

R16 Ratio-Maps and Scales

OCR

13 (a) The ratio 20 minutes to 1 hour can be written in the form $1:n$.

Find the value of n .

(a) $n = \dots\dots\dots$ [1]

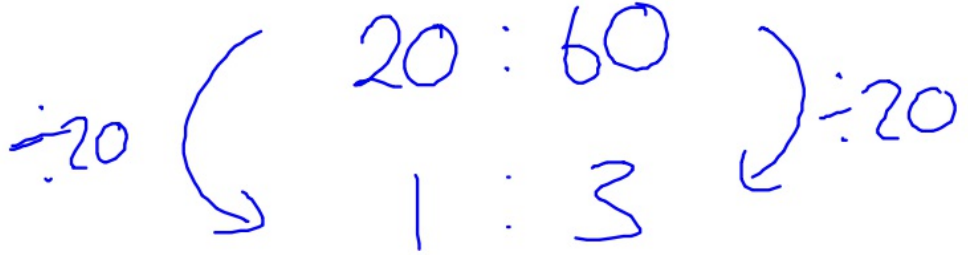
(b) The scale on a map is $1:25\,000$.

How many kilometres on the ground is represented by 6 cm on the map?

(b) $\dots\dots\dots$ km [3]

13 (a) The ratio 20 minutes to 1 hour can be written in the form 1 : n.

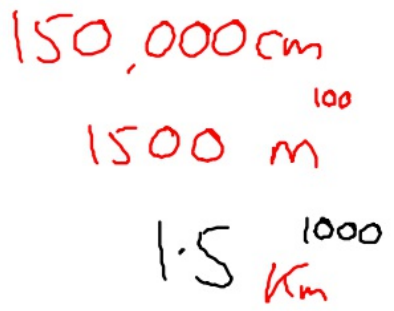
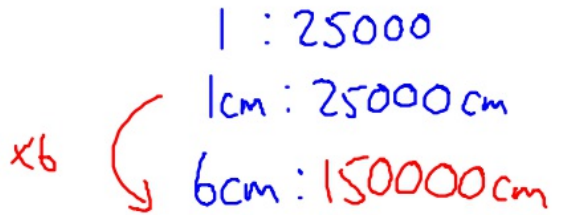
Find the value of n.



(a) n = 3 [1]

(b) The scale on a map is 1 : 25000.

How many kilometres on the ground is represented by 6 cm on the map?



(b) 1.5 km [3]

17 (a) The scale of a map is 1 cm represents 25 m.

(i) The length of a path is 240 m.

Work out the length, in centimetres, of the path on the map.

(a)(i)cm [1]

(ii) The scale 1 cm represents 25 m can be written in the form $1:k$.

Find the value of k .

(ii) $k =$ [1]

17 (a) The scale of a map is 1 cm represents 25 m.

(i) The length of a path is 240 m.

Work out the length, in centimetres, of the path on the map.

$$\begin{array}{l} \times 9.6 \quad \left(\begin{array}{l} 1 \text{ cm} = 25 \text{ m} \\ = 240 \text{ m} \end{array} \right) \times 9.6 \end{array}$$

(a)(i) 9.6 ✓ cm [1]

(ii) The scale 1 cm represents 25 m can be written in the form 1:k. $100 \text{ cm} = 1 \text{ m}$

Find the value of k.

$$1 \text{ cm} = 2500 \text{ cm}$$

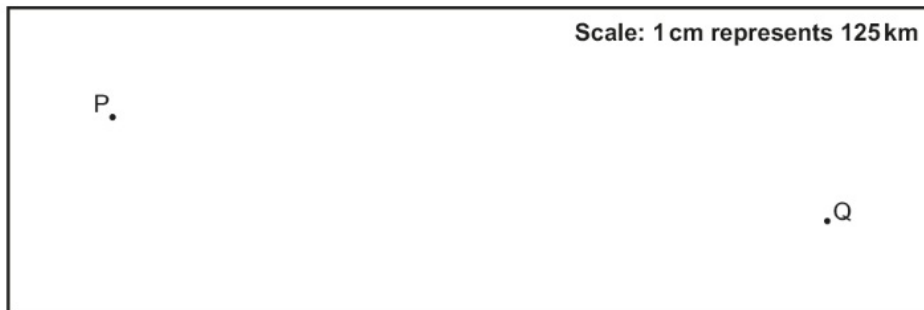
(ii) k = 2500 [1]

19 The scale diagram below shows two cities, P and Q.

A plane departs from P at 0947 and arrives at Q at 1207.

R16 (a) Work out the average speed, in kilometres per hour, of the plane.

R20



(a)km/h [5]

(b) Give one reason why your answer may be inaccurate.

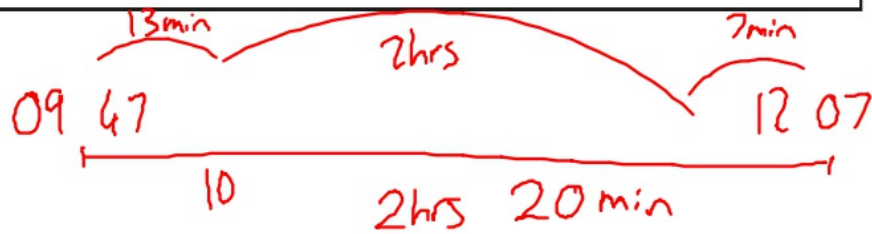
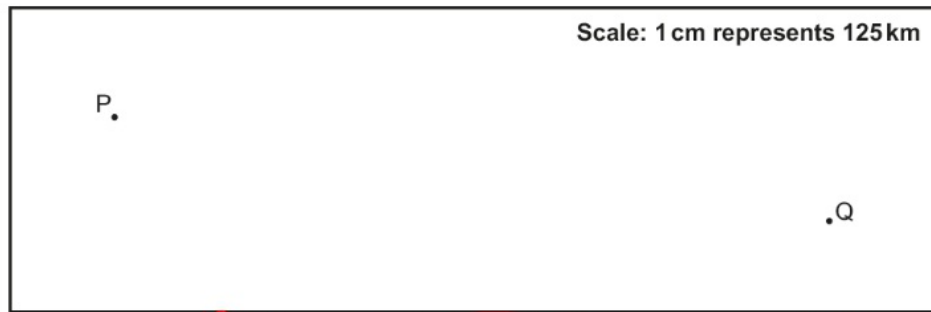
.....
..... [1]

19 The scale diagram below shows two cities, P and Q.

A plane departs from P at 0947 and arrives at Q at 1207.

R16 (a) Work out the average speed, in kilometres per hour, of the plane.

R20



Measure = 11.6 cm

$$11.6 \text{ cm} \times 125 = 1450 \text{ km} \checkmark$$

20 min
1/3 hr
0.3



$$S = \frac{1450}{2.3}$$

$$S = 621.4 \text{ km/h} \checkmark$$

(a) 610.7 - 632.2 km/h km/h [5]

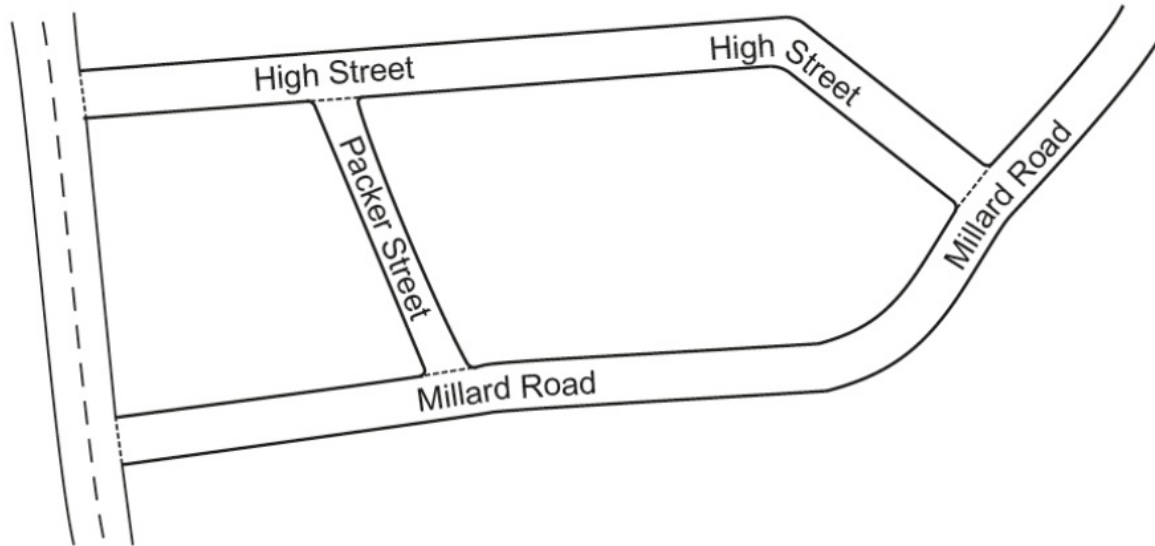
(b) Give one reason why your answer may be inaccurate.

