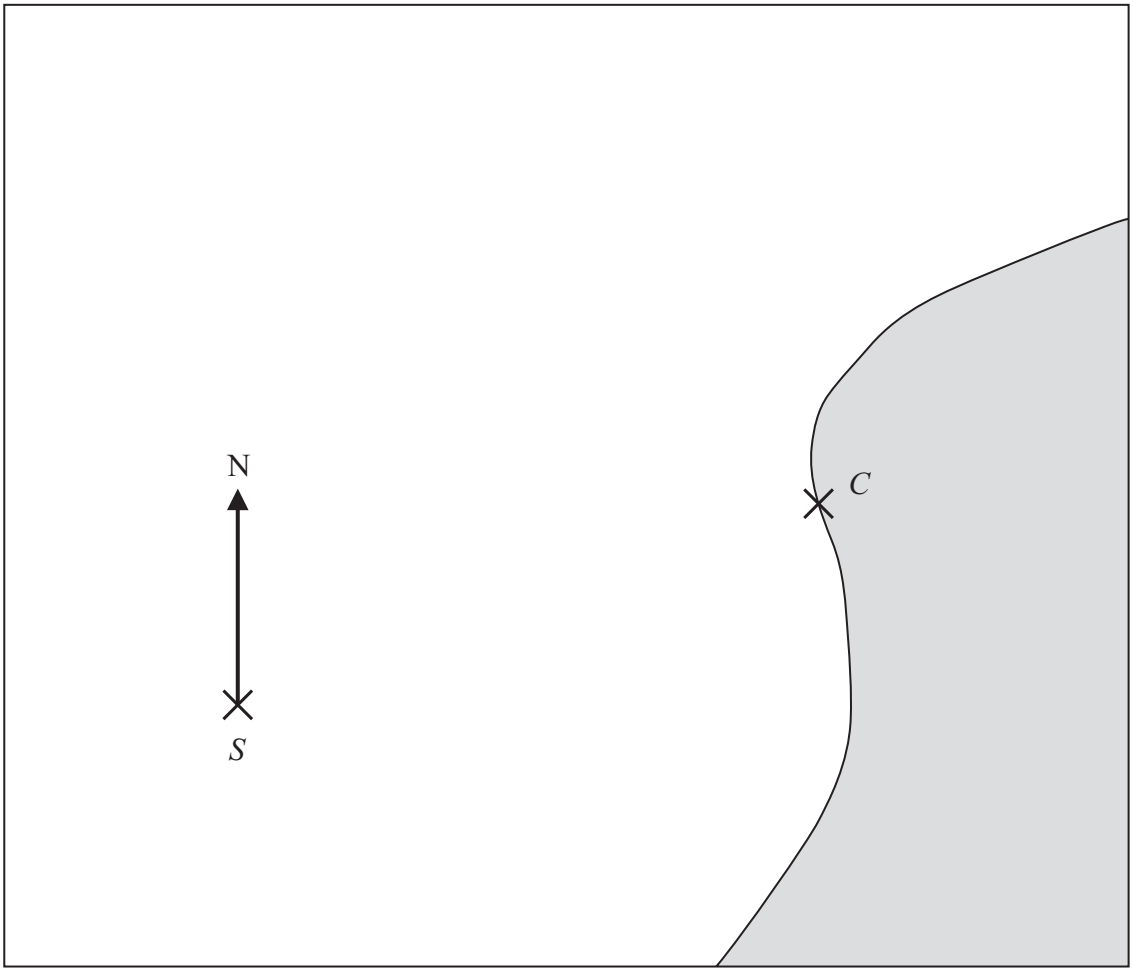
Gilda is going to plant an elm tree in the garden.

She must plant the elm tree at least 4 metres from the oak tree.

On the diagram, show by shading the region where Gilda can plant the elm tree.

(Total for Question 3 is 2 marks)

***13** Here is a map.
The position of a ship, *S*, is marked on the map.



Scale 1 cm represents 100 m

Point *C* is on the coast.
Ships must not sail closer than 500 m to point *C*.

The ship sails on a bearing of 037°

Will the ship sail closer than 500 m to point *C*?
You must explain your answer.

(Total for Question 13 is 3 marks)

