

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
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TOTAL	



General Certificate of Secondary Education
Foundation Tier
January 2013

Applications of Mathematics (Linked Pair Pilot)

93702F

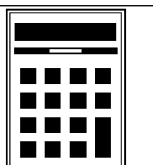
Unit 2 **Geometry and Measures**

F

Tuesday 22 January 2013 1.30 pm to 3.00 pm

For this paper you must have:

- mathematical instruments.
- You may use a calculator.



Time allowed

- 1 hour 30 minutes

Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work that you do not want to be marked.
- 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 maximum mark for this paper is 80.
- The quality of your written communication is specifically assessed in Questions 11, 14 and 15.
These questions are indicated with an asterisk (*).
- You may ask for more answer paper, graph paper and tracing paper.
These must be tagged securely to this answer booklet.
- You are expected to use a calculator where appropriate.

Advice

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



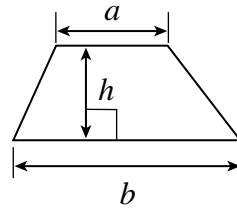
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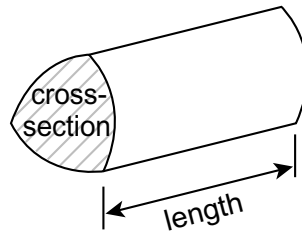
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Formulae Sheet: Foundation Tier

Area of trapezium = $\frac{1}{2}(a+b)h$



Volume of prism = area of cross-section \times length



Answer **all** questions in the spaces provided.

1 Complete each statement using the correct unit.

Choose from

tonnes kilograms grams litres millilitres

1 (a) A boy weighs 45.....
(1 mark)

1 (b) A packet of crisps weighs 28.....
(1 mark)

1 (c) The volume of water in a full bottle is 2.....
(1 mark)

2 The price of a DVD is £ 12.
In a sale the price is reduced by 25%.

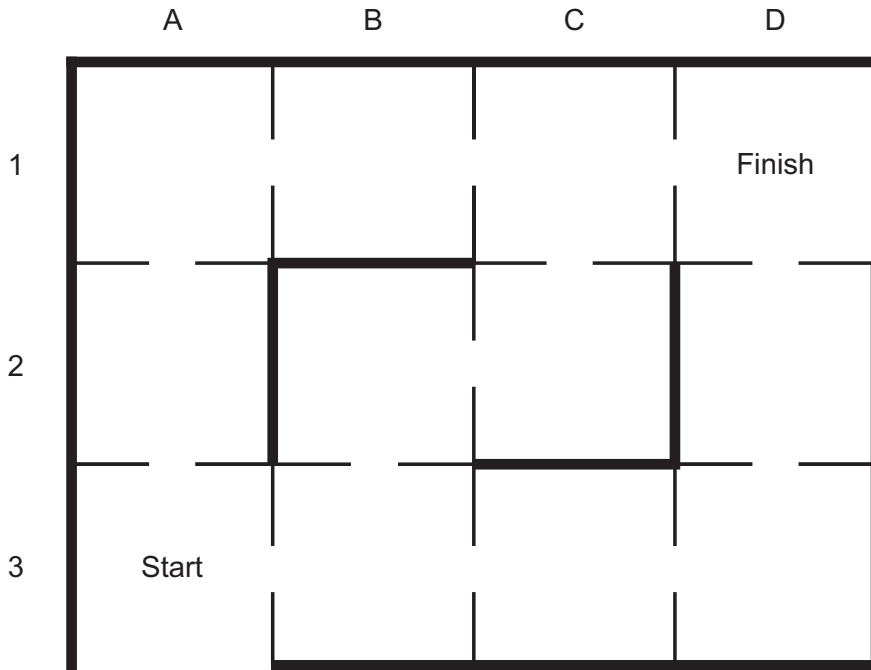
2 (a) Work out 25% of £ 12.
.....
.....
£ (2 marks)

2 (b) Work out the sale price.
.....
£ (1 mark)



3 (a) A maze has 12 rooms.

Walls without doors are shown as **————**
Other walls have doors which are shown as gaps.



One path from Start to Finish is A3 → B3 → C3 → D3 → D2 → D1

Complete these two paths through the maze.