Measured incorrectly / Maybe aeroplane has not flown
straight [1]

23 This map shows part of a village.

Video created by W Neill

R16
R26



Neil knows that Packer Street is 180 m long in real life.

(a) Neil measures the map.

He says

Packer Street is 3.5 cm long.
High Street is 11.2 cm long.

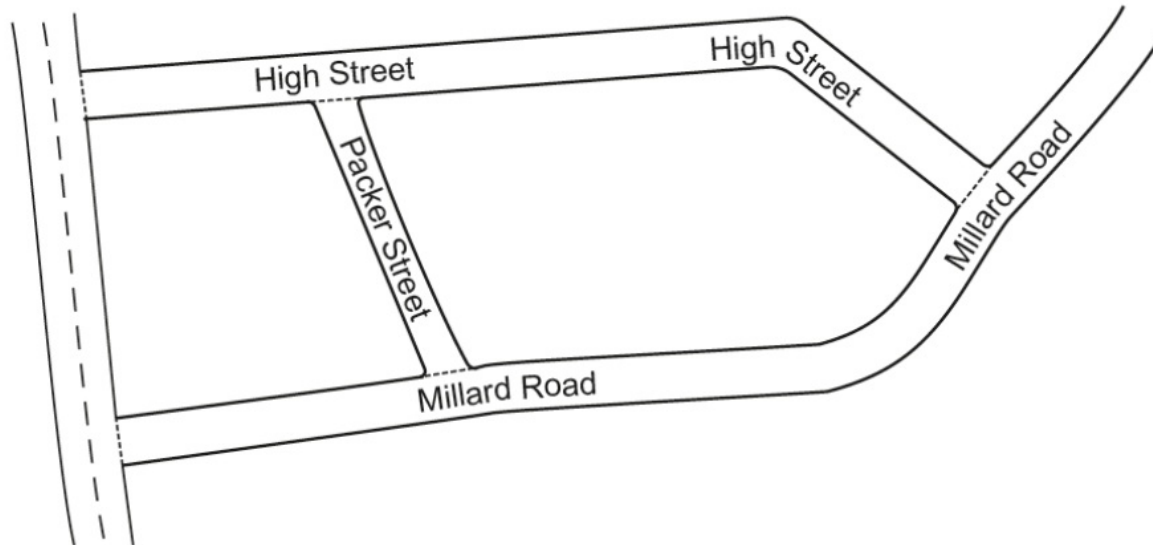
Therefore, I calculate that High Street is 576 m long in real life.

Use Neil's figures to show that the answer to his calculation is correct.

[3]

23 This map shows part of a village.

Video created by W Neill



Neil knows that Packer Street is 180m long in real life.

(b) Jodie measures the same map.

She says

I think Packer Street is longer than Neil's measurement of 3.5 cm.
Therefore, High Street must be longer than 576 m in real life.

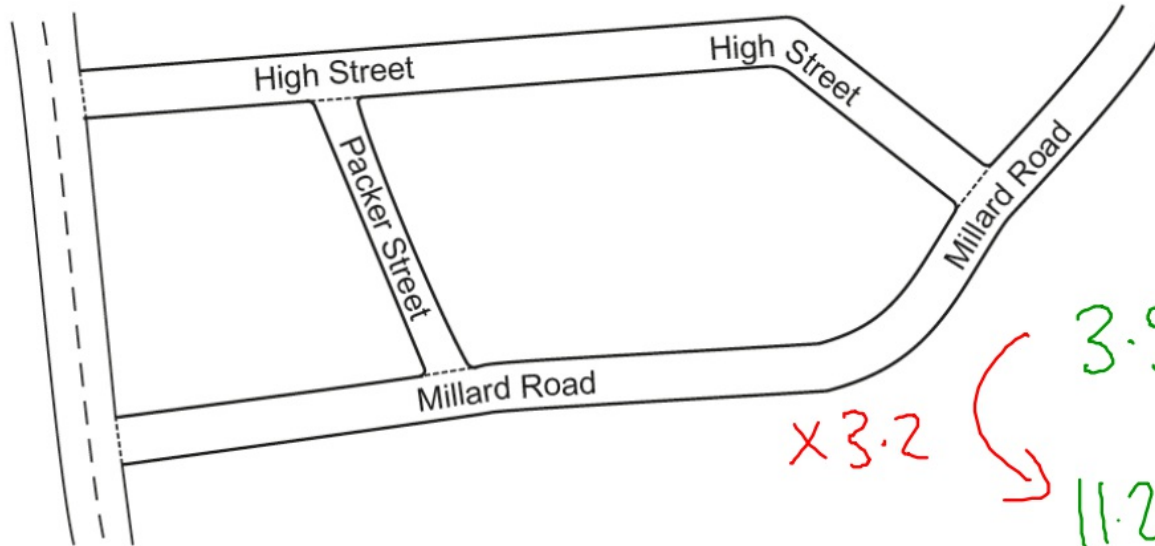
Is Jodie's reasoning correct?
Show how you decide.

..... [2]

23 This map shows part of a village.

Video created by W Neill

R16
R26



$$\begin{aligned} 3.5 \text{ cm} &= 180 \text{ m} \\ 11.2 \text{ cm} &= 576 \text{ m} \end{aligned}$$

$\times 3.2$

$\left. \begin{array}{l} 3.5 \text{ cm} = 180 \text{ m} \\ 11.2 \text{ cm} = 576 \text{ m} \end{array} \right\} \times 3.2$

✓

Neil knows that Packer Street is 180 m long in real life.

(a) Neil measures the map.

He says

Packer Street is 3.5 cm long.
High Street is 11.2 cm long.

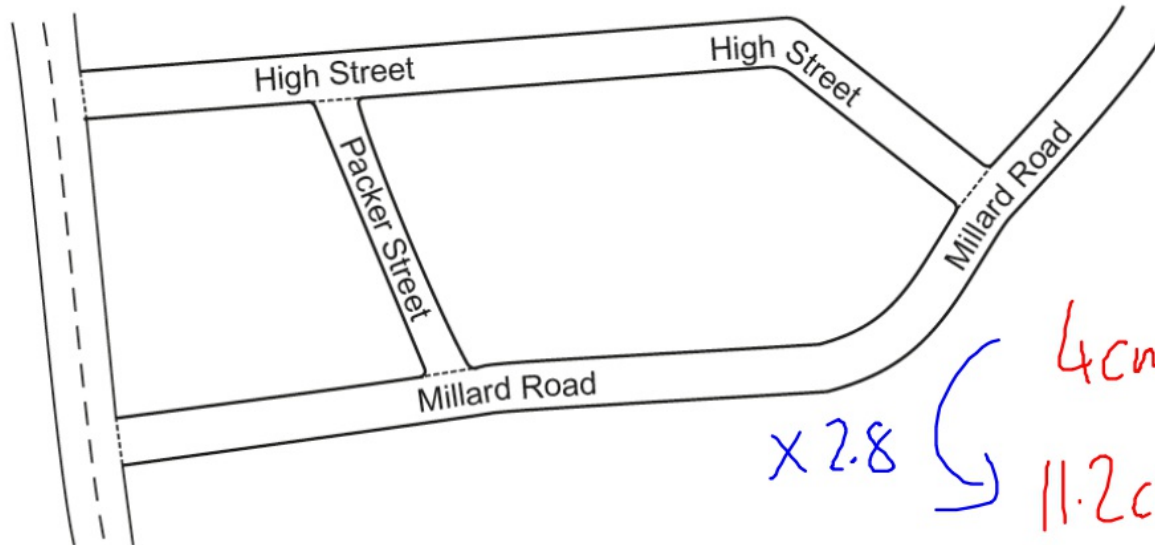
Therefore, I calculate that High Street is 576 m long in real life.

Use Neil's figures to show that the answer to his calculation is correct.

[3]

This map shows part of a village.

Video created by W Neill



$4\text{cm} = 180\text{m}$
 $11.2\text{cm} = 504\text{m}$

$\times 2.8$ $\times 2.8$

✓

Neil knows that Packer Street is 180m long in real life.

(b) Jodie measures the same map.

She says

I think Packer Street is longer than Neil's measurement of 3.5 cm.
Therefore, High Street must be longer than 576 m in real life.

Is Jodie's reasoning correct?
Show how you decide.

No, if it was longer than 3.5 cm the multiplier would be smaller. High street would be less.

13 A model railway is built using the scale 1 : 87.

(a) On the model railway, the distance between the rails is 16.5 mm.