6 The diagram shows the position of two boats, B and C.



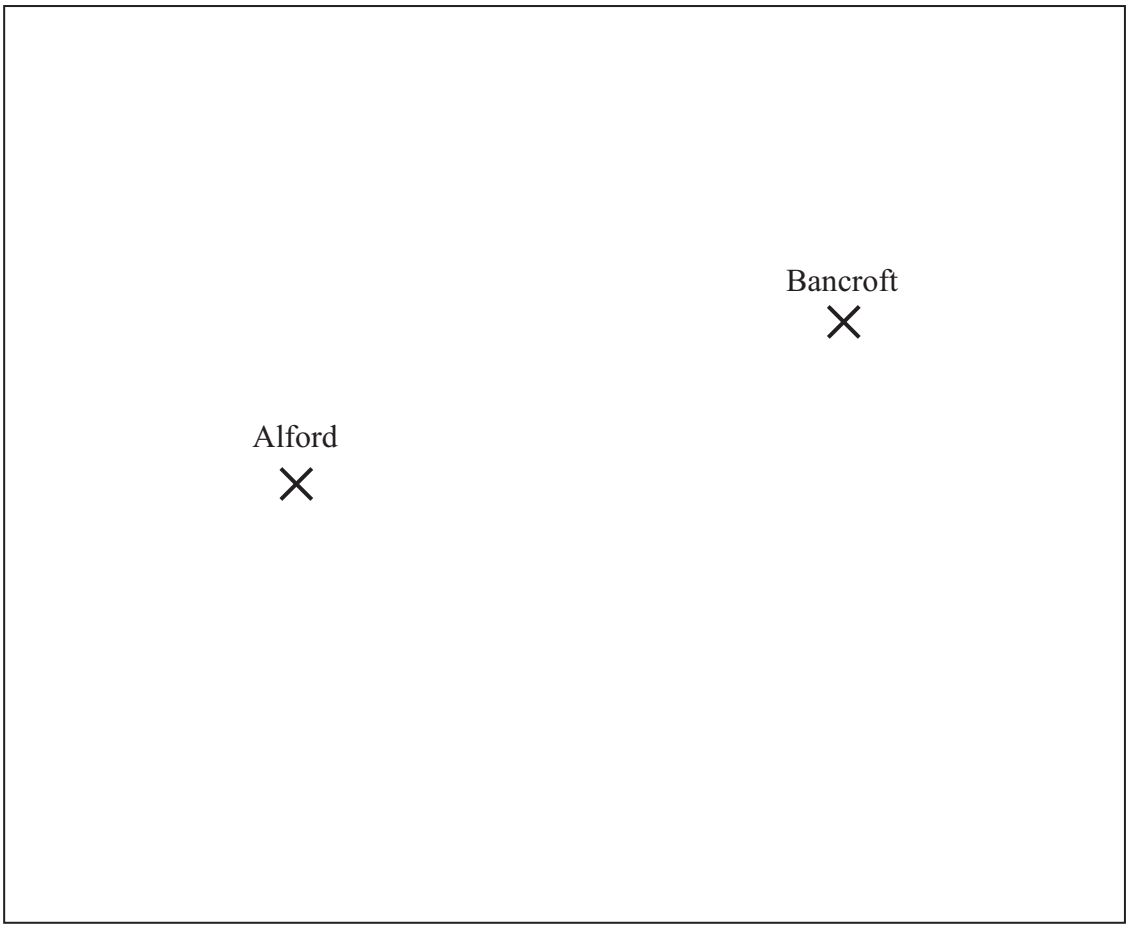
Boat T is on a bearing of 060° from boat B.
Boat T is on a bearing of 285° from boat C.

In the space above, draw an accurate diagram to show the position of boat T.

Mark the position of boat T with a cross (×).
Label it T.

(Total for Question 6 is 3 marks)

7 The map shows the positions of two schools, Alford and Bancroft.



Scale 1 cm represents 1 km

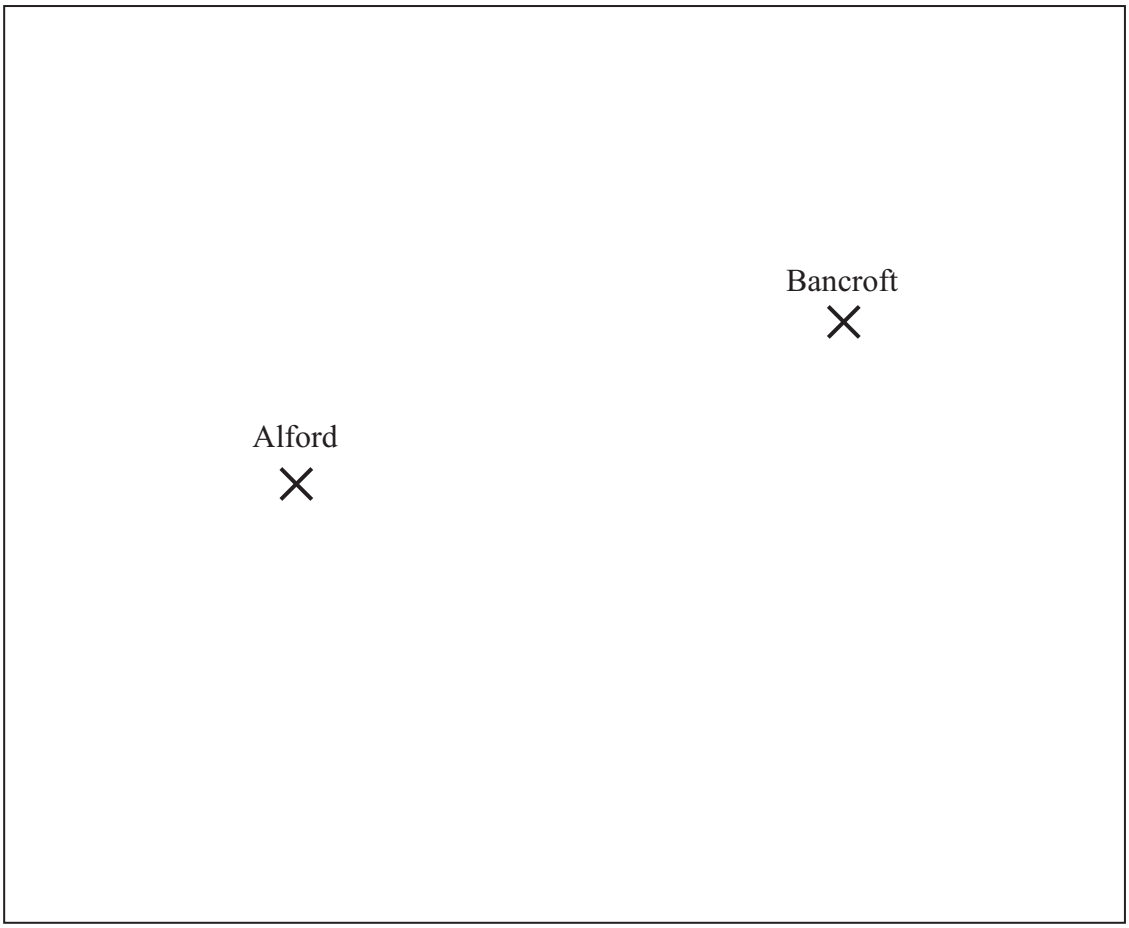
A new school is going to be built.

The new school will be less than 5 kilometres from Alford.
It will be nearer to Bancroft than to Alford.

Shade the region on the map where the new school can be built.

