

8300

GCSE MATHEMATICS

Foundation and Higher tier – Questions by Topic

Geometry

Scale diagrams – Drawing and interpreting scale diagrams

v1.0

Name _____

Materials

For this paper you must have:

- Mathematical instruments

Information

- The marks for questions are shown in brackets

Advice

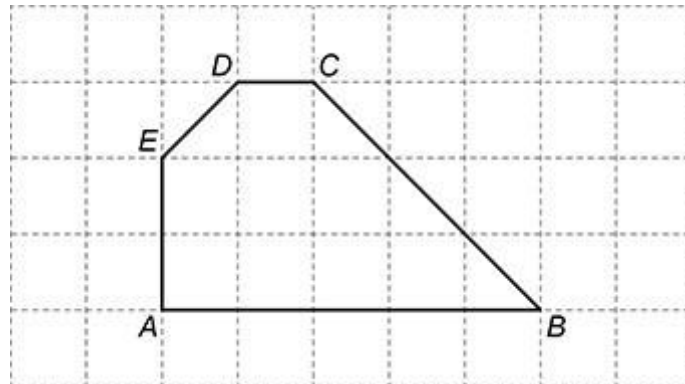
- In all calculations, show clearly how you work out your answer

For this section, you may use a calculator.



Q1.

Shape $ABCDE$ is drawn on a centimetre grid.

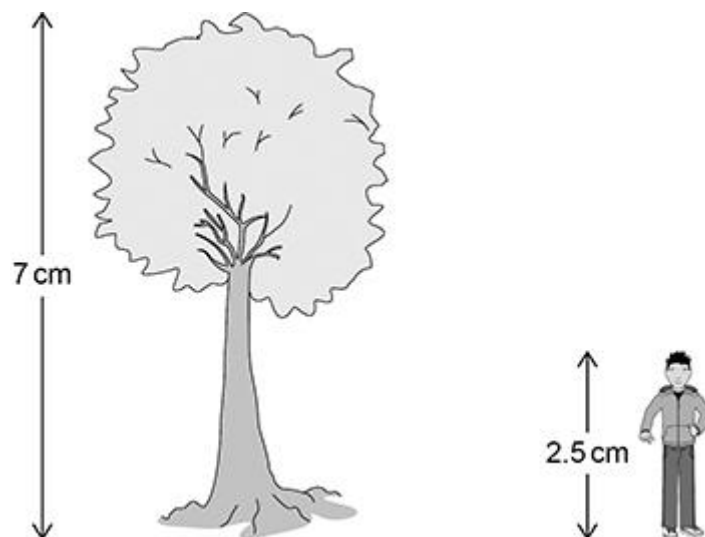


Complete this statement.

$AB : \text{_____} = 5 : 1$
(Total 1 mark)

Q2.

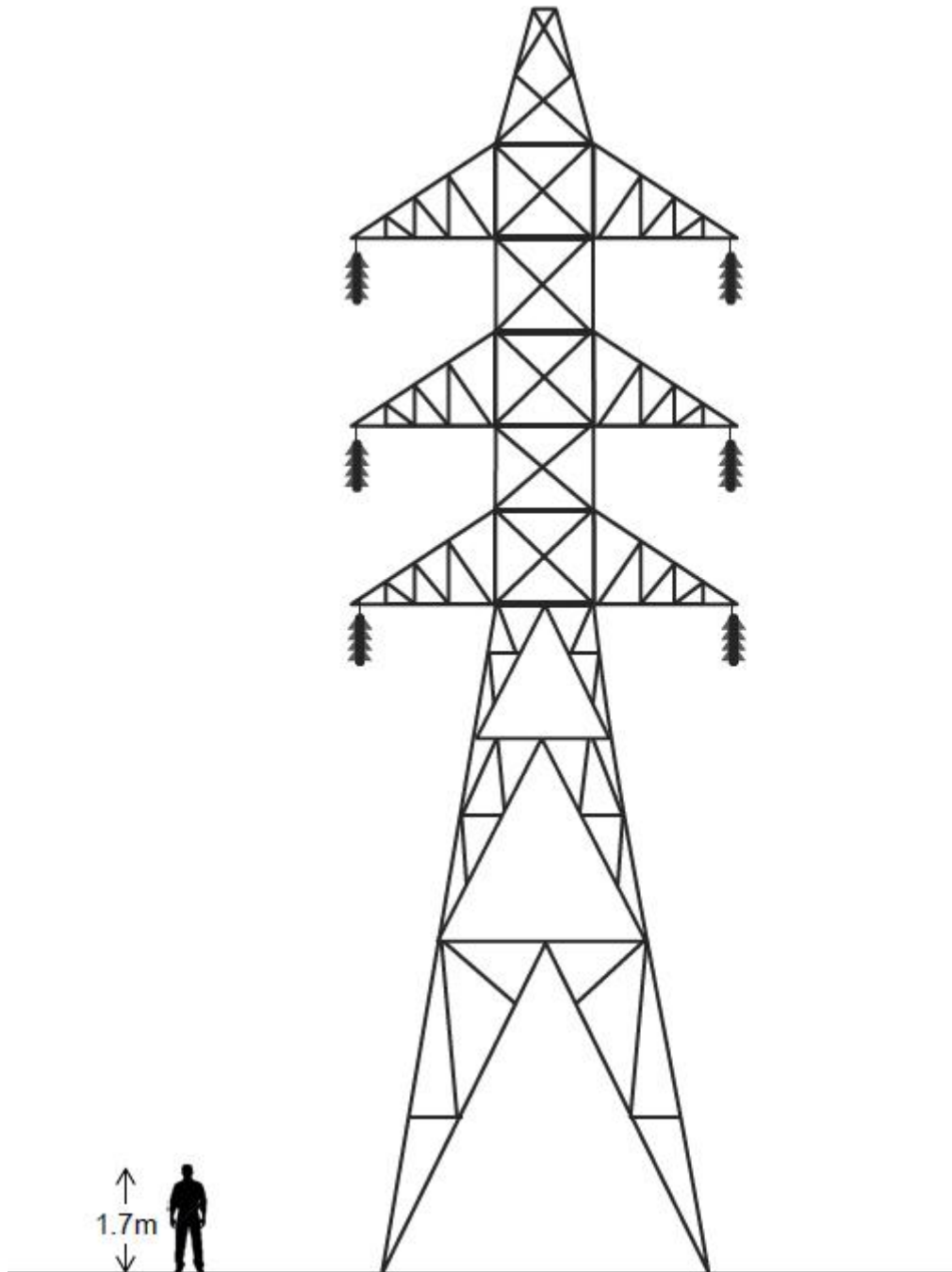
The scale drawing shows a tree and a student.



The actual height of the tree is 4.2 metres.
Work out the actual height of the student.

(Total 3 marks)

Q3.



Use the height of the man to estimate the height of the pylon.

(Total 2 marks)

Q4.

A dolphin and a whale are drawn to scale.



Dolphin



Whale

The actual length of the dolphin is 3 metres.

Estimate the actual length of the whale.

You **must** show your working.

(Total 2 marks)

Q5.

A scale drawing shows the positions of P , Q and R .



Not drawn accurately

On the scale drawing

$$PQ = 4 \text{ cm}$$

$$QR = 6.5 \text{ cm}$$

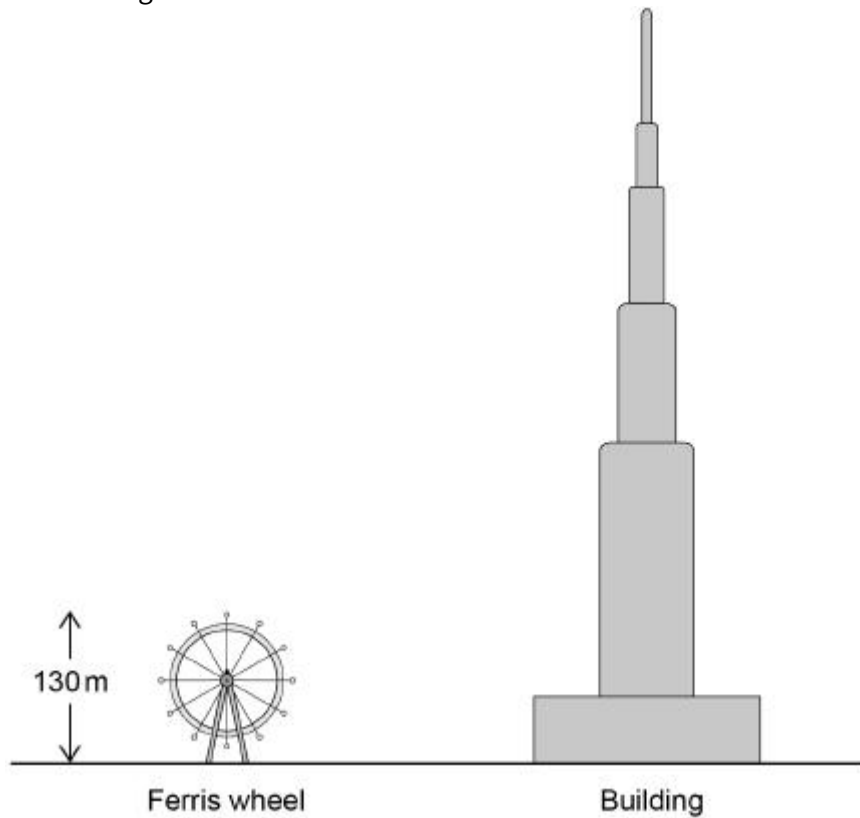
The actual distance PQ is 50 metres less than the actual distance QR .

Work out the scale.

(Total 3 marks)

Q6.

Here is a scale drawing.