Calculate, in metres, the distance between the rails for a full-size train.

(a) metres [2]

13 A model railway is built using the scale 1 : 87.

R16 (a) On the model railway, the distance between the rails is 16.5 mm.



Calculate, in metres, the distance between the rails for a full-size train.

$$16.5 \text{ mm} \times 87 = 1435.5 \text{ mm}$$

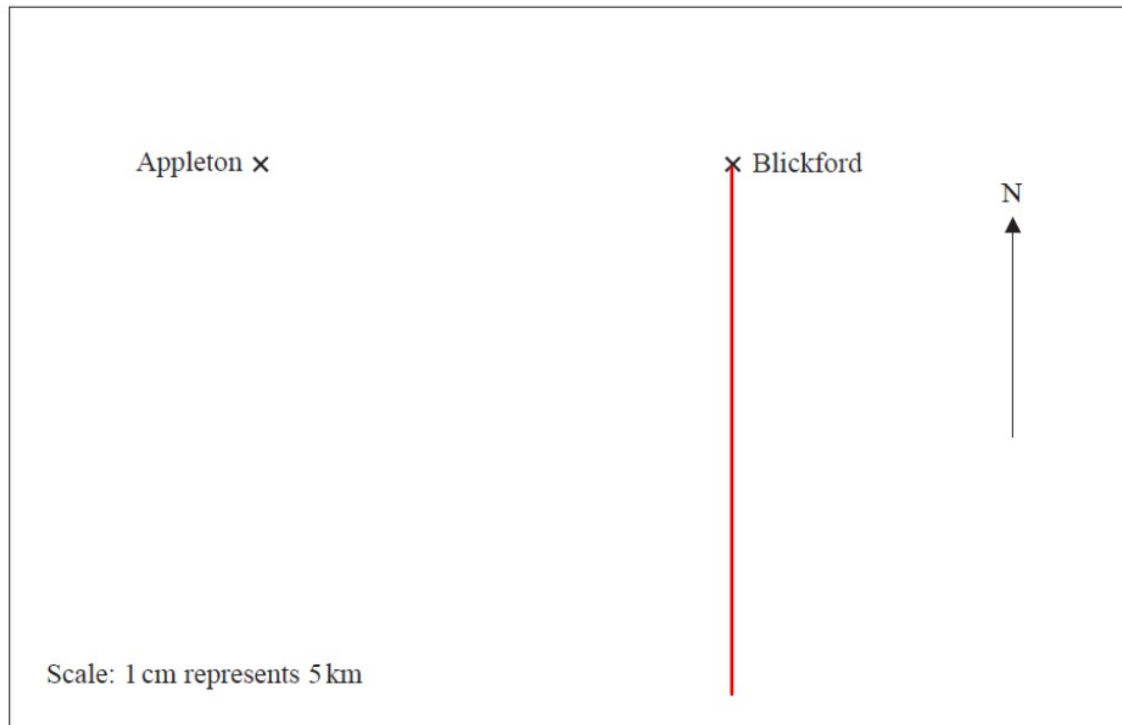
(a) metres [2]

$$= 143.55 \text{ cm}$$

$$= 1.4355 \text{ m} \checkmark \text{ ans}$$

Edexcel

8 Here is part of an accurately drawn map showing two towns, Appleton and Blickford.



(a) Find, in kilometres, the real distance between Appleton and Blickford.

..... km
(2)

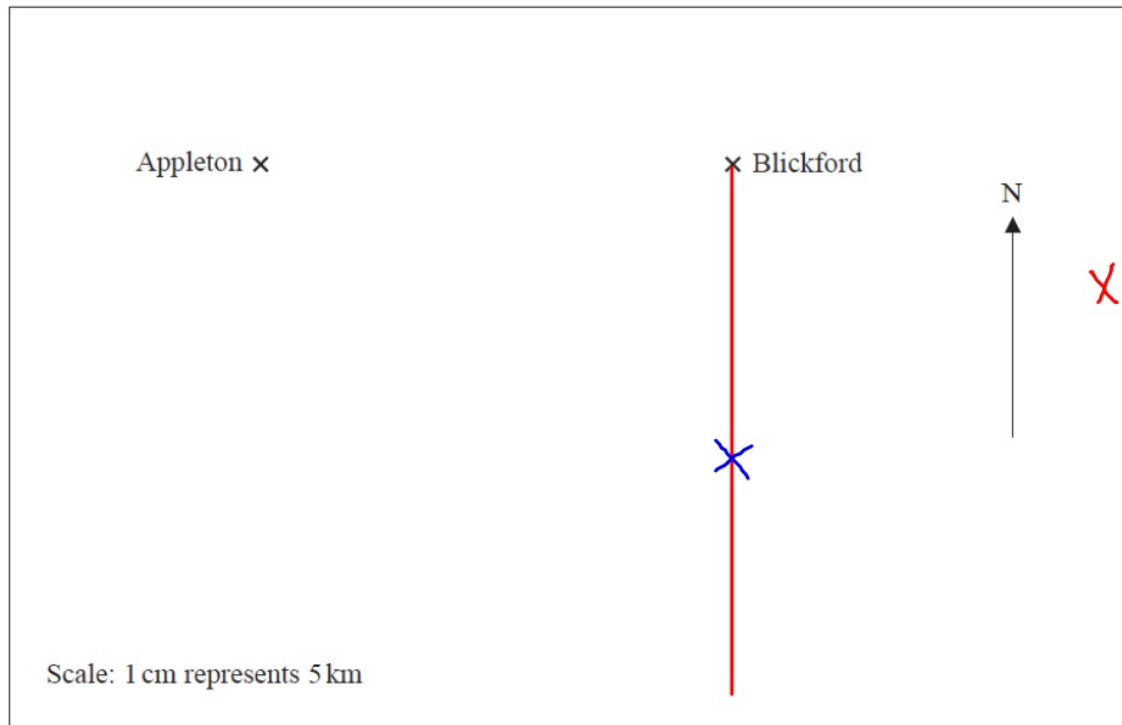
Cookwood is a town 22 km due South of Blickford.

(b) On the map, mark with a cross (x) the position of Cookwood.

(2)

(Total for Question 8 is 4 marks)

8 Here is part of an accurately drawn map showing two towns, Appleton and Blickford.



$1\text{cm} = 5\text{km}$
 $7\text{cm} = 35\text{km}$

$1\text{cm} = 5\text{km}$
 $4\text{cm} = 20\text{km}$
 $0.2\text{cm} = 1\text{km}$
 $0.4\text{cm} = 2\text{km}$

(a) Find, in kilometres, the real distance between Appleton and Blickford.

..... 35 km
(2)

Cookwood is a town 22 km due South of Blickford.

(b) On the map, mark with a cross (x) the position of Cookwood.

(2)

(Total for Question 8 is 4 marks)

11 A road map has a scale of 1 : 30 000

R16 The length of a road on the map is 7 cm.

Work out the length, in kilometres, of the real road.

..... kilometres

(Total for Question 11 is 3 marks)

11 A road map has a scale of 1 : 30 000

R16 The length of a road on the map is 7 cm.

Work out the length, in kilometres, of the real road.

$$100 \text{ cm} = 1 \text{ m}$$

$$1000 \text{ m} = 1 \text{ km}$$

$$\begin{array}{l} 1 : 30000 \\ 1 \text{ cm} : 30000 \text{ cm} \\ \times 7 \quad \curvearrowright \quad 7 \text{ cm} : 210,000 \text{ cm} \\ = 2100 \text{ m} \\ = 2.1 \text{ km} \dots\dots\dots 2.1 \text{ kilometres} \end{array}$$

(Total for Question 11 is 3 marks)

13 Here is a scale diagram of part of a wall.

R16
G17



Scale: 4 cm represents 1 m

Kamran is going to cover this part of the wall with square tiles.
Each tile has sides of length 10 cm.

The tiles cost 25p each.
Kamran spends £60 on tiles.

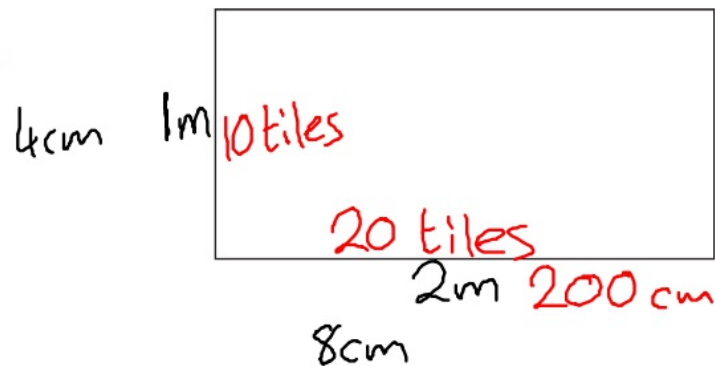
Show that Kamran has bought enough tiles.