(Total for Question 7 is 3 marks)

7 The map shows the positions of two schools, Alford and Bancroft.



Scale 1 cm represents 1 km

A new school is going to be built.

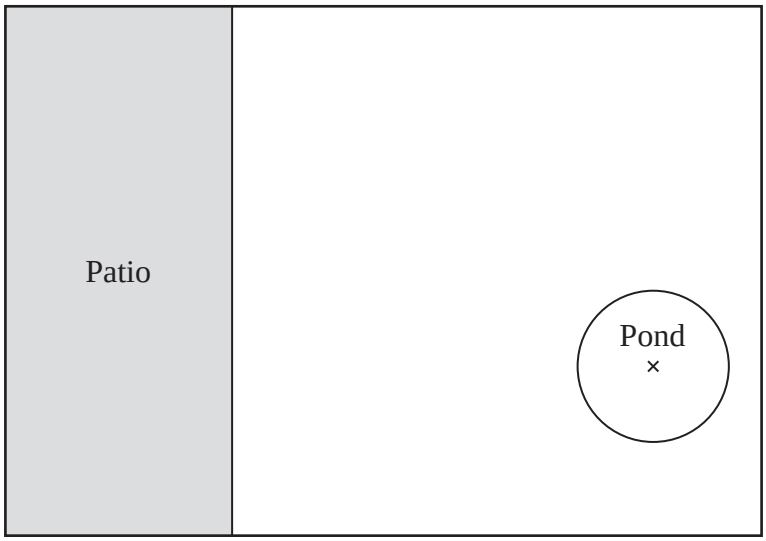
The new school will be less than 5 kilometres from Alford.
It will be nearer to Bancroft than to Alford.

Shade the region on the map where the new school can be built.

(Total for Question 7 is 3 marks)

8 The diagram shows a garden in the shape of a rectangle.

The scale of the diagram is 1 cm represents 2 m.



Scale: 1 cm represents 2 m

Irfan is going to plant a tree in the garden.
The tree must be

more than 3 metres from the patio
and more than 6 metres from the centre of the pond.

On the diagram, shade the region where Irfan can plant the tree.

(Total for Question 8 is 3 marks)

15 The diagram shows the positions of three turbines *A*, *B* and *C*.

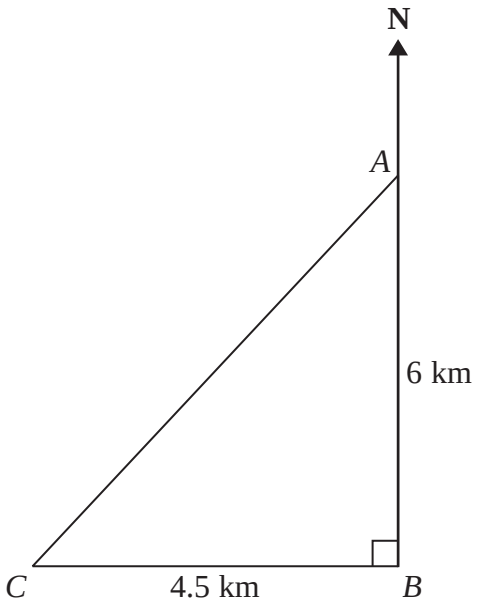


Diagram **NOT** accurately drawn

A is 6 km due north of turbine *B*.
C is 4.5 km due west of turbine *B*.

(a) Calculate the distance *AC*.

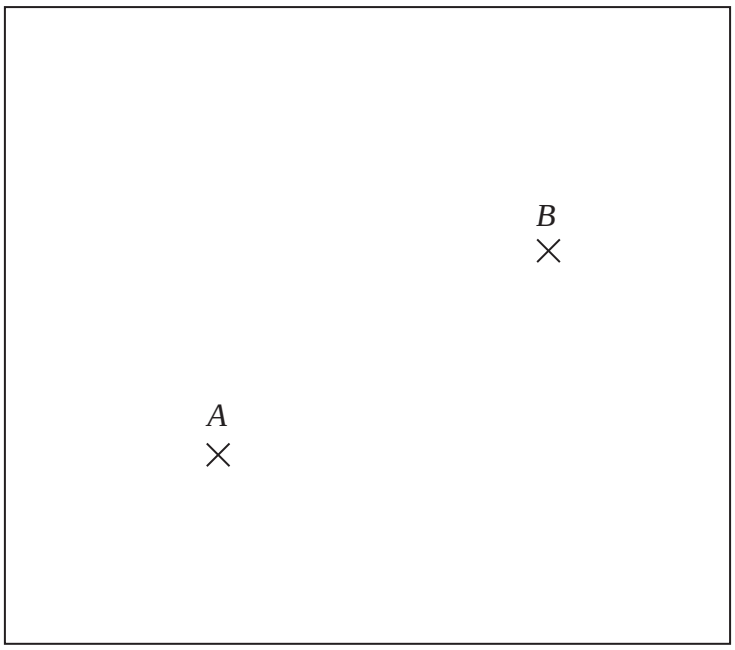
..... km
(3)

(b) Calculate the bearing of *C* from *A*.
Give your answer correct to the nearest degree.

..... °
(4)

(Total for Question 15 is 7 marks)

9 The diagram shows the positions of two shops, *A* and *B*, on a map.



The scale of the map is 1 cm represents 5 km.

Yannis wants to build a warehouse.

The warehouse needs to be

less than 10 km from *A*,
less than 20 km from *B*.

Show by shading where Yannis can build the warehouse.