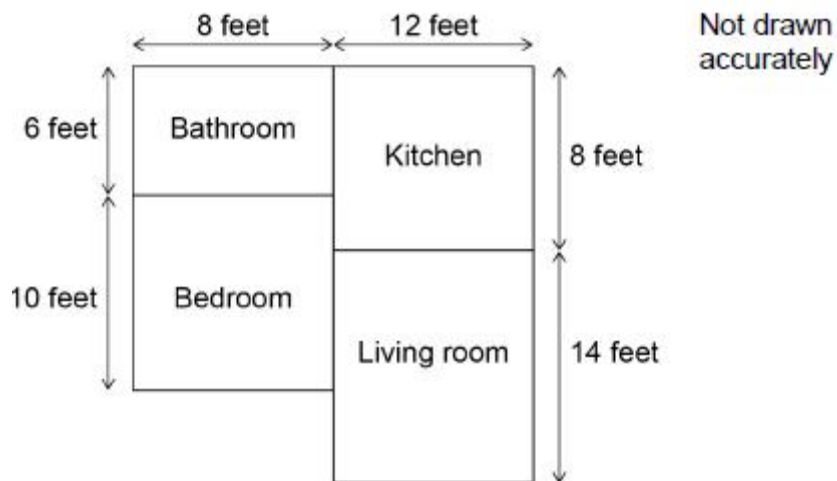


The Ferris wheel has a height of 130 m
Work out the height of the building.

(Total 3 marks)

Q7.

Here is a plan of a flat with four rectangular rooms.

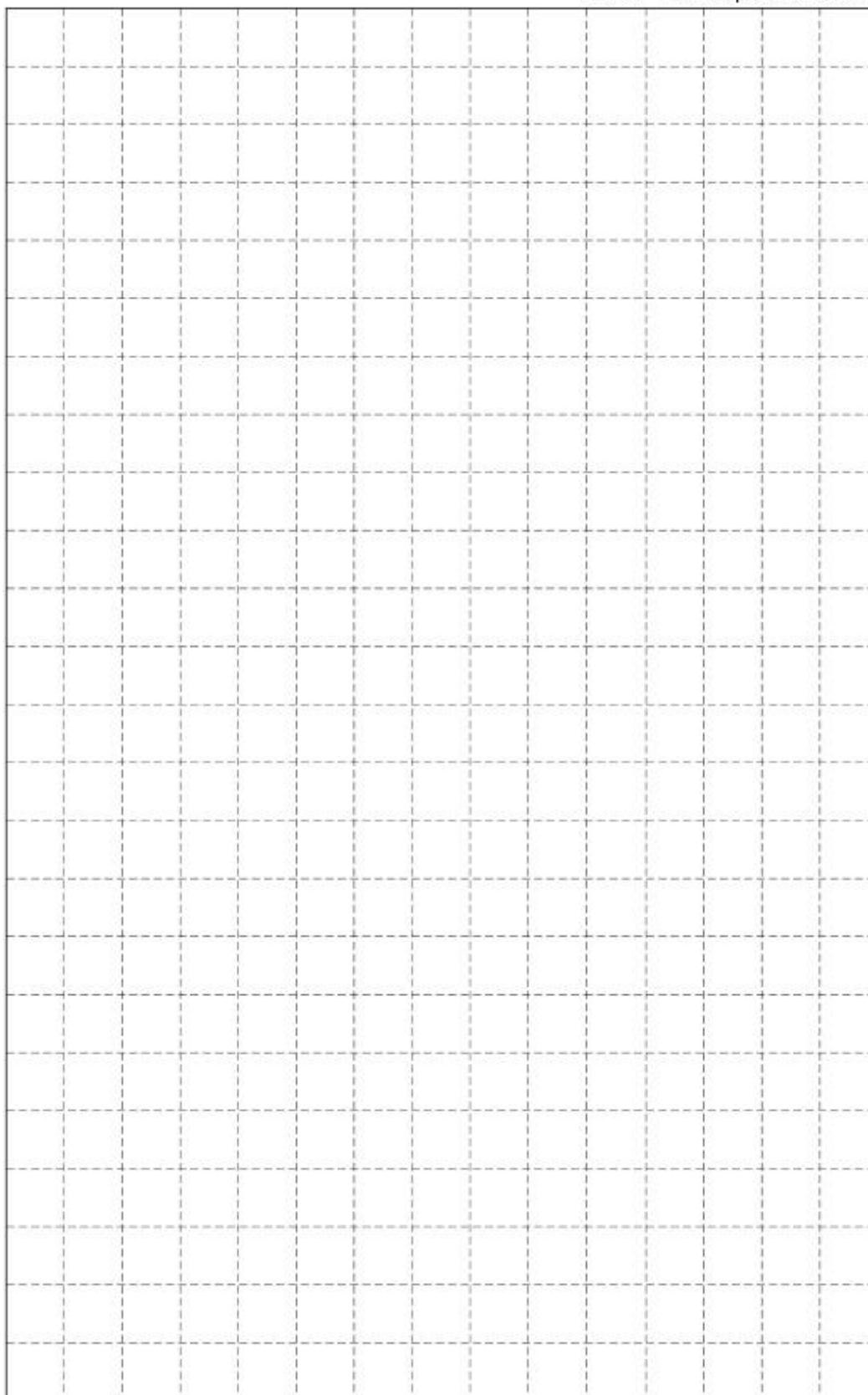


On the grid, make an accurate scale drawing of the plan.

Label each room.

Use a scale of 1 cm represents 2 feet

Scale: 1 cm represents 2 feet



(Total 3 marks)

Q8.

Here is a map of Cuba.
1.5 cm represents 200 km



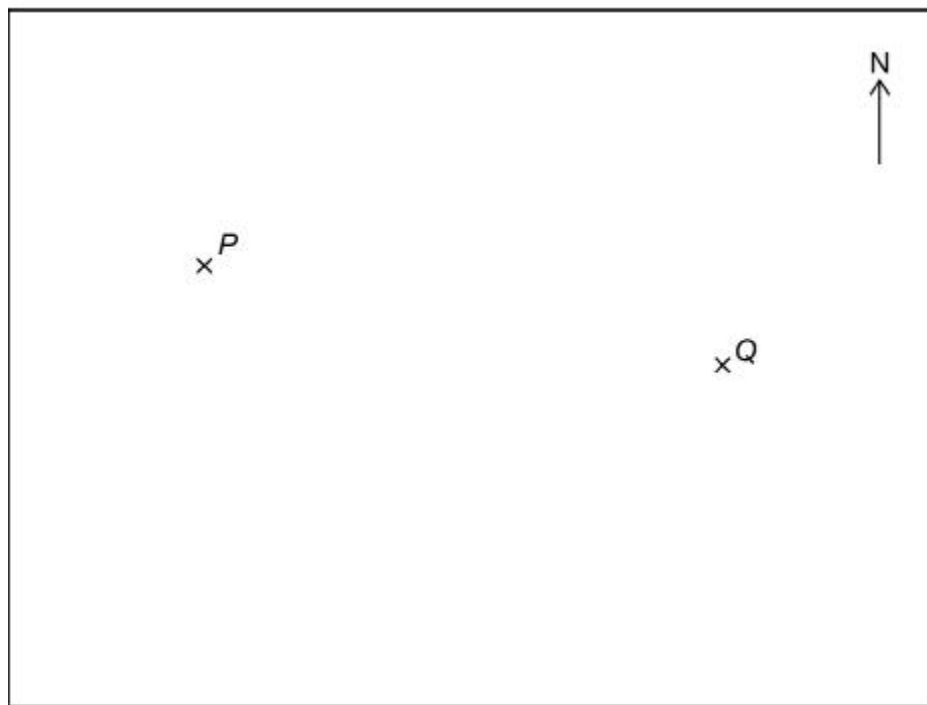
Work out the actual distance from Havana to Holguin.

(Total 3 marks)

Q9.

Here is a map showing two towns, *P* and *Q*.

Scale: 1 cm represents 50 km



- (a) Work out the **actual** distance between towns *P* and *Q*.

(2)

- (b) Town *R* is 200 km due South of town *P*.
Mark *R* on the map.

(2)

(Total 4 marks)

Q10.

The map shows the positions of two ships, A and B.

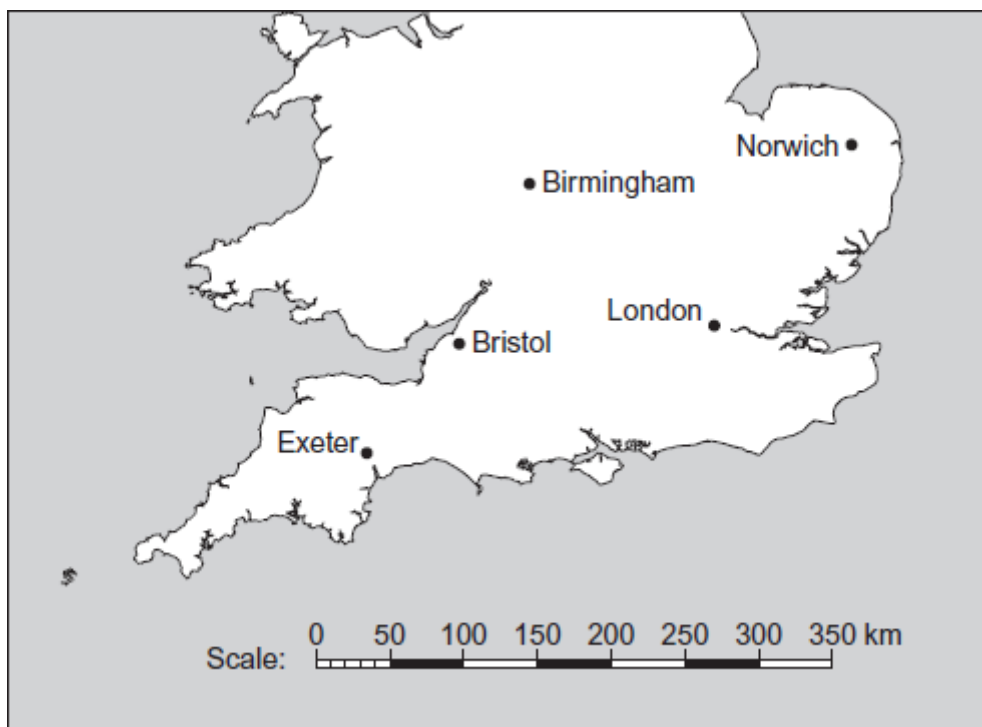
Scale: 1 cm represents 2.5 km



Work out the actual distance between the ships.