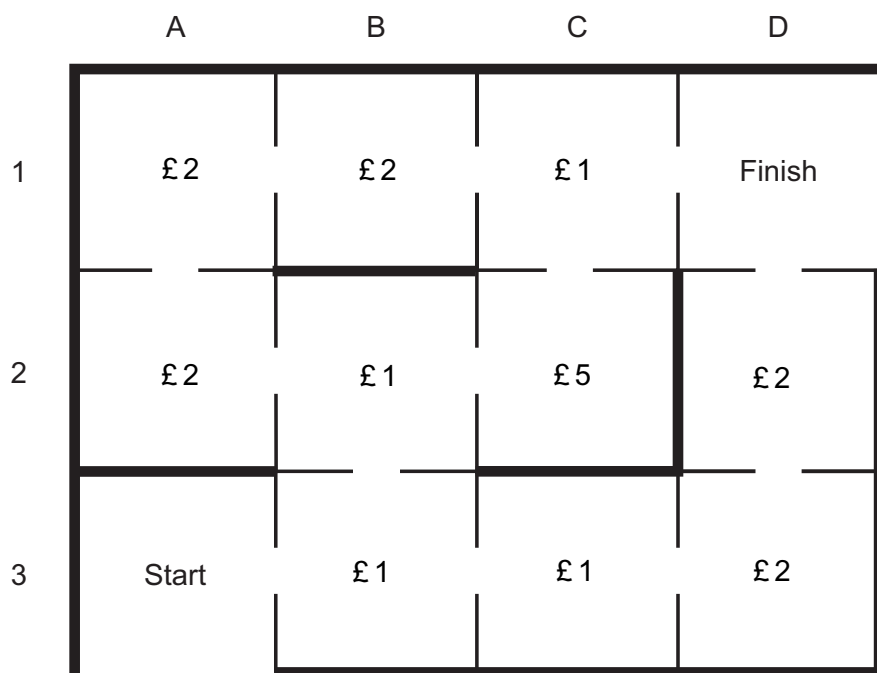
First path A3 → B3 → B2 →

Second path A3 → A2 → A1 →

(2 marks)



3 (b) This maze has money in some of the rooms.



3 (b) (i) How much is in room B3?

£ (1 mark)

3 (b) (ii) Which room has £5?

Answer (1 mark)

3 (b) (iii) Money is collected as you go through the maze from Start to Finish.
You can only go through a room **once**.

Complete the path that collects the most money.

A3 → B3 →

.....

.....

.....

.....

(2 marks)

6

Turn over ►



4 Some temperatures are shown.

Leeds	-2°C
Glasgow	-5°C
Oxford	4°C

4 (a) Which place has the lowest temperature?

Answer (1 mark)

4 (b) Work out the difference between the temperatures in Leeds and Oxford.

.....

Answer $^{\circ}\text{C}$ (1 mark)

4 (c) The Glasgow temperature falls by 2°C .

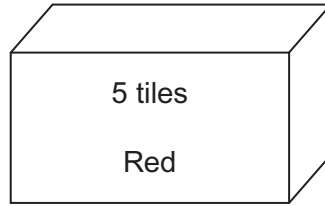
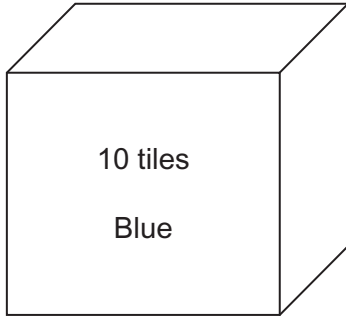
Work out the new temperature in Glasgow.

.....

Answer $^{\circ}\text{C}$ (1 mark)



5



Sam buys

six boxes of blue tiles
and
four boxes of red tiles.

How many tiles does he buy altogether?

.....

.....

.....

.....