(Total for Question 9 is 3 marks)

13 The diagram shows the positions of a tower and a tree.

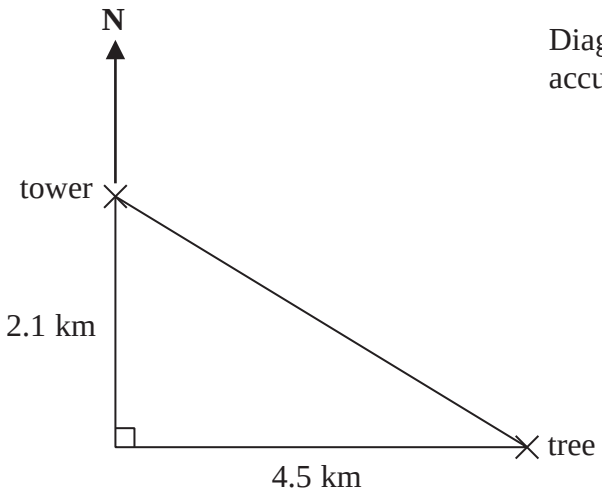


Diagram **NOT** accurately drawn

The tree is 2.1 km South of the tower and 4.5 km East of the tower.

(a) Work out the distance between the tower and the tree.
Give your answer correct to one decimal place.

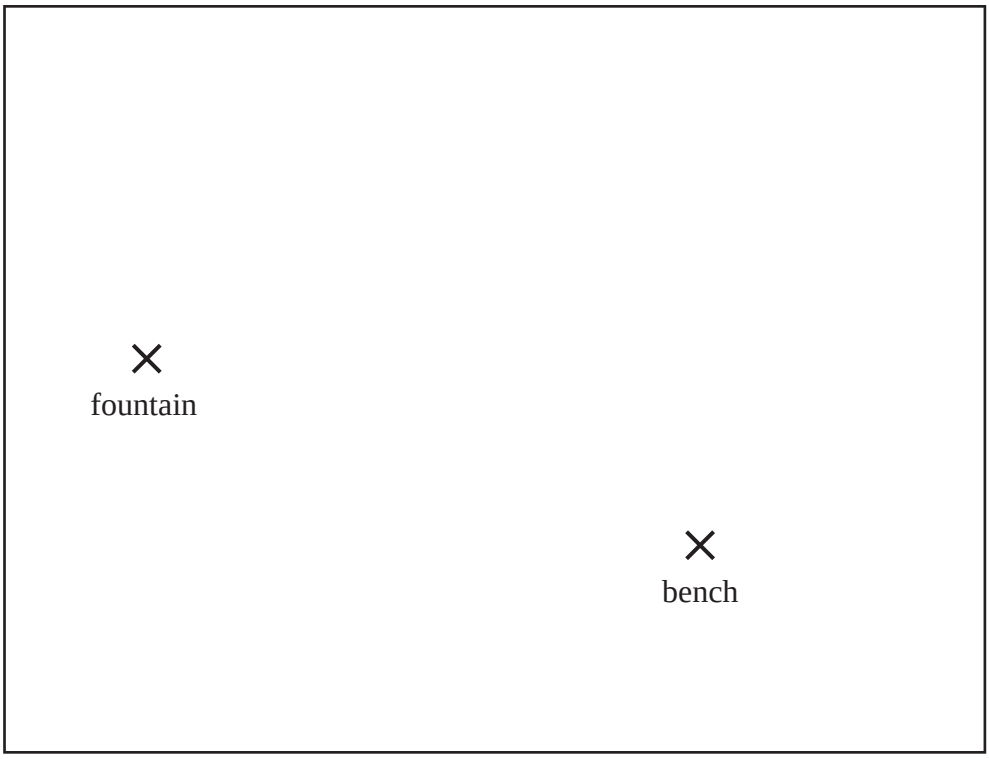
..... km
(3)

(b) Work out the bearing of the tree from the tower.
Give your answer correct to the nearest degree.

°
.....
(4)

(Total for Question 13 is 7 marks)

5 The diagram shows a scale drawing of a garden.



Scale: 1 centimetre represents 2 metres

Haavi is going to plant a tree in the garden.

The tree must be

less than 7 metres from the fountain,
less than 12 metres from the bench.

On the diagram show, by shading, the region in which Haavi can plant the tree.

(Total for Question 5 is 3 marks)

10 Here is a scale drawing of an office.
The scale is 1 cm to 2 metres.



A photocopier is going to be put in the office.
The photocopier has to be closer to *B* than it is to *A*.
The photocopier also has to be less than 8 metres from *C*.

Show, by shading, the region where the photocopier can be put.

(Total for Question 10 is 3 marks)

13 Martin and Janet are in an orienteering race.

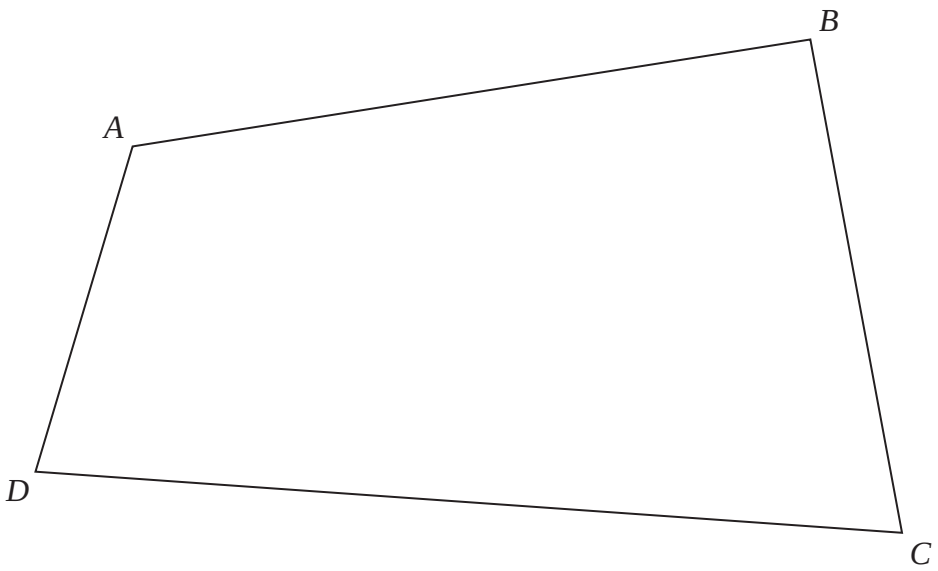
Martin runs from checkpoint *A* to checkpoint *B*, on a bearing of 065°
Janet is going to run from checkpoint *B* to checkpoint *A*.