(Total 2 marks)

Q11.

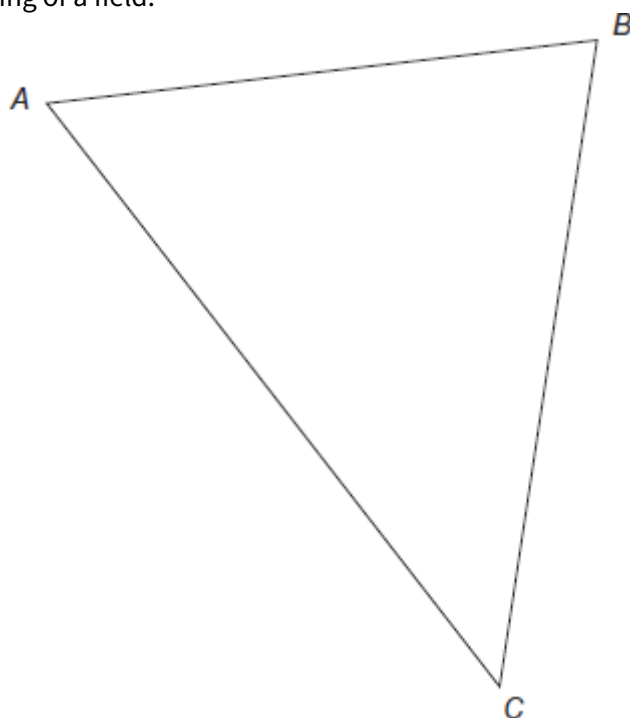


Work out the straight line distance between Exeter and Norwich.
Give your answer in kilometres.

(Total 3 marks)

Q12.

Here is a scale drawing of a field.



- (a) Measure the length of AC in centimetres.

(1)

- (b) The actual length of AC is 160 metres.
Work out the actual length of AB .

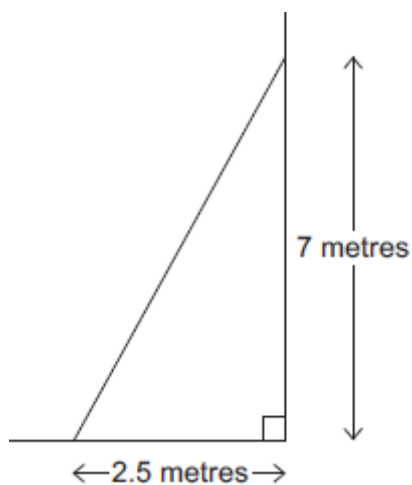
(4)

(Total 5 marks)

Q13.

- (a) The diagram shows a sketch of a ladder on horizontal ground against a vertical wall.

Not drawn accurately



Make an accurate scale drawing.

The horizontal ground has been drawn for you.

Use a scale of 1 cm to represent 1 metre.

- (b) Use your drawing to work out the actual length of the ladder.

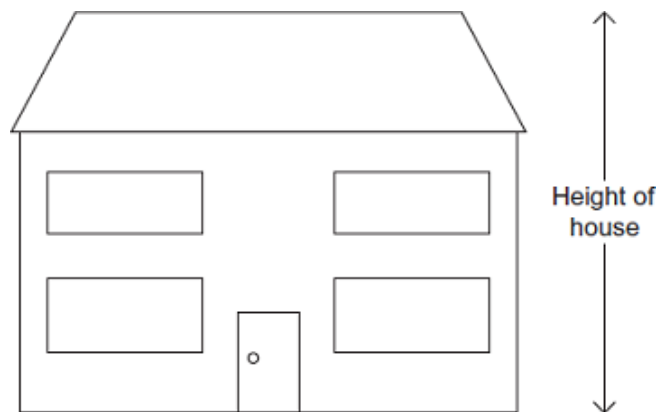
(2)

(1)

(Total 3 marks)

Q14.

Here is a scale drawing of the front of a house.

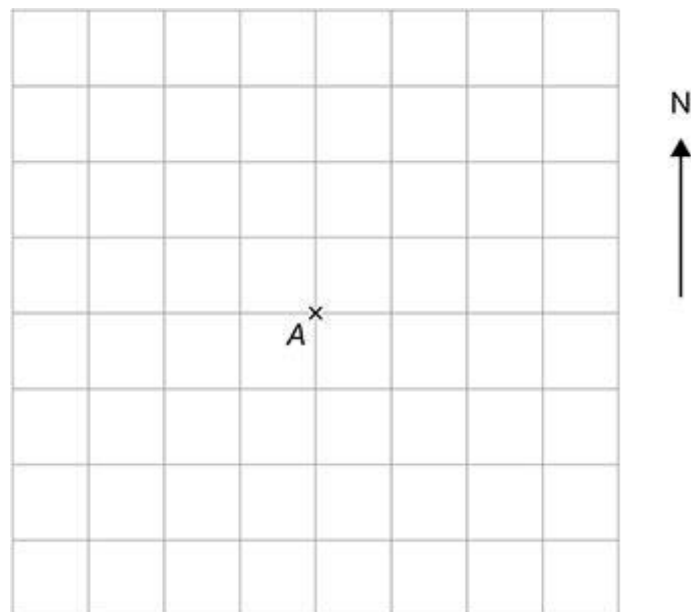


The actual height of the door is 2 metres.
Work out the actual height of the house.

(Total 3 marks)

Q15.

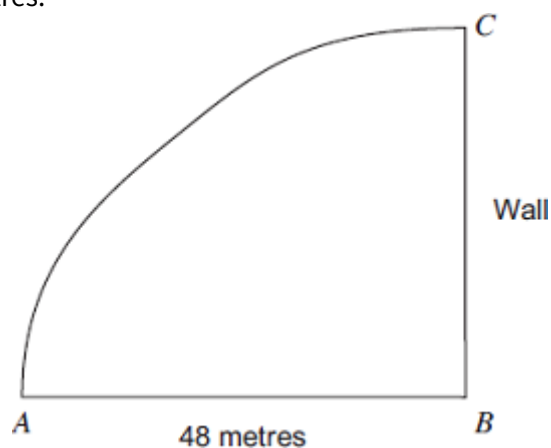
Point *B* is 400 metres north east of point *A*.
Mark point *B* on the centimetre grid.
Use a scale of 1 centimetre represents 100 metres.



(Total 2 marks)

Q16.

Here is a scale drawing of a park.
A to B measures 48 metres.



A wall is to be built from B to C.
250 bricks are needed for each metre of wall.
Work out the total number of bricks needed to build the wall.

(Total 5 marks)

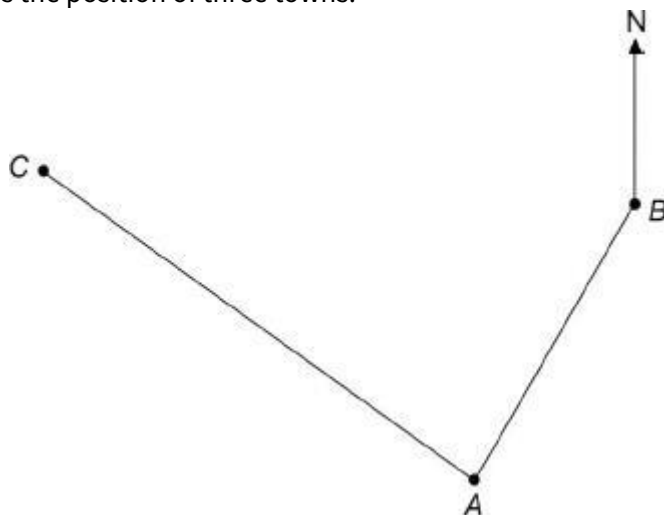
Scale diagrams – Drawing and interpreting scale diagrams – Cross topic questions

For questions 17 to 23 you must **NOT** use a calculator.



Q17.

The diagram shows the position of three towns.



Scale: 1 cm represents 50 km

- (a) Write down the three-figure bearing of A from B.

(1)

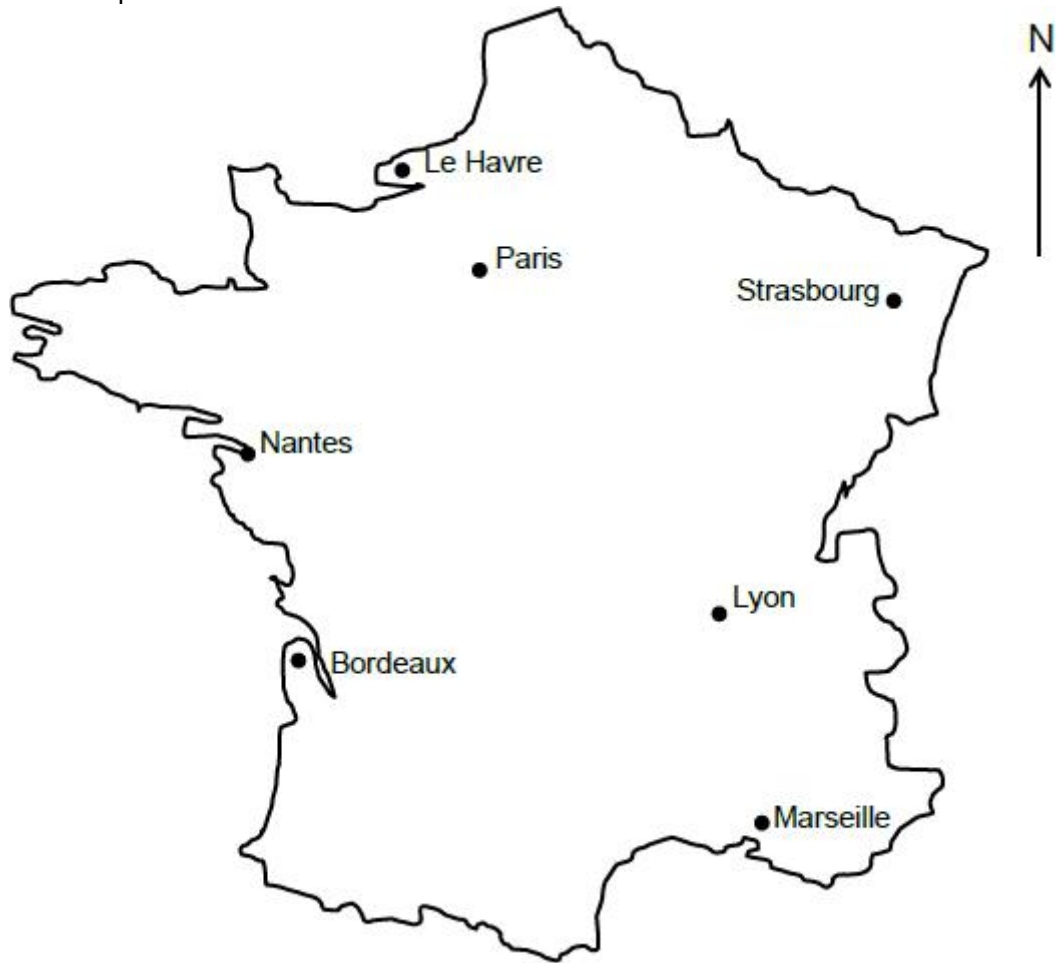
- (b) Work out the actual straight line distance from C to A.