(Total for Question 13 is 4 marks)

13 Here is a scale diagram of part of a wall.

R16

G17



Scale: 4 cm represents 1 m

$$2 \text{ m} = 200 \text{ cm}$$

$$\frac{200}{10} = 20$$

Kamran is going to cover this part of the wall with square tiles.
Each tile has sides of length 10 cm.

The tiles cost 25p each.
Kamran spends £60 on tiles.

Show that Kamran has bought enough tiles.

$$\text{Total tiles ... } 20 \times 10 = 200 \text{ tiles}$$

$$\begin{aligned} \underline{200} \times \underline{25p} &= 5000p \\ &= \pounds 50 \end{aligned}$$

£50 is 200 tiles
so spending £60 is more than enough.

(Total for Question 13 is 4 marks)

13 The diagram shows a tree and a man.

Video created by W Neill



The man is of average height.

The tree and the man are drawn to the same scale.

(a) Write down an estimate for the real height, in metres, of the man.

..... metres
(1)

(b) Find an estimate for the real height, in metres, of the tree.

..... metres
(2)

13 The diagram shows a tree and a man.

Video created by W Neill



The man is of average height.

The tree and the man are drawn to the same scale.

(a) Write down an estimate for the real height, in metres, of the man.

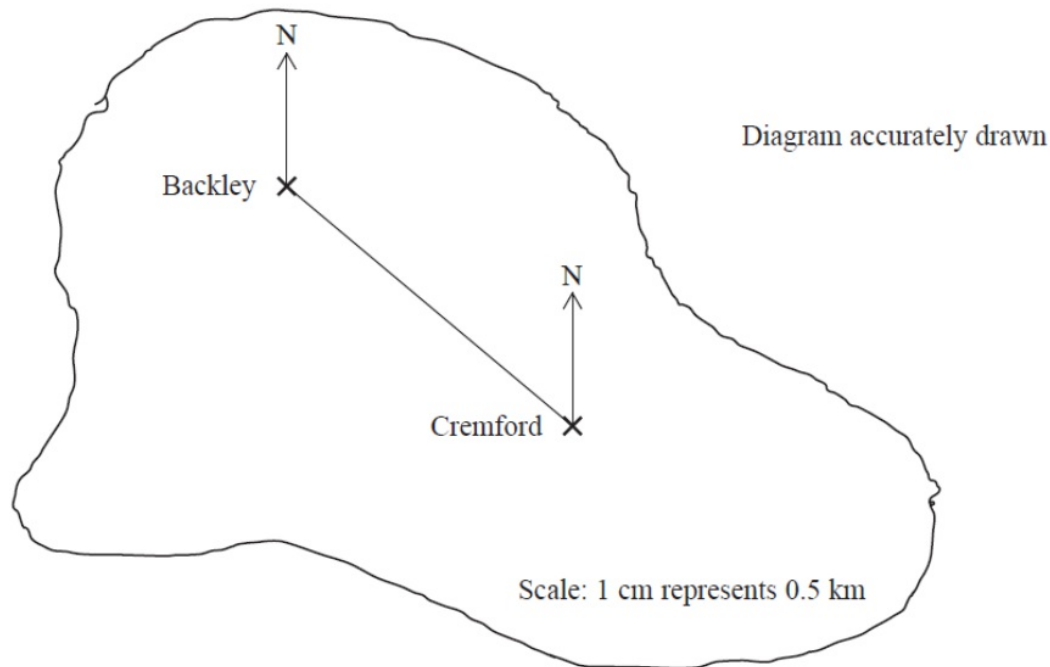
$$\frac{1.5}{2} \text{ metres} \quad (1)$$

(b) Find an estimate for the real height, in metres, of the tree.

$\times 5$

$$\frac{7.5}{10} \text{ metres} \quad (2)$$

9 Here is a map of an island.



A straight road joins the two villages, Backley and Cremford.

(a) Work out the real distance between the two villages.

(b) Find the bearing of Cremford from Backley.

..... km
(2)

.....
(1)

Created by W Neill

9 Here is a map of an island.

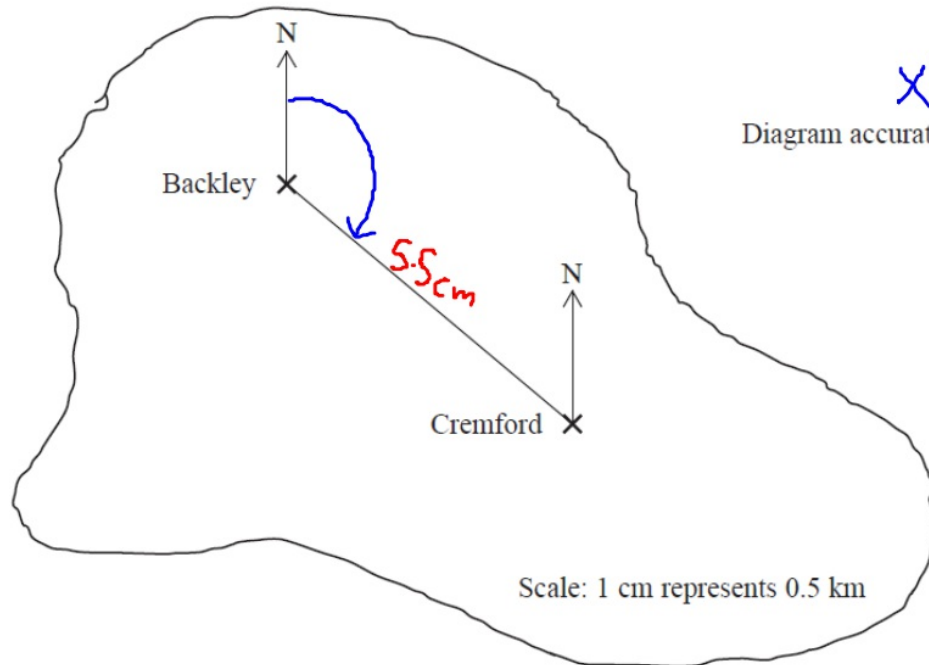


Diagram accurately drawn

x5.5

$$1 \text{ cm} = 0.5 \text{ km}$$

$$5.5 \text{ cm} = 2.75$$

x5.5

2.75

km

(2)

130°

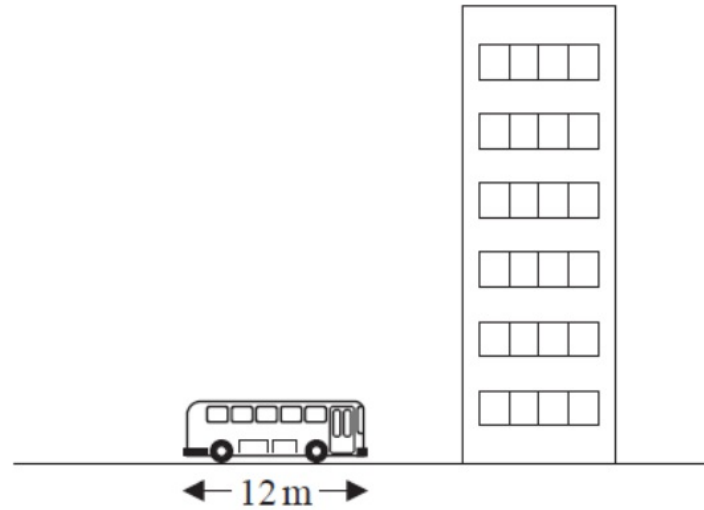
(1)

$$128^\circ - 132^\circ$$

A straight road joins the two villages, Backley and Cremford.

(a) Work out the real distance between the two villages.

(b) Find the bearing of Cremford from Backley.



The picture shows a bus next to a building.
The bus has a length of 12 m.

The bus and the building are drawn to the same scale.

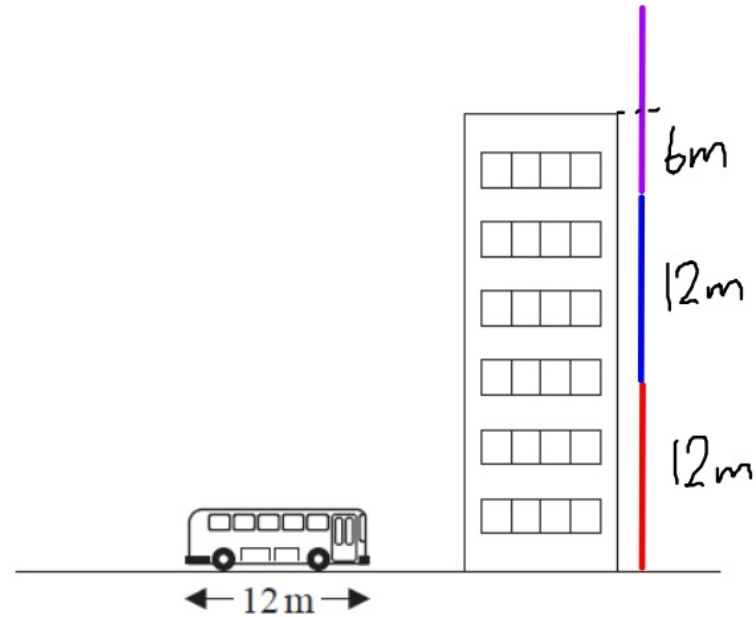
Work out an estimate for the height, in metres, of the building.