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

.....°

(Total for Question 13 is 2 marks)

8 The diagram shows the plan of a park.



Scale: 1 cm represents 100 m

A fountain in the park is equidistant from *A* and from *C*.
The fountain is exactly 700 m from *D*.

On the diagram, mark the position of the fountain with a cross (✕).

(Total for Question 8 is 3 marks)

22

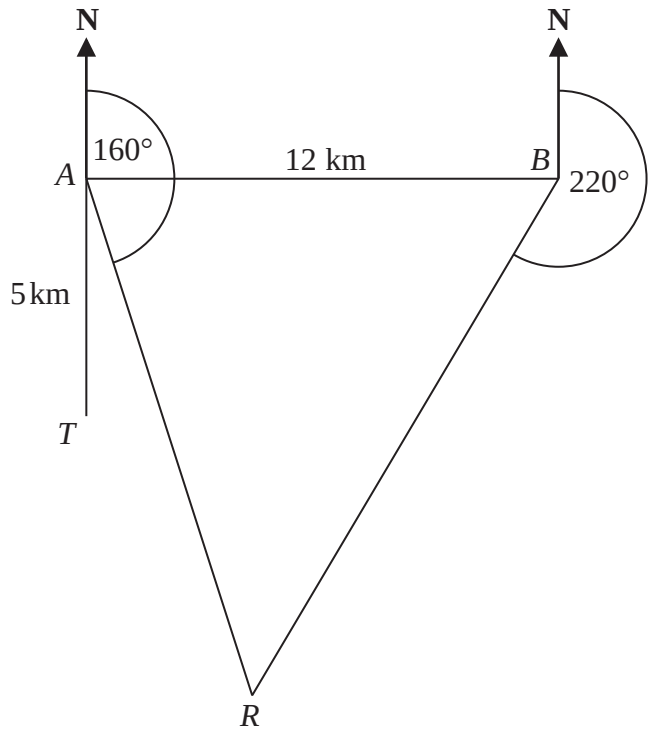


Diagram **NOT** accurately drawn

There is a coastguard station at point A and at point B.
B is due East of A.
The distance from A to B is 12 km.

There is a rowing boat at point R.
R is on a bearing of 160° from A.
R is on a bearing of 220° from B.

There is a speedboat at point T.
T is 5 km due South of A.

Work out the shortest distance from T to R.
Give your answer correct to 1 decimal place.
You must show all your working.

.....km

(Total for Question 22 is 5 marks)

11 Manchester airport is on a bearing of 330° from a London airport.

(a) Find the bearing of the London airport from Manchester airport.

.....°

(2)

The London airport is 200 miles from Manchester airport.

A plane leaves Manchester airport at 10 am to fly to the London airport.
The plane flies at an average speed of 120 mph.

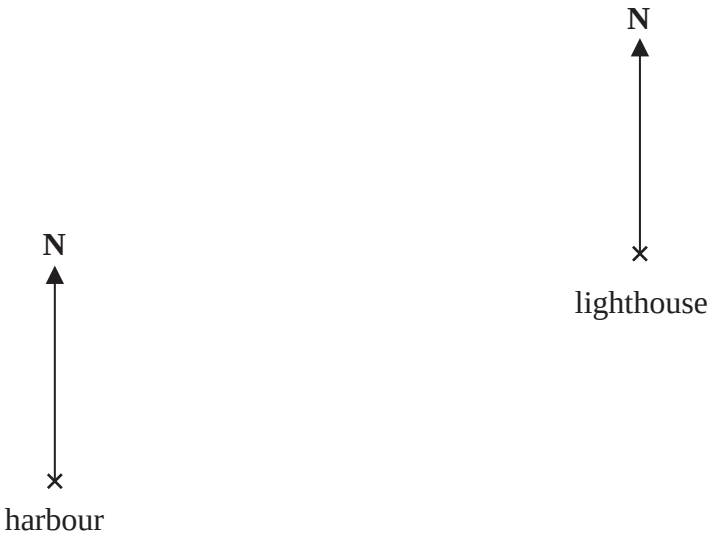
(b) What time does the plane arrive at the London airport?

.....

(4)

(Total for Question 11 is 6 marks)

2 The diagram shows the positions of a lighthouse and a harbour on a map.



A boat is on a bearing of

300° from the lighthouse
040° from the harbour.

(a) On the diagram, mark with a cross (×) the position of the boat.
Label the boat *B*.

(3)

The scale of the map is 1 cm represents 50 000 cm.

(b) Work out the real distance from the harbour to the lighthouse.
Give your answer in km.