(2)

(Total 3 marks)

Q18.

Here is a map of France.



Scale: 1 cm represents 80 km

- (a) Estimate the time it would take to drive from Nantes to Paris.

Assume

- the road is straight
- an average speed of 100 km/h

(4)

- (b) Comment on how each assumption affects the accuracy of your estimate.

(2)

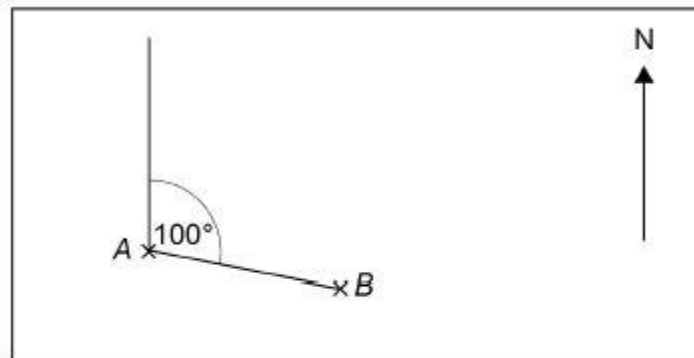
(Total 6 marks)

Q19.

- (a) Here is a map showing points A and B .



Kemal wants to measure the bearing of **A from B** .
He draws two lines and measures the angle between them.



Kemal says that the bearing of A from B is 100° .
Is his method correct?
Give a reason for your answer.

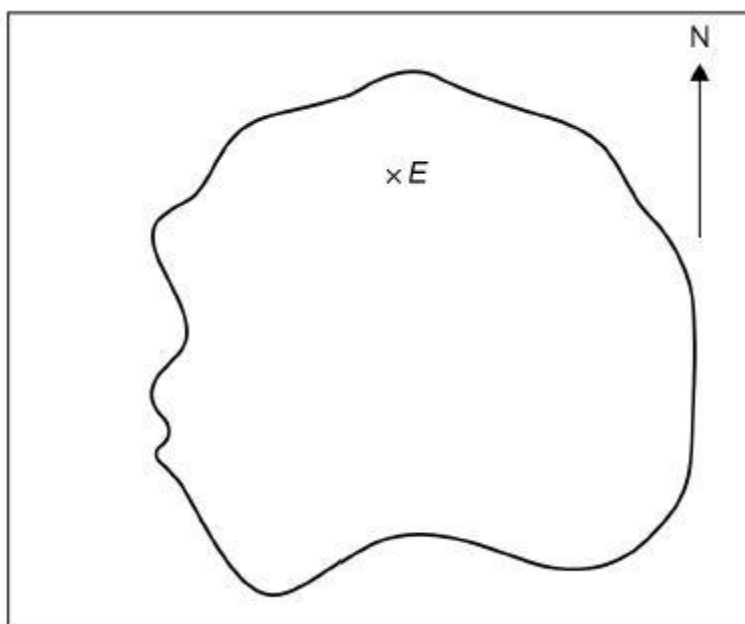
(1)

- (b) On a different map, the bearing of D from C is 045° .
Nina says,
 " D is North West of C ."
Is Nina correct?
Give a reason for your answer.

(1)

(c) This map shows an airport, E , on an island.

Scale: 1 cm represents 100 km



A plane flies due South from the airport.
How far does it fly until it reaches the sea?

(3)

(Total 5 marks)

Q20.

Circle the ratio which is the same as the scale 1 cm represents 1 km

1 : 100

1 : 1000

1 : 10 000

1 : 100 000

(Total 1 mark)

Q21.

Here is a map of France.



Scale: 1 cm represents 80 km

- (a) What is the three-figure bearing of Lyon from Bordeaux?
Circle your answer.

005° 085° 095° 175°

(1)

- (b) Work out the actual straight-line distance from Paris to Marseille.

(2)

(Total 3 marks)

Q22.

Here is a map of France.



Scale: 1 cm represents 80 km

- (a) Estimate the time it would take to drive from Paris to Marseille.

Assume

- the road is straight
- an average speed of 100 km/h

(4)

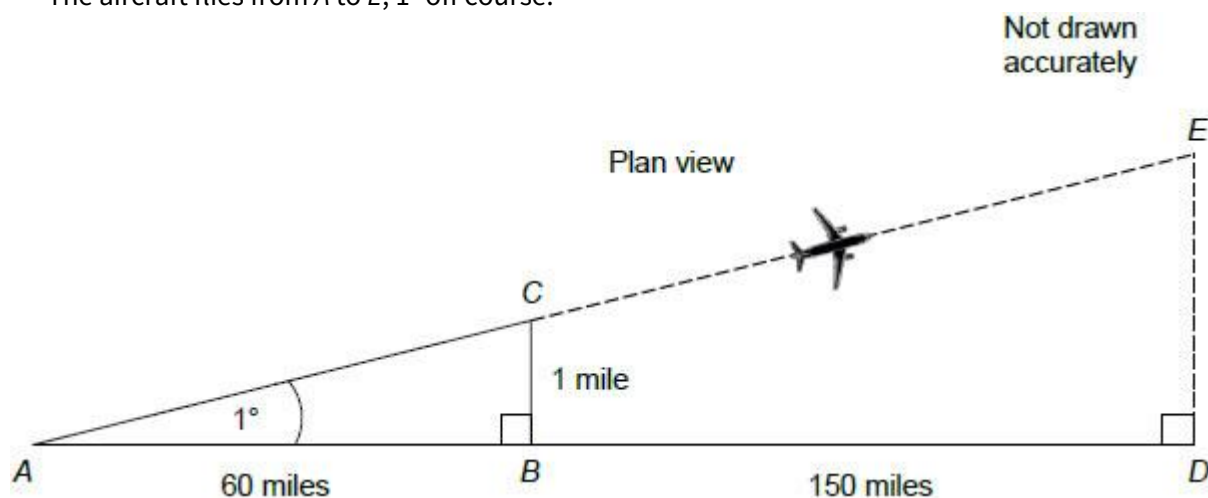
- (b) Comment on how each assumption affects the accuracy of your estimate.

(2)

(Total 6 marks)

Q23.

The pilot of an aircraft wants to fly from A to D .
The aircraft flies from A to E , 1° off course.



- (a) The distance BC is 1 mile.
Work out the distance DE

(2)

- (b) How should the aircraft have turned at C to fly directly towards D ?
Tick a box.

1° clockwise

between 1° and 2° clockwise

2° clockwise

more than 2° clockwise

(1)

(Total 3 marks)

For the remaining questions, you may use a calculator.



Q24.

A map has a scale of $1 : 4000$

On the map, the distance from a station to a museum is 7 cm

Is the **actual** distance from the station to the museum **more** than 300 m?

Tick a box.

Yes

☐

No

☐

Show working to support your answer.

(Total 3 marks)

Q25.

A map has a scale of 1 : 20 000
Two churches are 15 cm apart on the map.
Work out the actual distance between them.
Give your answer in **kilometres**.

(Total 3 marks)