..... m

(Total for Question 8 is 2 marks)

8

Created by W Neill



The picture shows a bus next to a building.
The bus has a length of 12 m.

The bus and the building are drawn to the same scale.

Work out an estimate for the height, in metres, of the building.

27 - 33m ✓

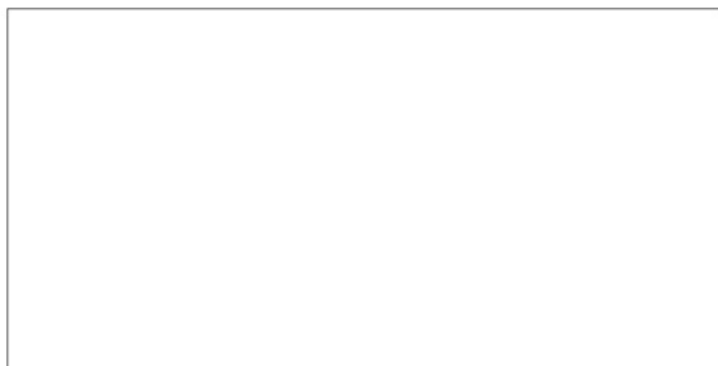
30m

..... m

(Total for Question 8 is 2 marks)

12 The diagram shows a scale drawing of a tennis court.

Video created by W Neill



The scale of the drawing is 1 : 200

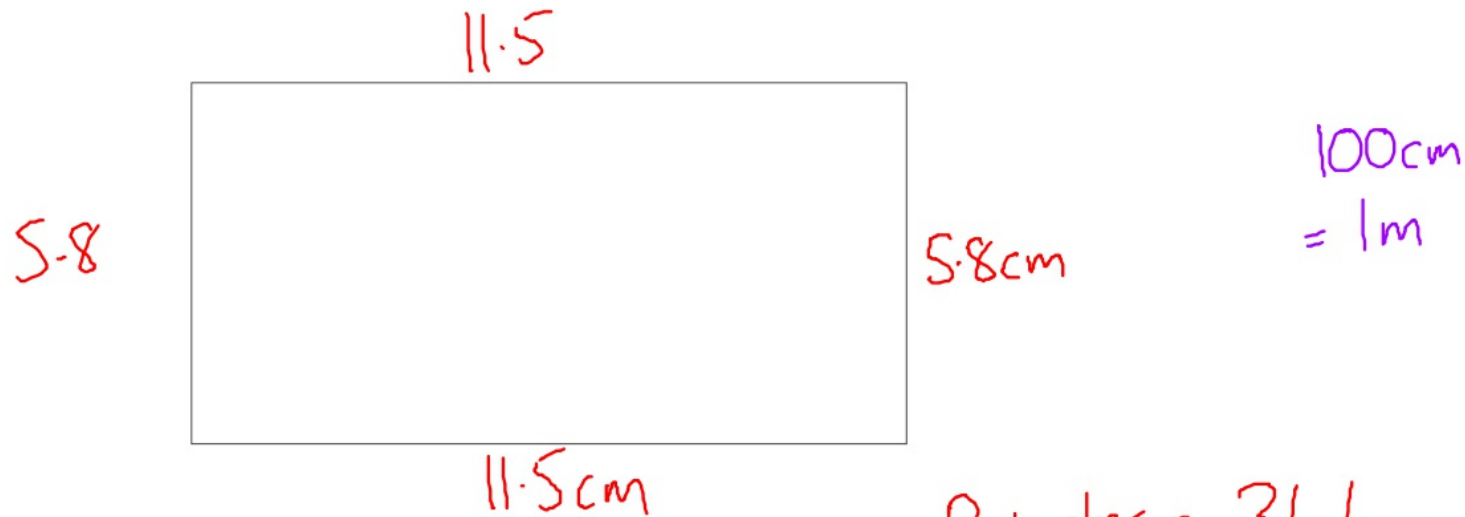
Work out the perimeter of the real tennis court.
Give your answer in metres.

..... metres

12 The diagram shows a scale drawing of a tennis court.

Video created by W Neill

R16



The scale of the drawing is 1 : 200

Work out the perimeter of the real tennis court.

Give your answer in metres.

$$\begin{array}{l} \xrightarrow{\times 200} \text{Perimeter} = 34.6 \text{ cm} \\ 1 : 200 \\ 34.6 \text{ cm} : 6920 \text{ cm} \end{array}$$

$$\boxed{\text{ms } 67.6 \leftrightarrow 70.8}$$

$$\underline{69.2} \checkmark \text{ metres}$$

8 A map has a scale of 1 cm to 14 km.

R16 On the map, the distance between Manchester and London is 18.8 cm.

R26 What is the real distance, in km, between Manchester and London?

.....km

(Total for Question 8 is 2 marks)

8 A map has a scale of 1 cm to 14 km.

R16 On the map, the distance between Manchester and London is 18.8 cm.

R26 What is the real distance, in km, between Manchester and London?

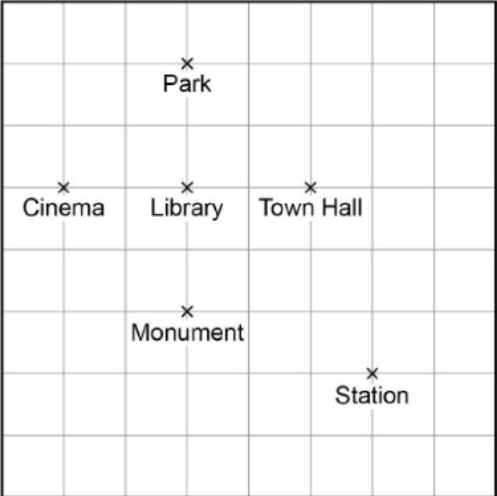
$$\begin{array}{l} \text{1 cm} = 14 \text{ km} \\ \text{18.8 cm} = 263.2 \text{ km} \end{array}$$

$\times 18.8$ $\times 18.8$

263.2 ✓ km

(Total for Question 8 is 2 marks)

AQA

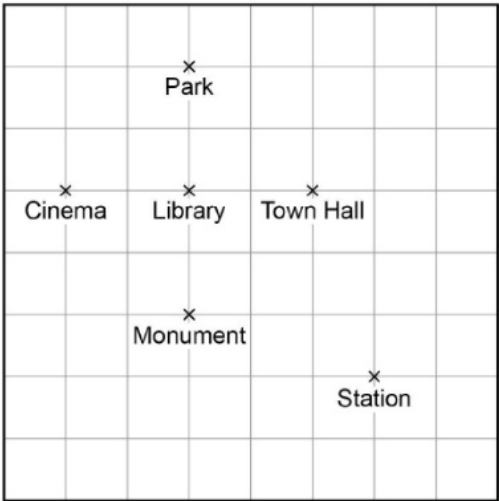


8 (c) What is the distance, in metres, from the Cinema to the Station?

[3 marks]

Scale: 1 cm represents 200 m

Answer _____ metres



$1 \text{ cm} = 200 \text{ m}$
 $5.8 \text{ cm} = 1160 \text{ m}$

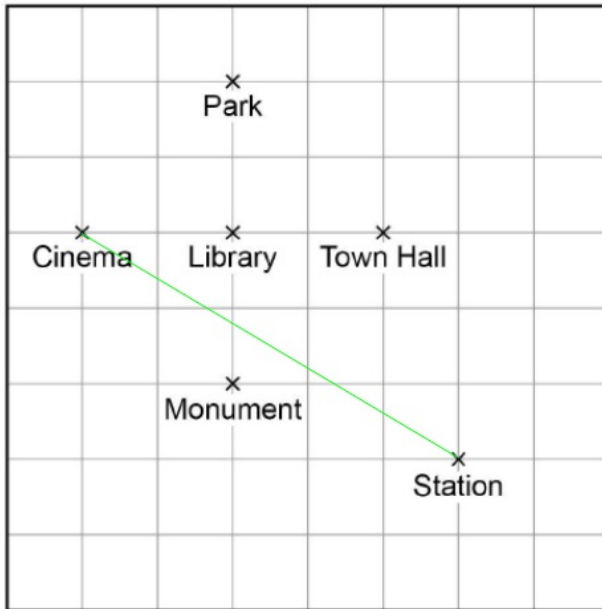
c) R16

8 (c) What is the distance, in metres, from the Cinema to the Station?