.....km

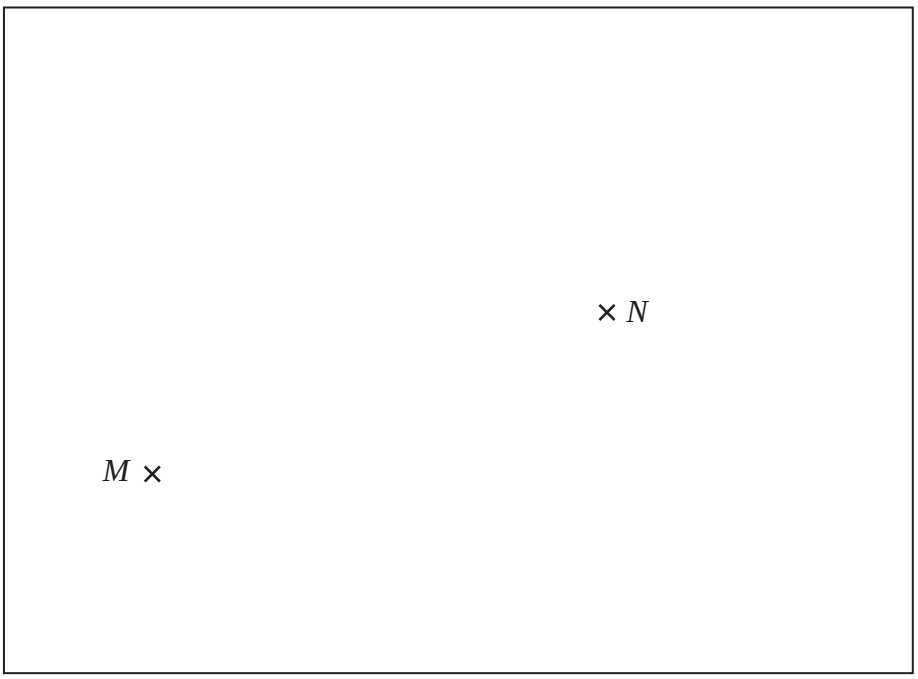
(2)

(Total for Question 2 is 5 marks)

5 Here is a map.
The map shows two towns Marlford (M) and Newborough (N).

A company is going to build a supermarket.
The supermarket will be more than 10 km from Marlford and less than 6 km from Newborough.

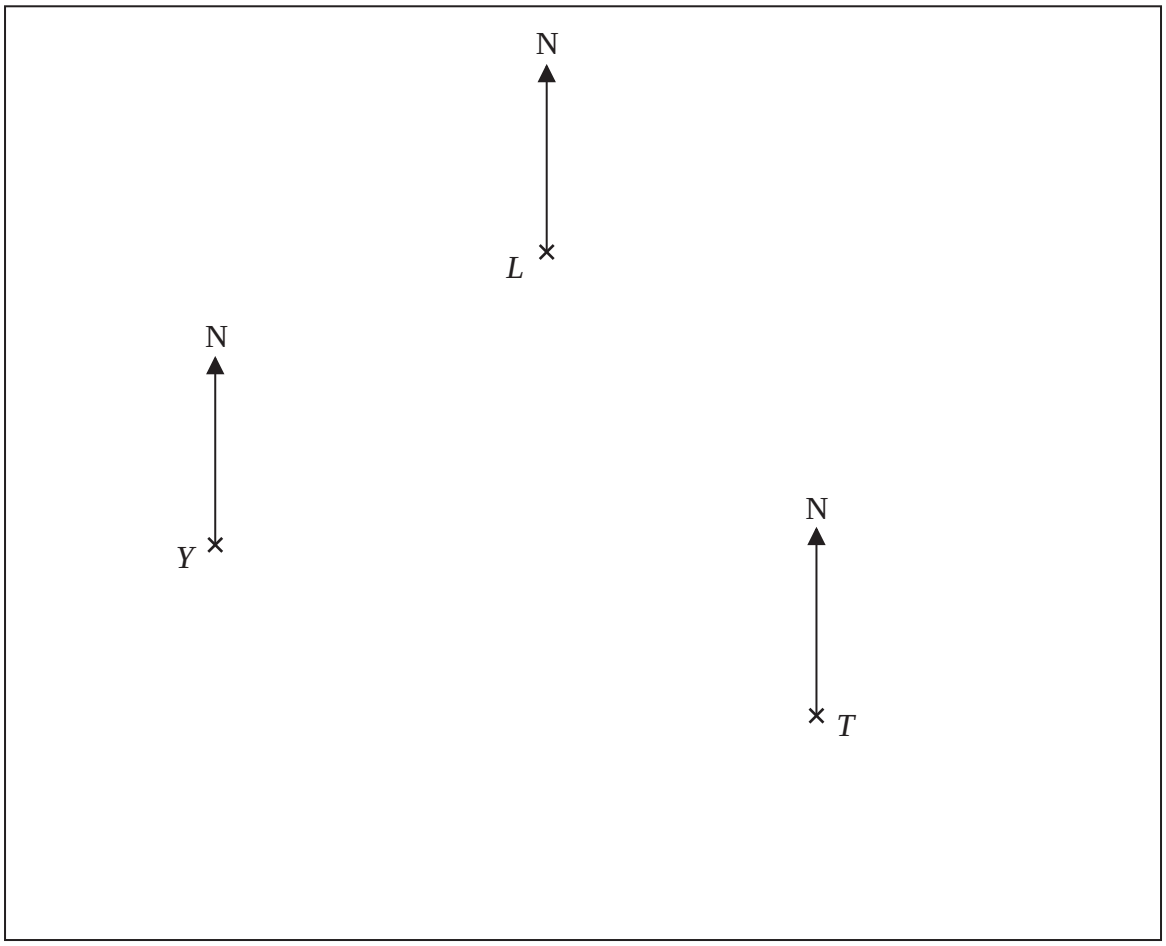
Find and shade the region on the map where the company can build the supermarket.



Scale: 1 cm represents 2 km.

(Total for Question 5 is 3 marks)

12 The diagram shows the positions of a lighthouse L, a yacht Y and a tanker T on a map.



Scale 1 cm represents 10 km

(a) Measure the bearing of L from Y.

..... °

(1)

The tanker, T, sails 80 km on a bearing of 320°.

(b) Find the distance, in km, between the tanker and the lighthouse when the tanker is closest to the lighthouse.