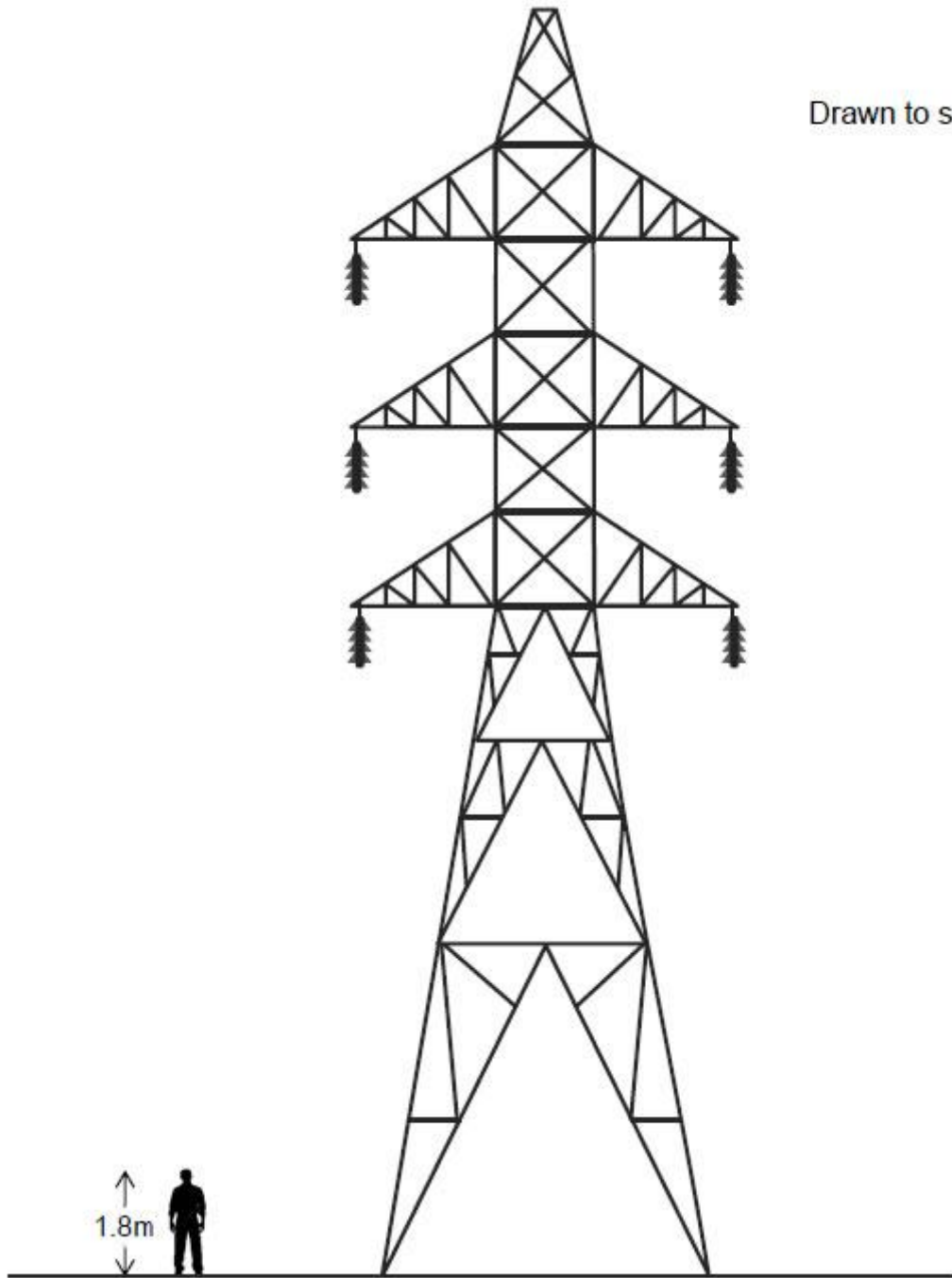
Q26.

A map has a scale of 1 : 5000
How many **metres** are represented by a length of 4.5 cm on the map?

(Total 2 marks)

Q27.

Drawn to scale

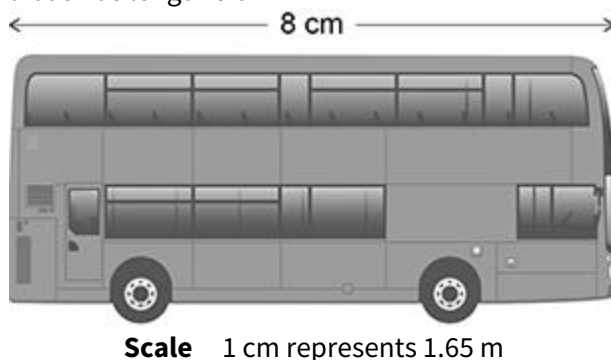


Use the height of the man to estimate the height of the pylon.

(Total 2 marks)

Q28.

This scale drawing of a bus has length 8 cm



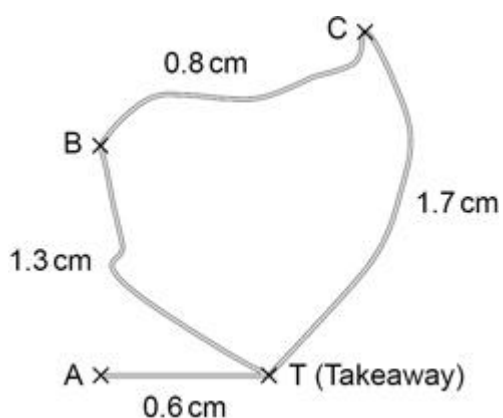
The actual length of the bus is 3.8 times the actual length of a car.
Work out the actual length of the car.
Give your answer in metres, to the nearest centimetre.

(Total 3 marks)

Q29.

Des delivers takeaways to houses A, B and C.

Scale: 1 cm represents 3 miles



Not drawn
accurately

Des drives
from T to A and back
and
from T to B, then B to C, then C to T.

Des is paid
40p for each mile he drives
and
£1.35 for each house he delivers to.

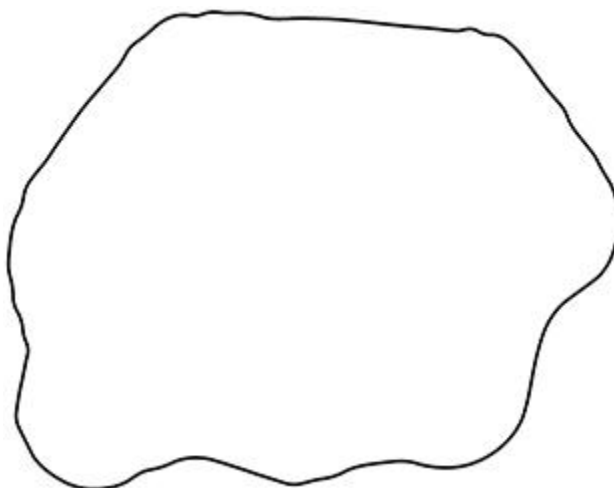
How much is Des paid in total for this work?

(Total 4 marks)

Q30.

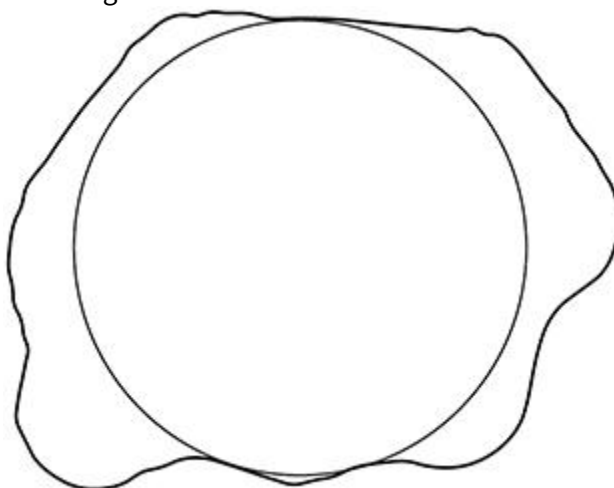
Here is a scale drawing of a reservoir.

Scale: 1 cm represents 500 m



Virat wants to estimate the volume of water in the reservoir.

He draws on the scale drawing a circle with radius 3 cm



- (a) Virat estimates the volume of the reservoir by assuming that
- the reservoir is a cylinder whose cross section is the circle
 - the depth of the reservoir is 17 metres.

Work out Virat's estimate in cubic metres.

(3)

- (b) In fact,
- the depth of the reservoir is 13.8 metres
 - the reservoir is **not** a cylinder (see diagram).

Which statement about the actual volume of the reservoir is correct?

Tick **one** box.

☐
☐
☐

It is less than Virat's estimate

It is greater than Virat's estimate

It could be less than or greater than Virat's estimate

Give a reason for your answer.

(2)

(Total 5 marks)

Q31.

The scale on a map is 1 : 200 000

Work out the number of kilometres represented by 2 cm on the map.

(Total 2 marks)

Q32.

On a map the distance between two towns is 5 cm.

The actual distance is 2 km.

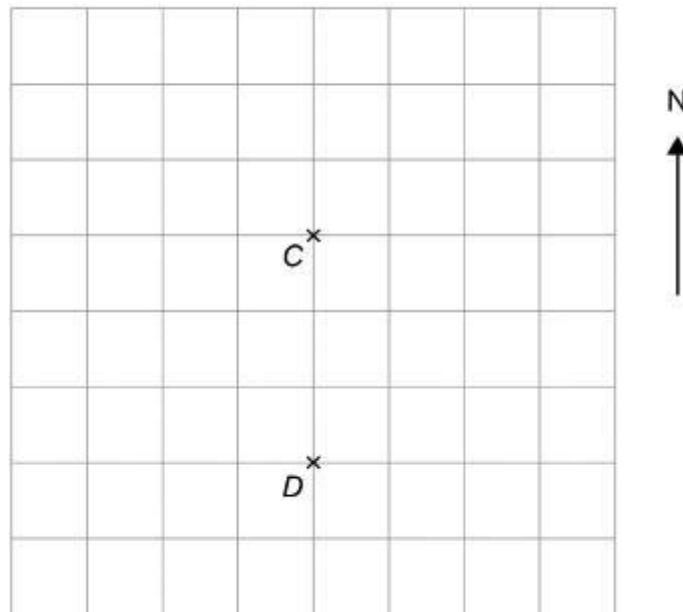
Work out the scale of the map as a ratio in its simplest form.

(Total 3 marks)

Q33.

Points *C* and *D* are shown on a centimetre grid.

Scale: 1 : 1000



(a) Work out the bearing of *D* from *C*.

(1)

(b) Work out the actual distance, in metres, of *D* from *C*.

Use the scale 1 : 1000

(1)

(Total 2 marks)

Q34.