[3 marks]

Scale: 1 cm represents 200 m

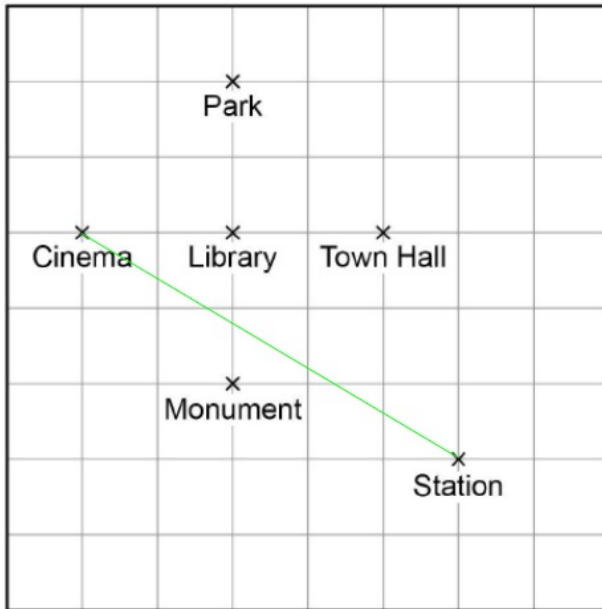
Answer 1160 ✓ metres



Scale: 1 cm represents 200 m

8 (d) Why might the shortest **walking** distance from the Cinema to the Station be greater than your answer to part (c)?

[1 mark]



Scale: 1 cm represents 200 m

8 (d) Why might the shortest **walking** distance from the Cinema to the Station be greater than your answer to part (c)?

Distance 1160m

[1 mark]

But, you may not be able to walk in a straight line.

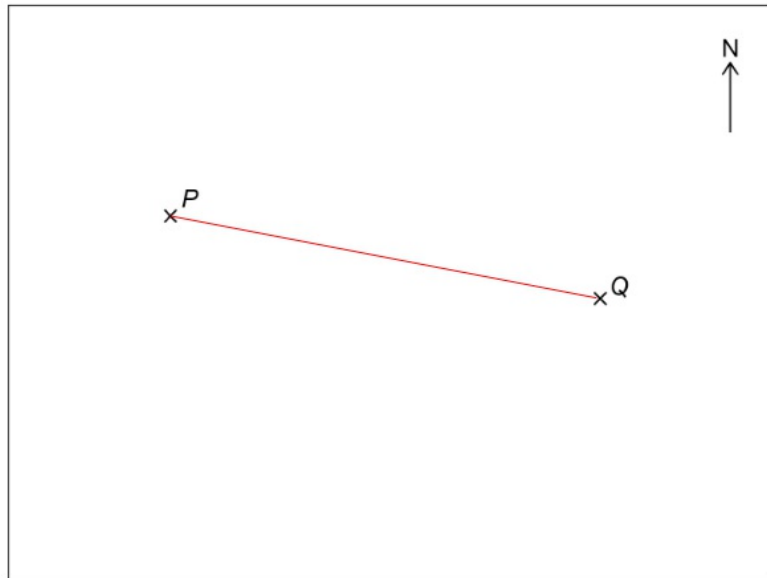
Building might be in the way.

15

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

Video created by W Neill

R16



Scale: 1 cm represents 50 km

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

[2 marks]

R16

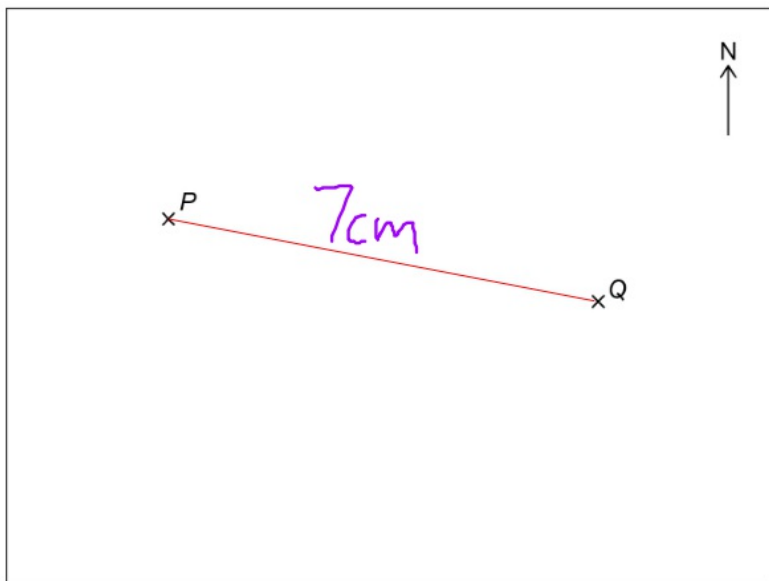
Answer _____ km

15

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

Video created by W Neill

R16



Scale: 1 cm represents 50 km

$$7 \text{ cm} \times 50 = 350 \text{ km}$$

Handwritten purple calculation: $7 \text{ cm} \times 50 = 350 \text{ km}$. The '50' is written as 'x7' with a bracket over it, indicating the scale factor.

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

[2 marks]

R16

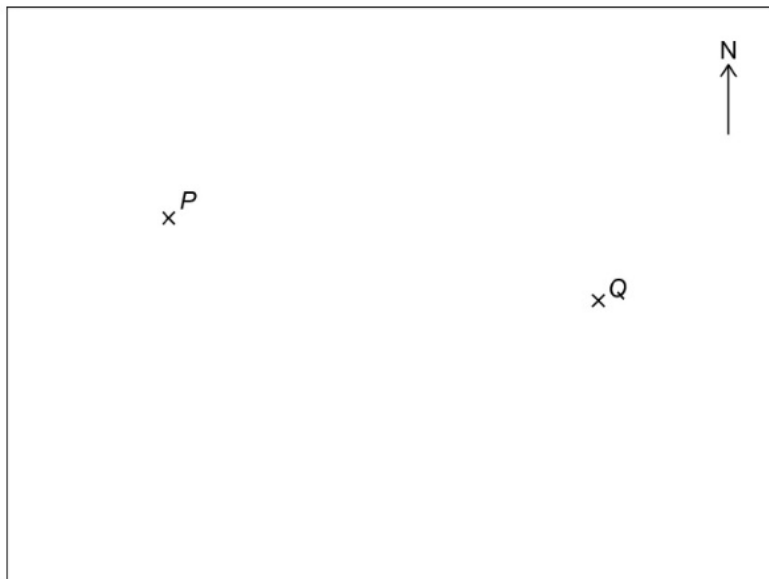
Answer 350 km

15

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

Video created by W Neill

Scale: 1 cm represents 50 km



15 (b) Town R is 200 km due South of town P .

R16

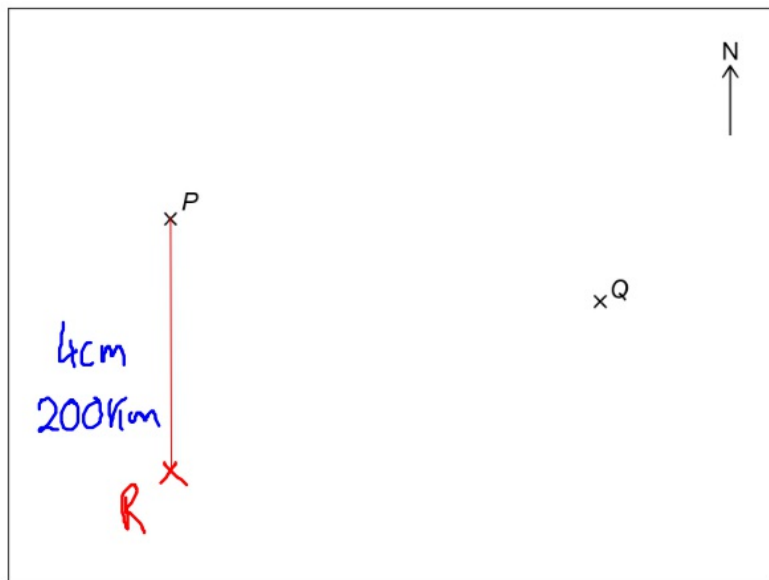
Mark R on the map.

[2 marks]

15

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

Video created by W Neill



Scale: 1 cm represents 50 km

$\times 4$ $\left\{ \begin{array}{l} 4\text{cm} \\ 200\text{km} \end{array} \right. \times 4$

15 (b) Town R is 200 km due South of town P .

R16

Mark R on the map.