..... km

(2)

(Total for Question 12 is 3 marks)

10 The diagram shows the positions of two lighthouses, *A* and *B*, on a map.

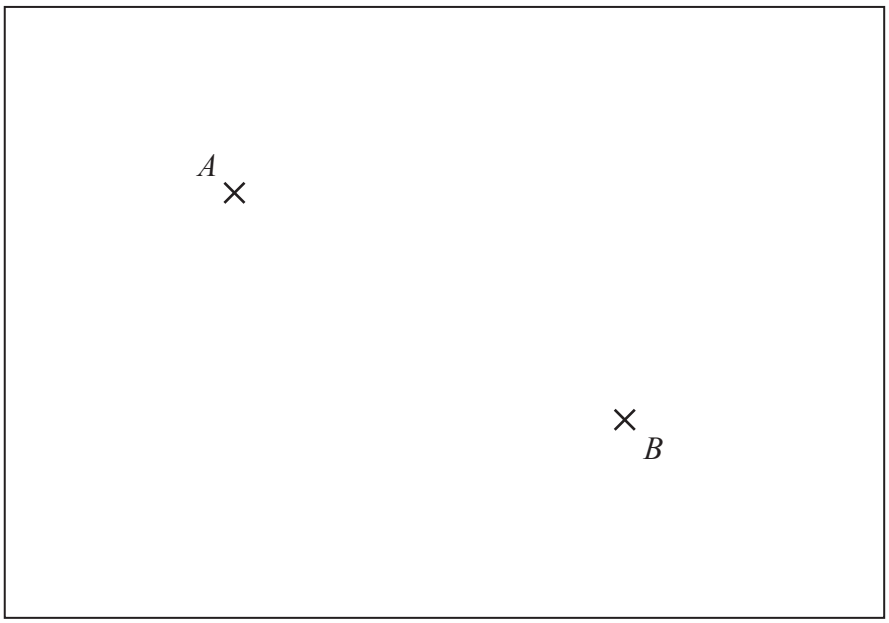


A ship is on a bearing of 070° from *A*.
The ship is also on a bearing of 320° from *B*.

Mark the position of the ship with a cross (×) and label it *C*.

(Total for Question 10 is 3 marks)

7 Here is a map.
The map shows two airports, A and B.



Scale: 1 cm represents 10 km

Sophie is going to have a hotel built.

The hotel
will be closer to airport A than to airport B
will be less than 40 km from airport B

On the map, shade the region where the hotel can be built.

(Total for Question 7 is 3 marks)

9 The diagram shows the position of two churches, A and B.



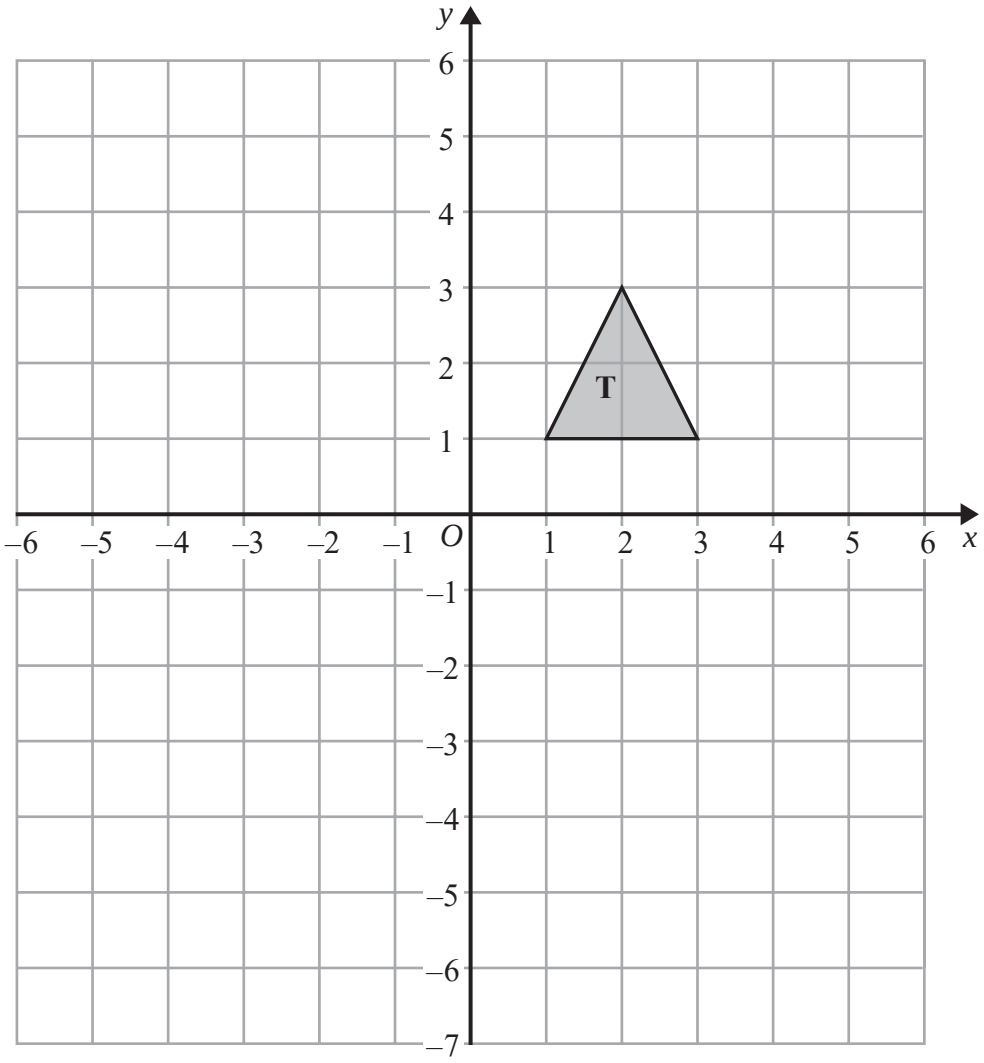
Church C is on a bearing of 130° from church A.
Church C is on a bearing of 245° from church B.

In the space above, draw an accurate diagram to show the position of church C.

Mark the position of church C with a cross (×).
Label it C.