A drawing has a scale of 1 : 40

On the drawing, a bedroom is a rectangle measuring 10 cm by 18 cm

A kitchen has an actual area of 300 000 cm²

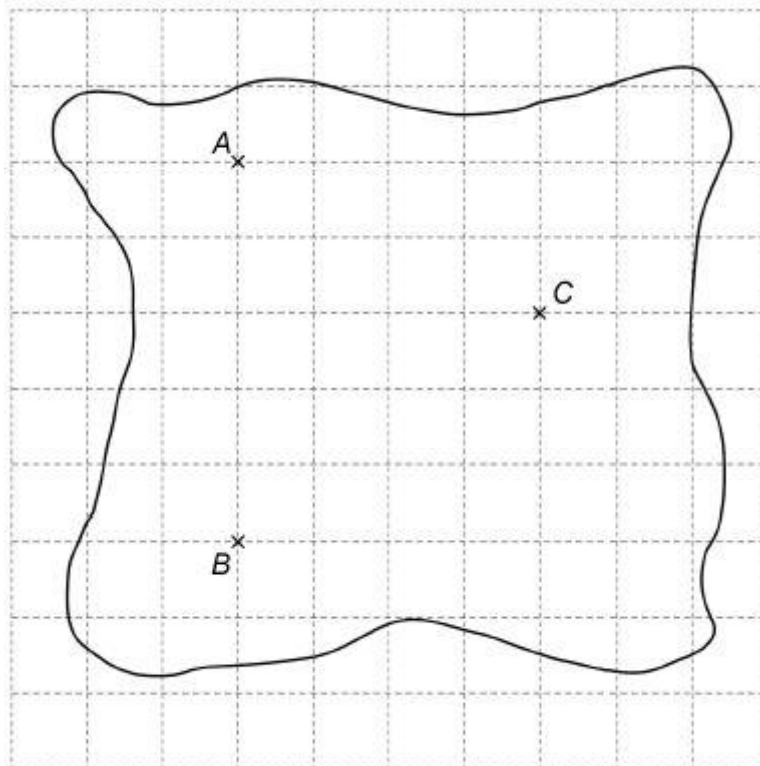
Which has the bigger actual area, the kitchen or the bedroom?

You **must** show your working.

(Total 4 marks)

Q35.

A map of an island is shown on a centimetre grid.
 A , B and C are houses.



- (a) The actual distance between A and B is 1500 metres.
Show that the scale on the map is $1 : 30\,000$
- (b) Work out the actual distance between A and C .
Give your answer in kilometres.

(2)

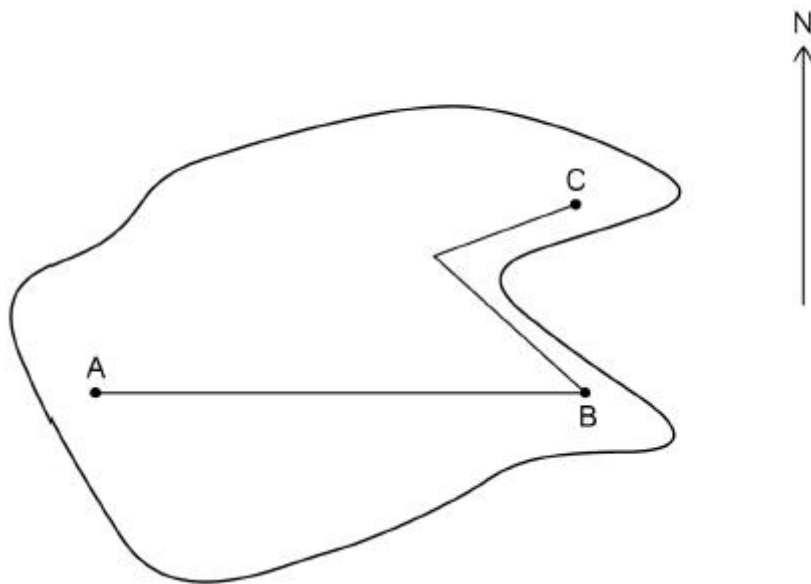
(4)

(Total 6 marks)

Q36.

Here is a map of an island with cities A, B and C.
The straight lines represent roads.

Scale: 1 cm represents 200 km



- (a) A is due West of B.
Write down the bearing of A from B.
- (b) Umar drives from A to B on the route shown.
Kaz drives from B to C on the route shown.
Use the map to work out how much further Umar drives than Kaz.
You **must** show your working.

(1)

(5)

(Total 6 marks)

Q37.

The scale on a map is 1 : 200 000
Work out the number of kilometres represented by 2.5 cm on the map.

(Total 2 marks)

Q38.

Circle the ratio which is the same as the scale 1 cm represents 2 m

1 : 2 1 : 20 1 : 200 1 : 2000

(Total 1 mark)

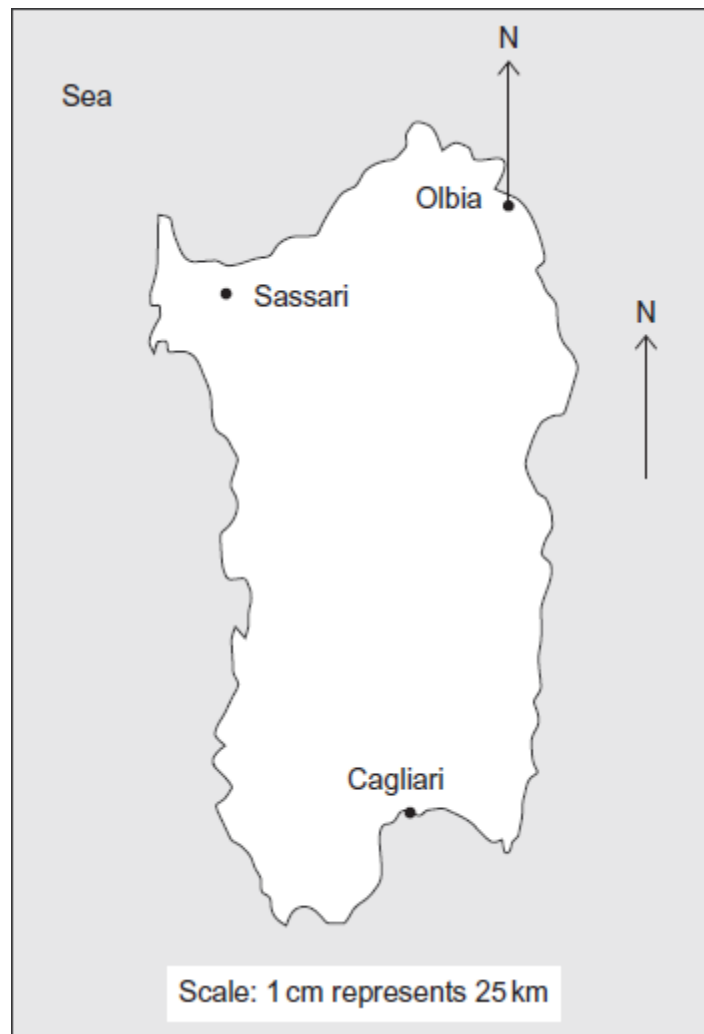
Q39.

On a map the distance between two towns is 6 cm.
The actual distance is 1.2 km
Work out the scale of the map as a ratio in its simplest form.

(Total 3 marks)

Q40.

Here is a map of Sardinia.



- (a) Work out the **actual** distance between Cagliari and Sassari.

(3)

- (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)

(Total 5 marks)

Q41.

- (a) The scale on a map is 1 : 20 000
What is the actual distance represented by 1 centimetre?
Give your answer in metres.
- (b) The scale on a different map is 1 inch represents 4 miles.
A road on the map measures 6 inches to the nearest inch.
What is the shortest possible distance of the road?

(2)

(3)

(Total 5 marks)

Q42.

- (a) The scale on a map is $1 : 250\,000$
What is the actual distance represented by 1 centimetre?
Give your answer in kilometres.
- (b) The scale on a different map is 1 inch represents 4 miles.
A road on the map measures 6 inches to the nearest inch.
What is the shortest possible distance of the road?

(3)

(3)

(Total 6 marks)

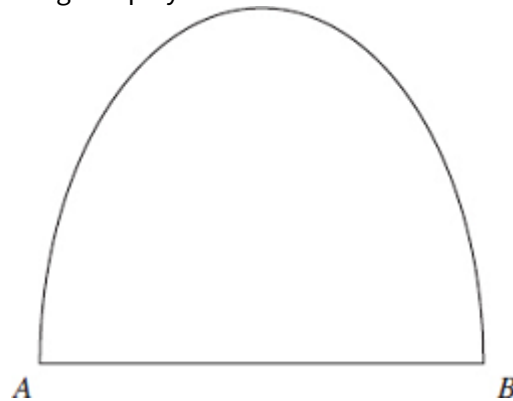
Q43.

The scale on a map is $1 : 500\,000$
Two towns are 8 cm apart on the map.
Work out the actual distance between the towns.
Give your answer in kilometres.

(Total 3 marks)

Q44.

Here is a scale drawing of a play area.



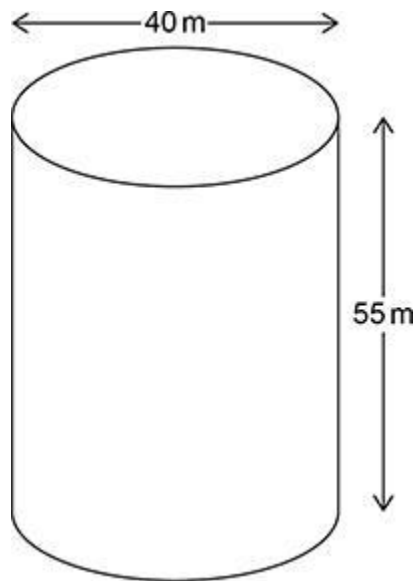
Scale $1 : 800$

A straight wall is to be built from *A* to *B*.
250 bricks are needed for each metre of wall.
Work out the total number of bricks needed to build the wall.

(Total 4 marks)

Q45.