[2 marks]

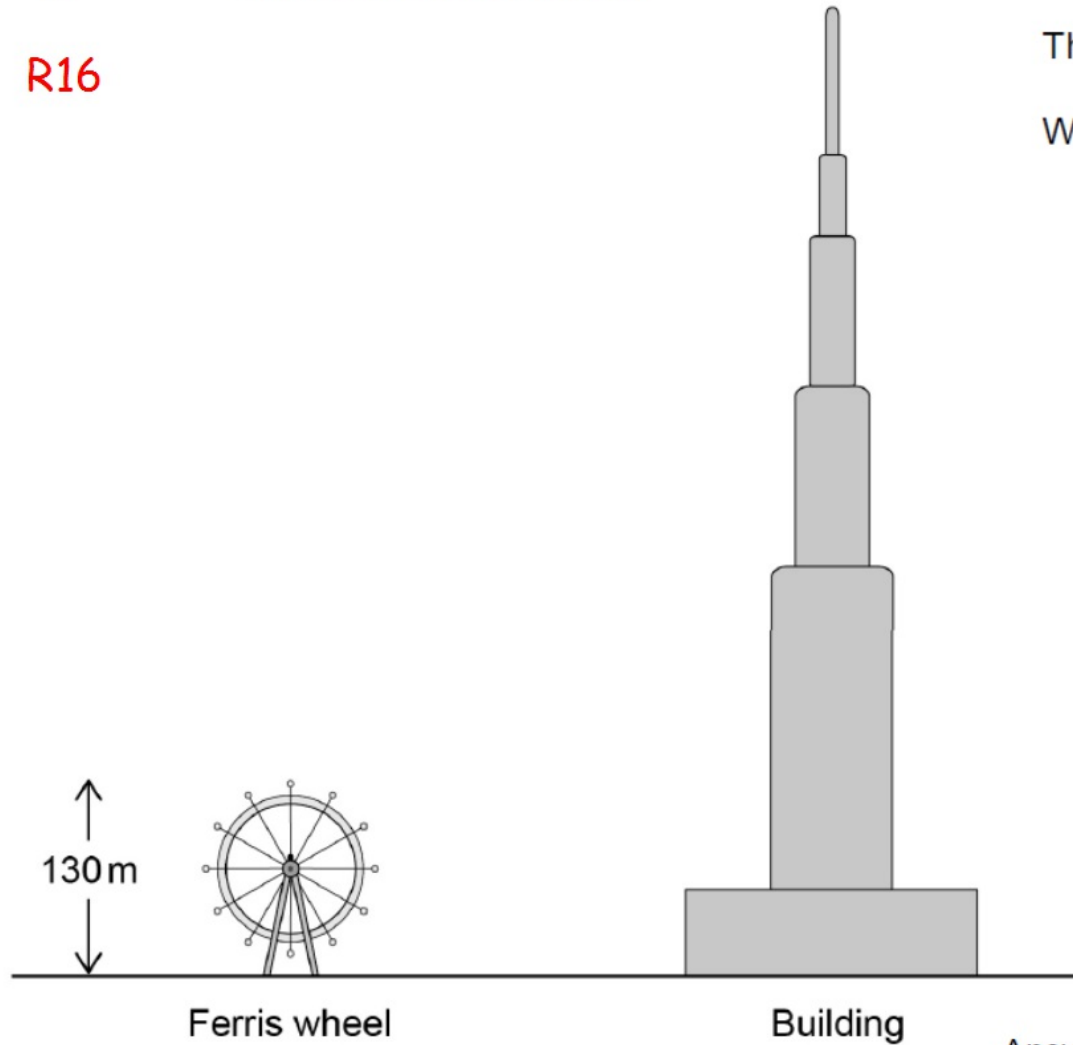
10

Here is a scale drawing.

R16

The Ferris wheel has a height of 130 m

Work out the height of the building [3 marks]



Answer _____ m

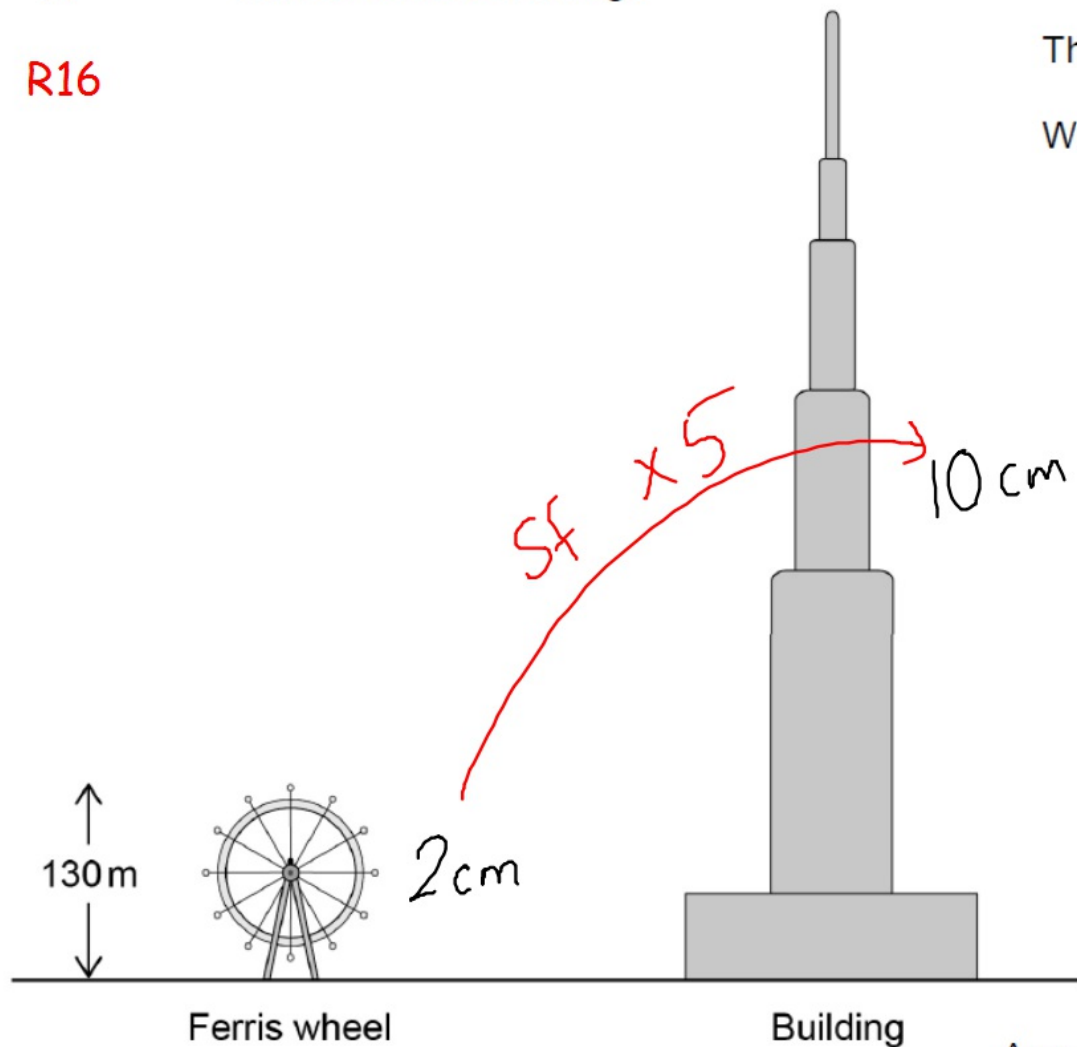
10

Here is a scale drawing.