(Total for Question 9 is 3 marks)

7



Shape **T** is reflected in the line $x = -1$ to give shape **R**.
Shape **R** is reflected in the line $y = -2$ to give shape **S**.

Describe the **single** transformation that will map shape **T** to shape **S**.

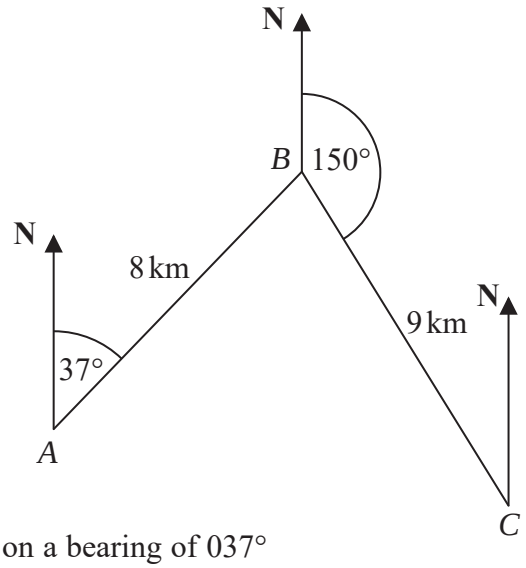
.....

.....

.....

(Total for Question 7 is 2 marks)

23 The diagram shows the positions of three towns, Acton (A), Barston (B) and Chorlton (C).



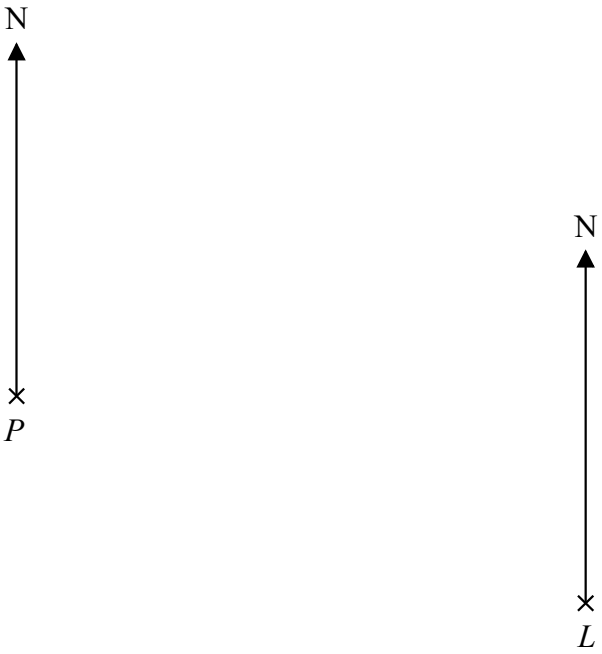
Barston is 8 km from Acton on a bearing of 037°
Chorlton is 9 km from Barston on a bearing of 150°

Find the bearing of Chorlton from Acton.
Give your answer correct to 1 decimal place.
You must show all your working.

.....°

(Total for Question 23 is 5 marks)

8 The accurate scale drawing shows the positions of port P and a lighthouse L.



Scale: 1 cm represents 4 km.

Aleena sails her boat from port P on a bearing of 070°

She sails for $1\frac{1}{2}$ hours at an average speed of 12 km/h to a port Q.

Find

(i) the distance, in km, of port Q from lighthouse L,

(ii) the bearing of port Q from lighthouse L.

distance QL = ... km

bearing of Q from L = ... °

(Total for Question 8 is 5 marks)

6 The bearing of port *B* from port *A* is 147°

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

.....°

(Total for Question 6 is 2 marks)

Question 39

November 2023 | 1MA1/3H | Original Q11

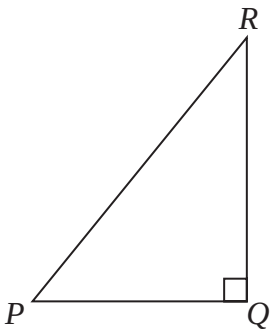
11 The floor plan of a house is drawn using a scale of 1 : 50
On the plan, a room in the house has a floor area of 48 cm^2

Work out the real area of the floor of this room.
Give your answer in m^2

..... m^2

(Total for Question 11 is 3 marks)

8 A playground is in the shape of a right-angled triangle.



Dan makes a scale drawing of the playground.
He uses a scale of 1 cm represents 5 m

The area of the playground on the scale drawing is 28 cm^2

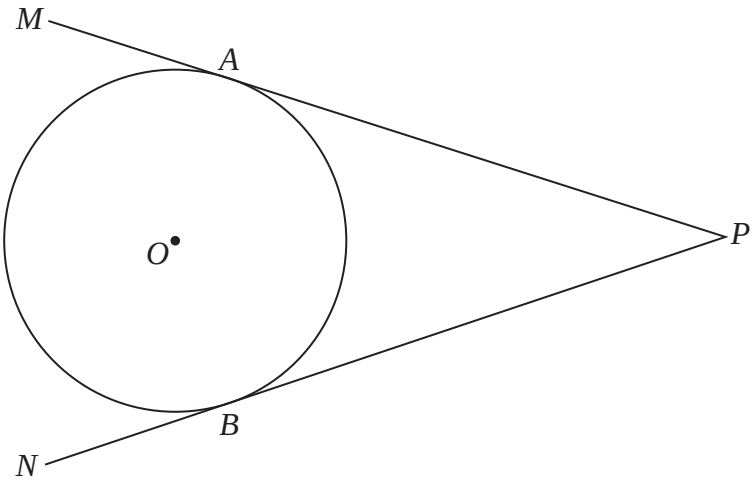
The real length of QR is 40 m

Work out the real length of PQ.

..... m

(Total for Question 8 is 3 marks)

22 A and B are points on a circle, centre O.



MAP and NBP are tangents to the circle.

Prove that $AP = BP$

(Total for Question 22 is 4 marks)