A building in the shape of a cylinder has diameter 40 m and height 55 m



- (a) On the centimetre grid, draw a **plan** of the building.
Use a scale of 1 cm to 10 m



(2)

- (b) On this centimetre grid, draw the **front elevation** of the building.
Use a scale of 1 cm to 10 m



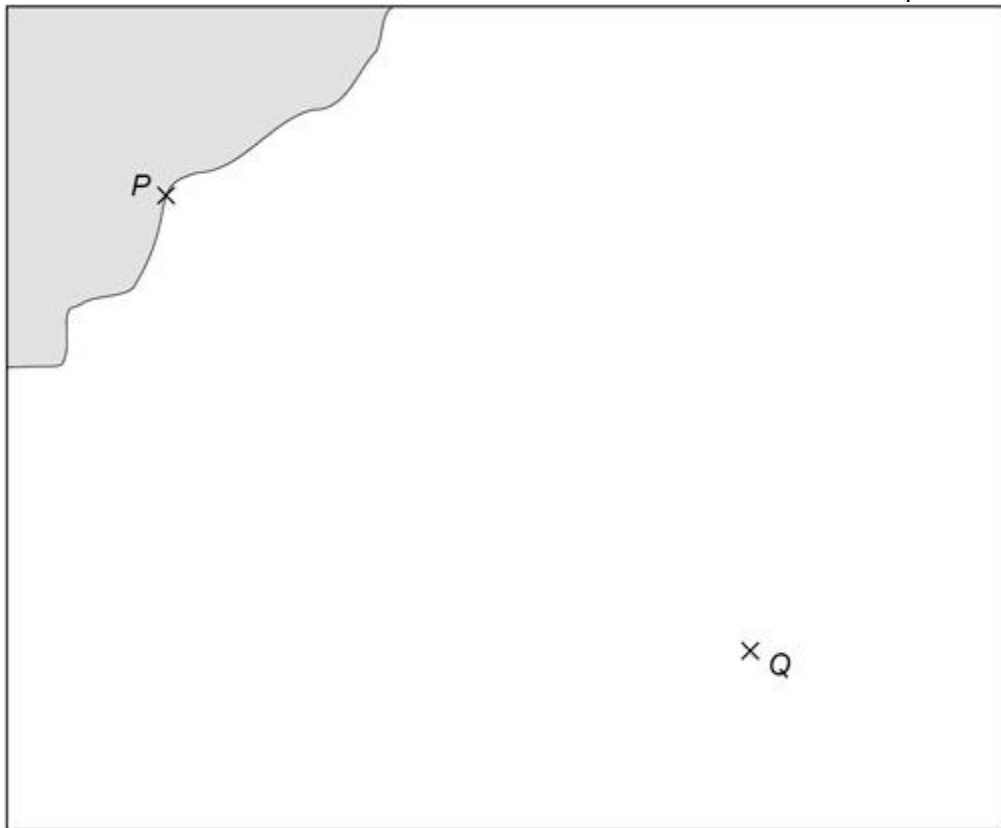
(2)
(Total 4 marks)

Q46.

Use a ruler and compasses in this question.

The scale diagram shows port P and lighthouse Q .

Scale: 1 cm represents 2 km



A ship is

less than 14 km from P

and

closer to Q than to P .

Label the region, R , where the ship could be.

Show all your construction lines.

(Total 4 marks)

Q47.

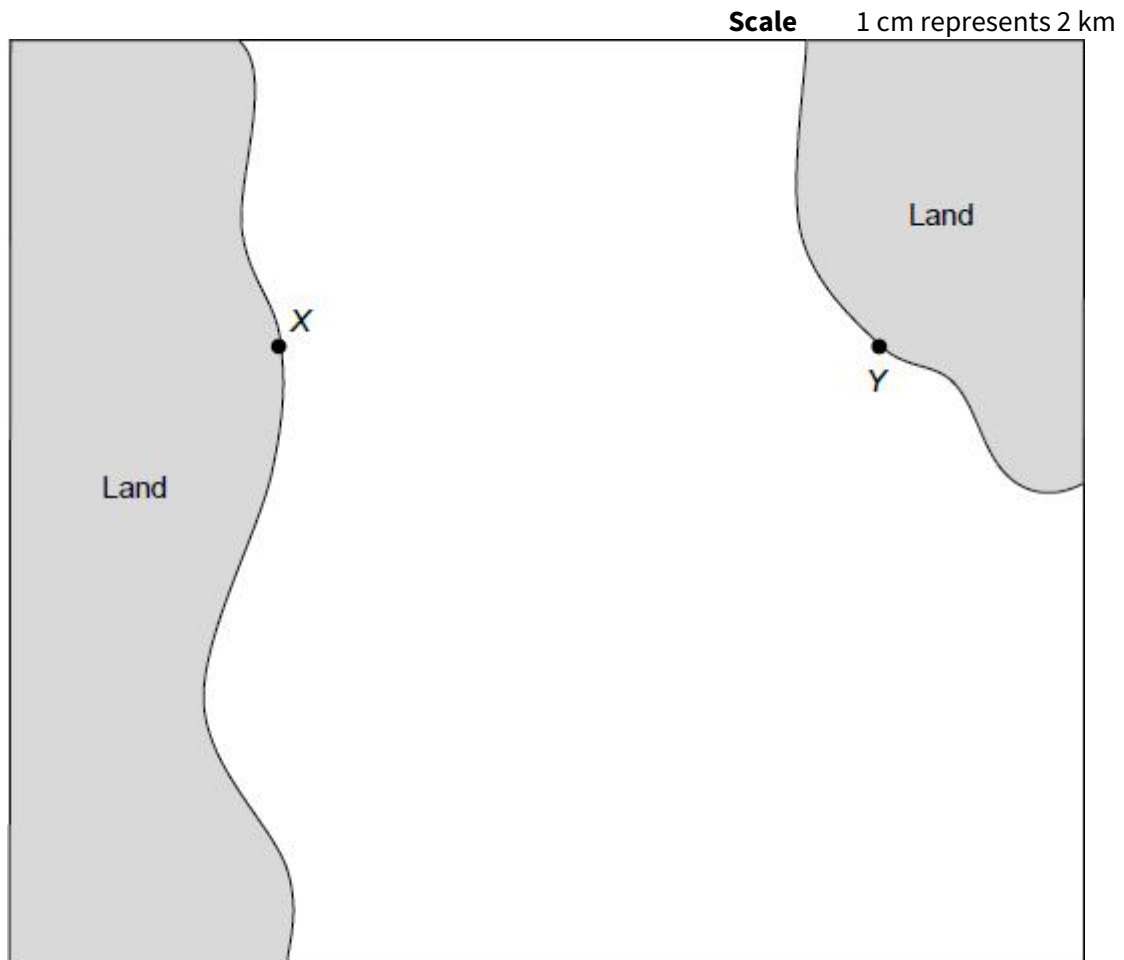
Use ruler and compasses for this question.

A wind turbine needs to be positioned
closer to port Y than port X
less than 12 km from X .

The map below shows the positions of X and Y .

On the map, show the region where the wind turbine could be positioned.

Label it R .



(Total 4 marks)

Q48.

An equilateral triangle has side length 16 metres.

Using ruler and compasses only, construct a scale drawing of the triangle.

Use the scale 1 centimetre represents 2 metres.

Scale: 1 cm represents 2 m

(Total 3 marks)

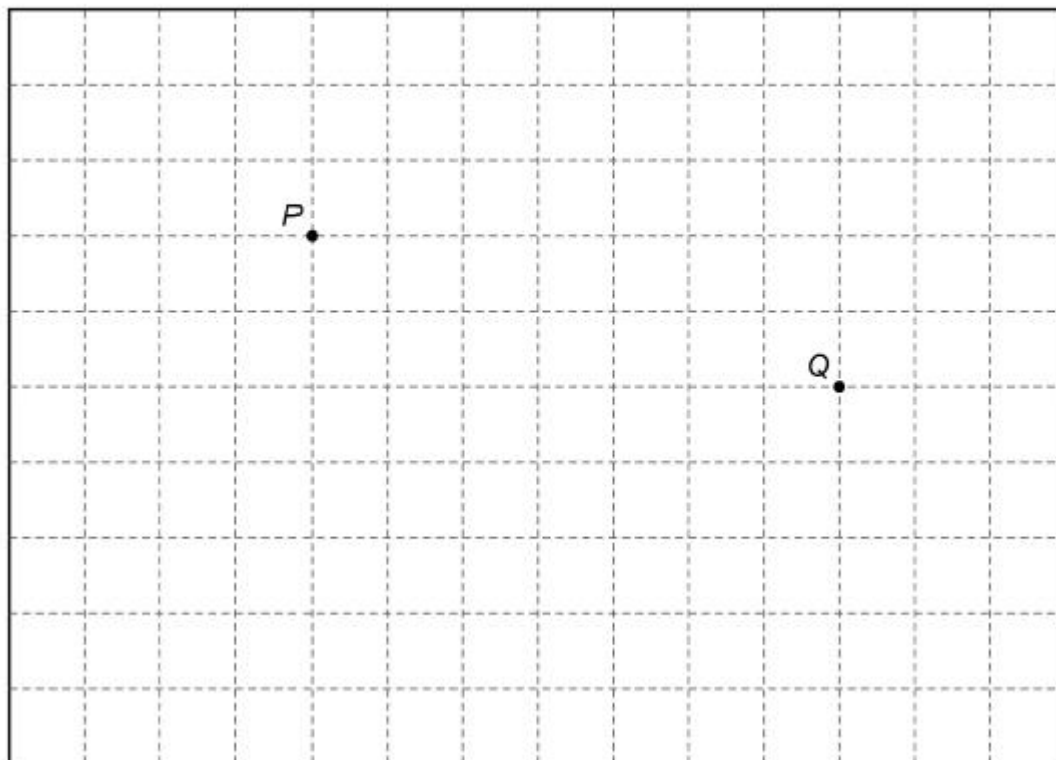
Q49.

The scale drawing represents a garden.

Water from a sprinkler at P reaches up to 20 metres from P .

Water from a sprinkler at Q reaches up to 25 metres from Q .