R16

The Ferris wheel has a height of 130 m

Work out the height of the building [3 marks]

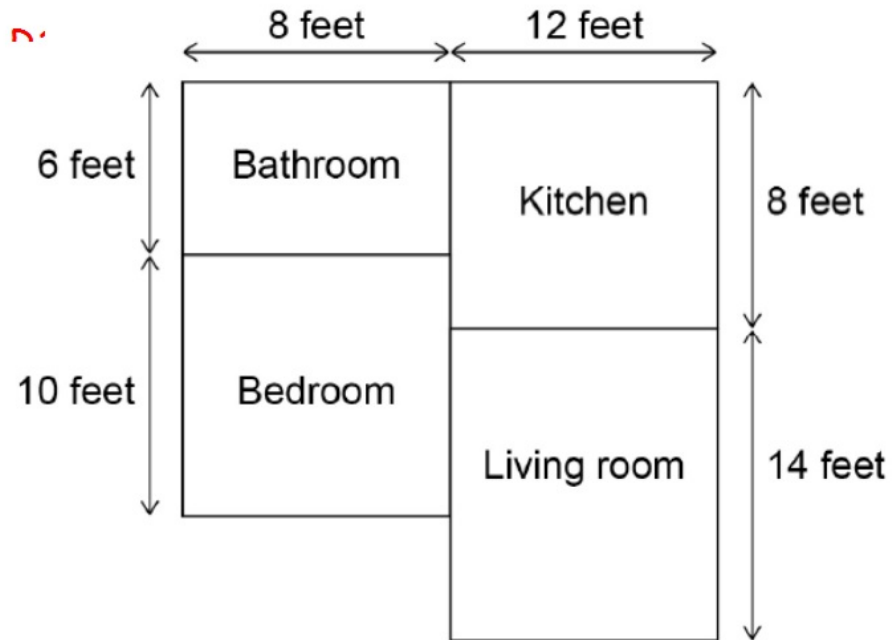


$$130\text{m} \times 5$$

=

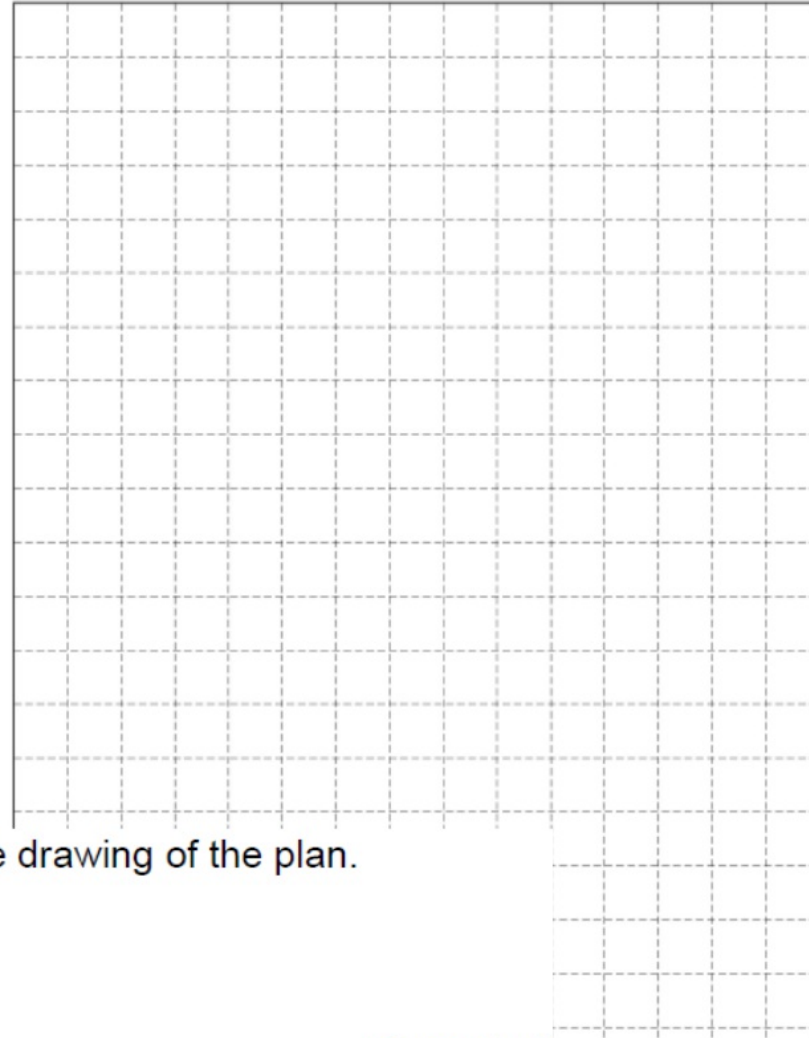
Answer 650 m ✓ m

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



Video camera

Scale: 1 cm represents 2 feet



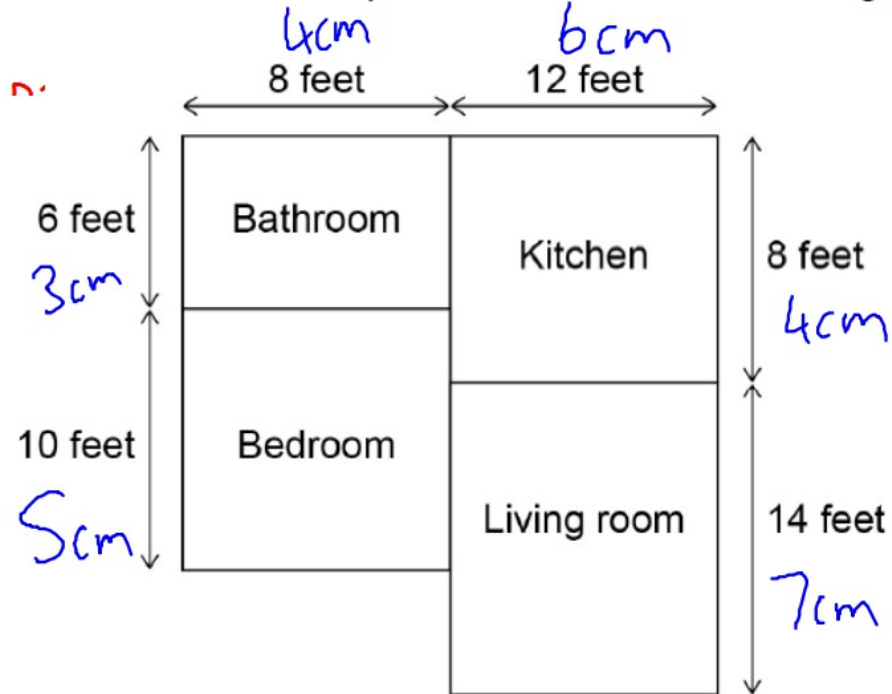
On the grid on the opposite page, make an accurate scale drawing of the plan.

Label each room.

Use a scale of 1 cm represents 2 feet

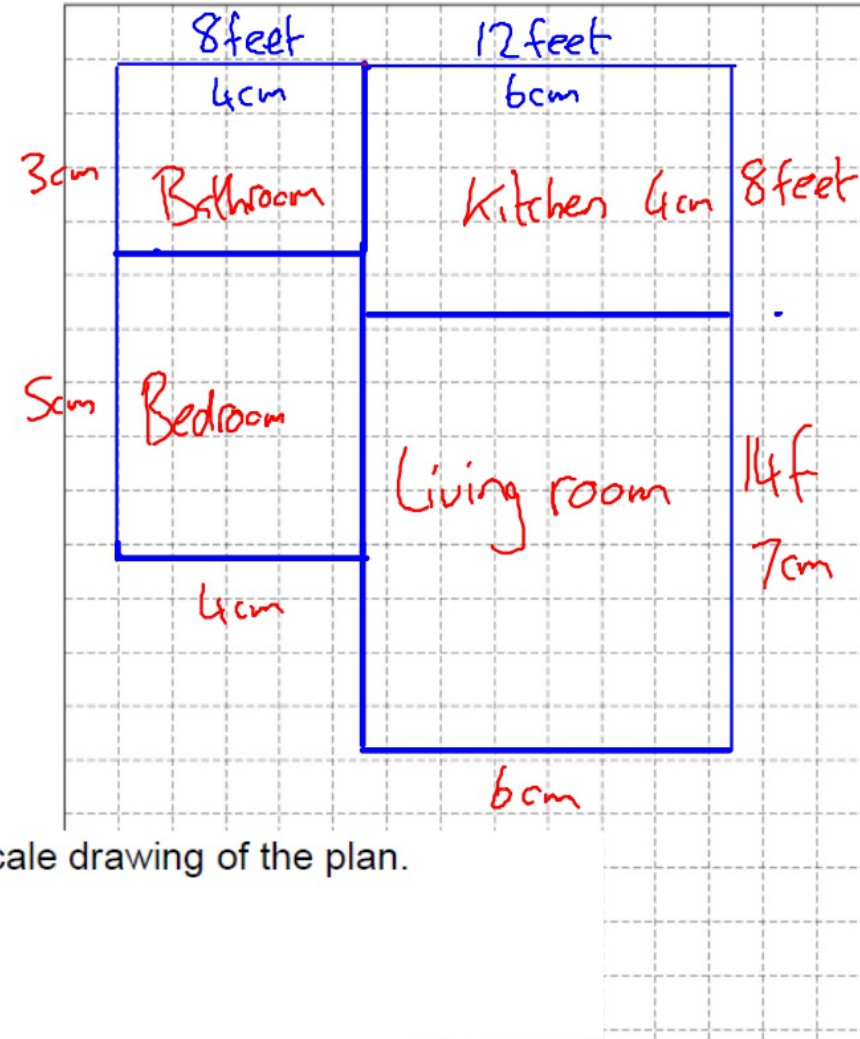
[3 marks]

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



Video camera

Scale: 1 cm represents 2 feet



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

Label each room.

Use a scale of 1 cm represents 2 feet

[3 marks]