Scale: 1 cm represents 5 m



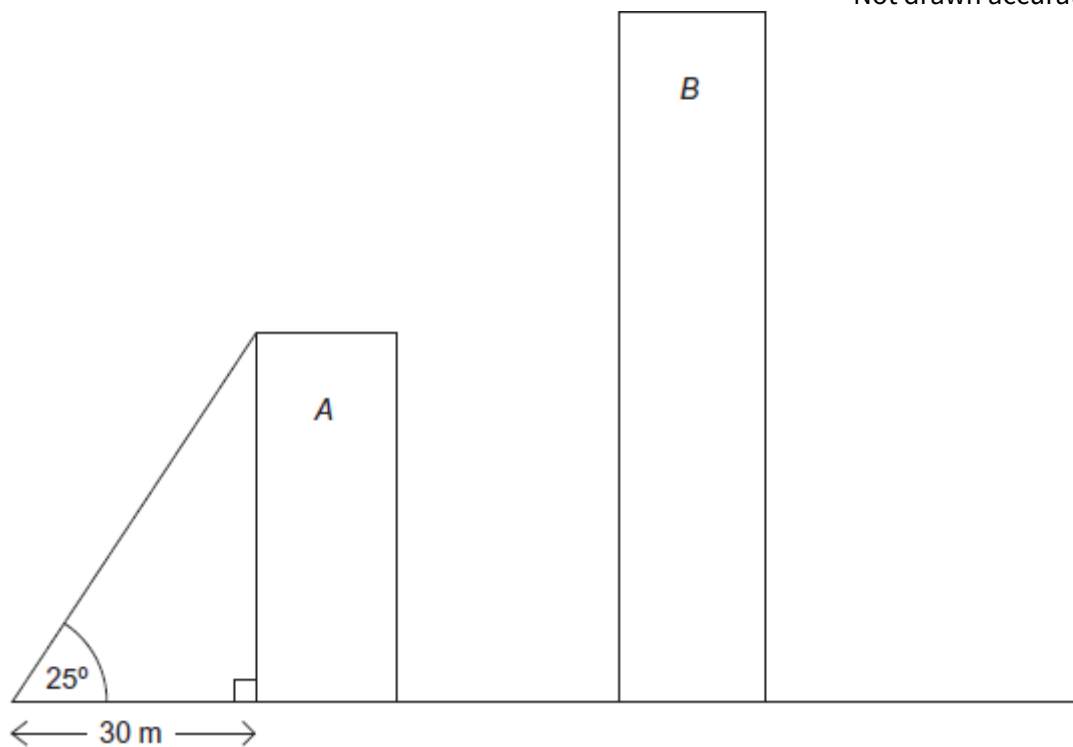
Using a pair of compasses,
show the region that water from **both** sprinklers reaches.

(Total 2 marks)

Q50.

The diagram shows two buildings, *A* and *B*.
The heights of the buildings are in the ratio 3 : 5

Not drawn accurately



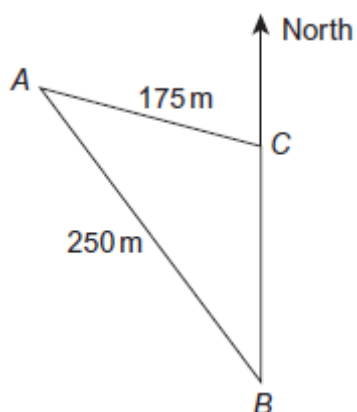
Work out the height of building *B*.

(Total 4 marks)

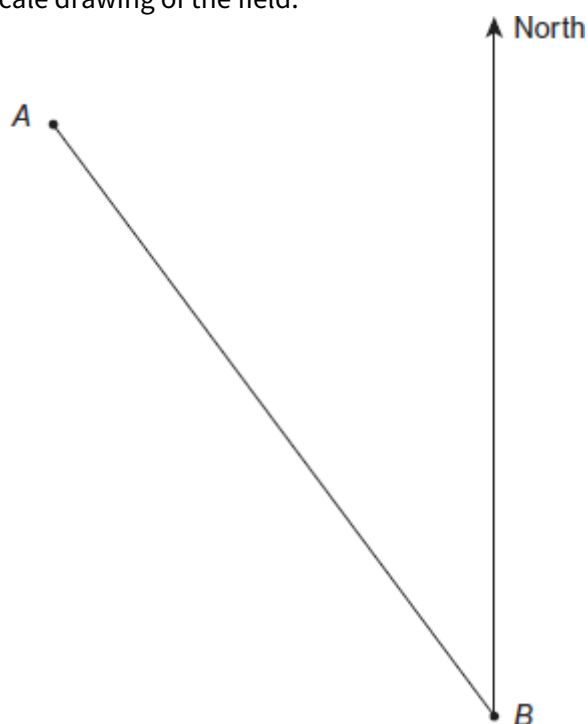
Q51.

(a) Here is a sketch of a triangular field ABC .

Not drawn accurately

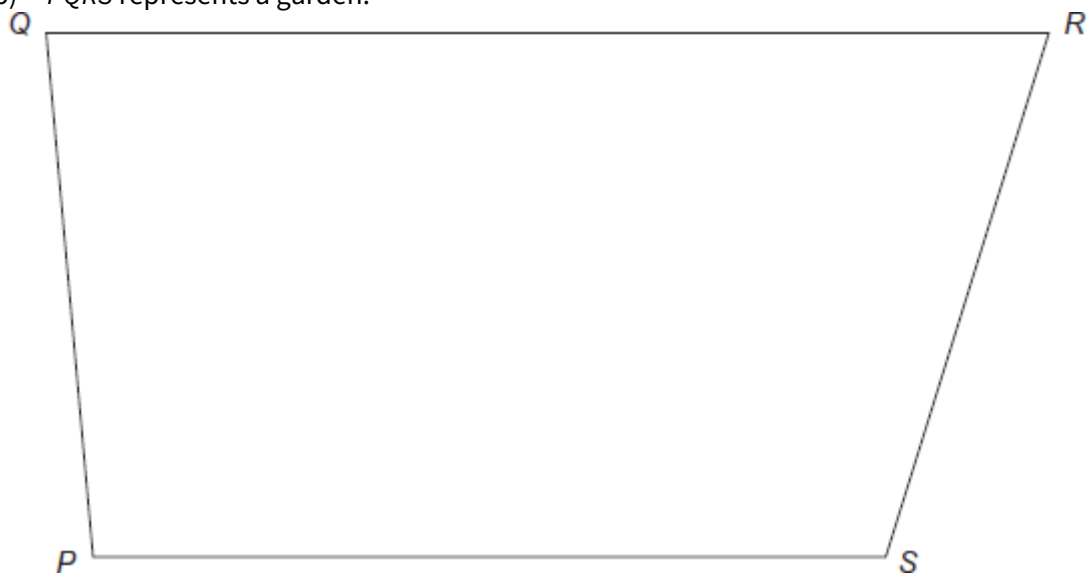


Complete this scale drawing of the field.



(3)

(b) $PQRS$ represents a garden.



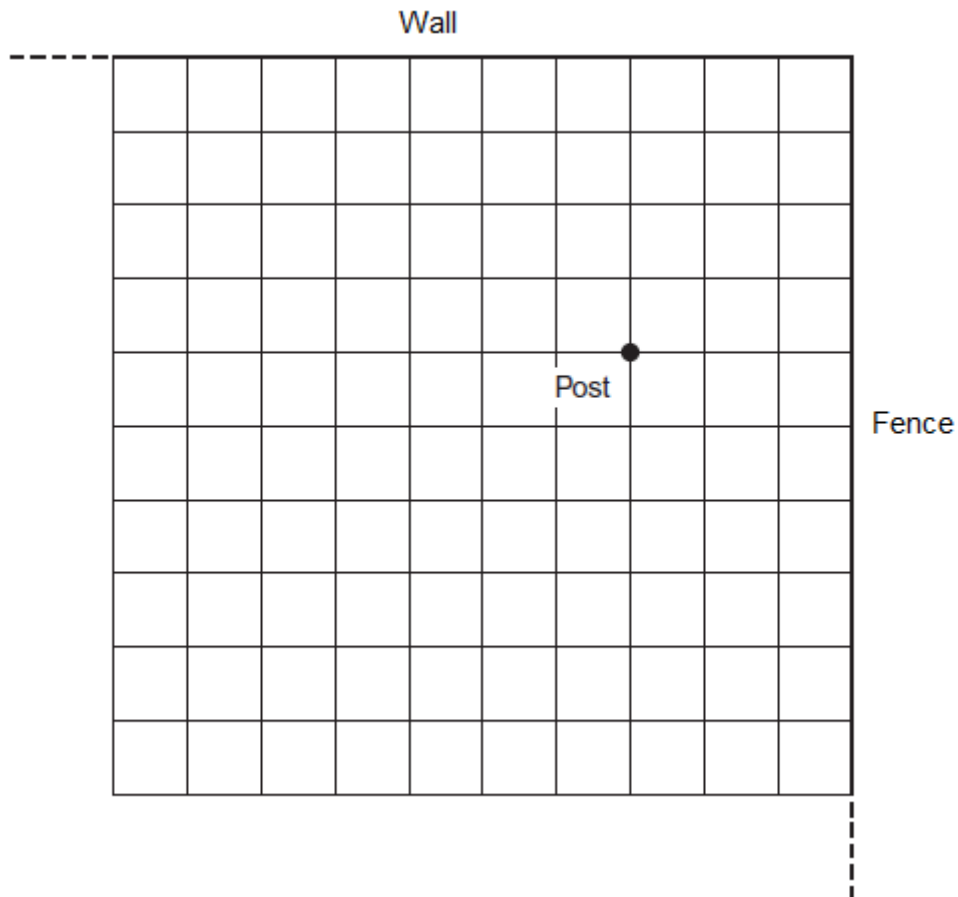
A straight path across the garden is the same distance from PQ and PS .
Use ruler and compasses to construct the position of the path.

(2)
(Total 5 marks)

Q52.

The scale drawing shows a post which is 1.5 metres from the fence.

Drawn
to scale



- (a) How far is the post from the wall?

(1)

- (b) A pony is tied to the post by a rope.

The pony can reach 2.5 metres from the post.

On the scale drawing, show accurately the area that the pony can reach.

(2)

- (c) Work out the scale of the drawing as a ratio.

Give your answer in its simplest form.

(3)

(Total 6 marks)