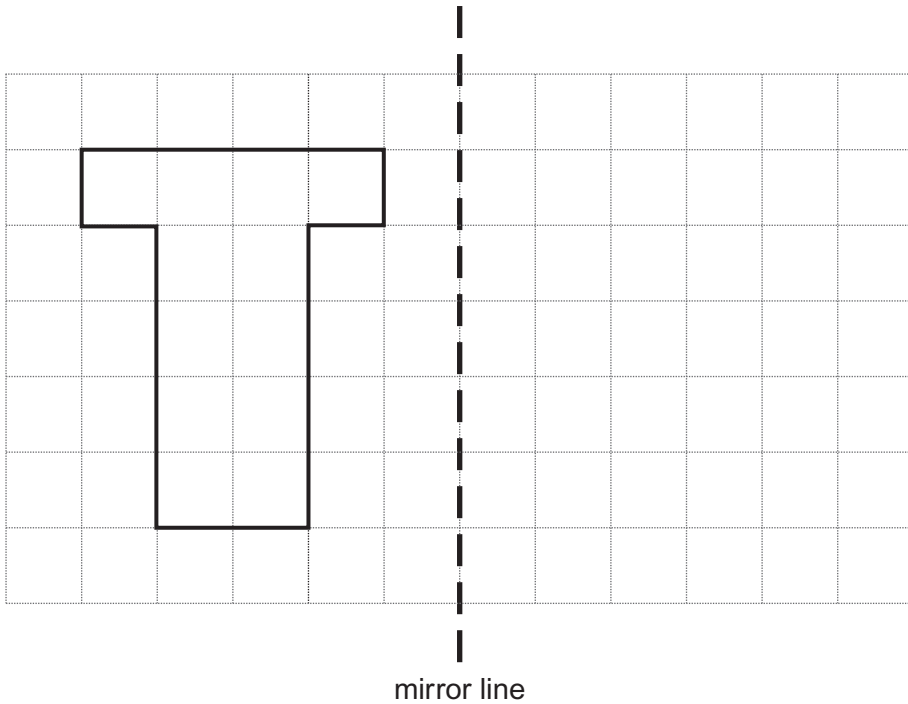
Answer (3 marks)

Turn over for the next question



6 Trendy Tees make T-shirts.

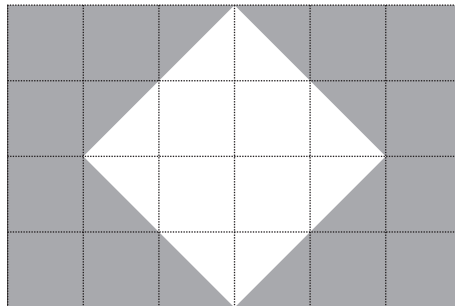
6 (a) Trendy Tees have a logo that uses two letter Ts.



Reflect the letter T in the mirror line to complete the logo.

(2 marks)

6 (b) A design that is printed on the T-shirts is shown on a centimetre grid.



Show that the shaded area is double the white area.

.....

.....

.....

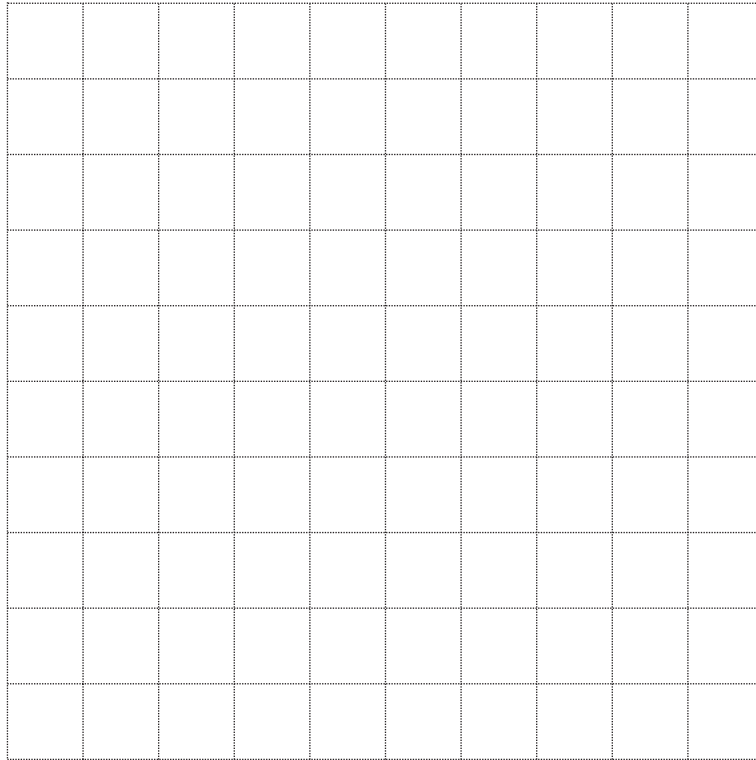
(2 marks)



6 (c) A different design has

- a circle of radius 4 cm
- two lines of symmetry
- a rectangle measuring 6 cm by 2 cm inside the circle.

Draw a possible design on the centimetre grid below.



(3 marks)

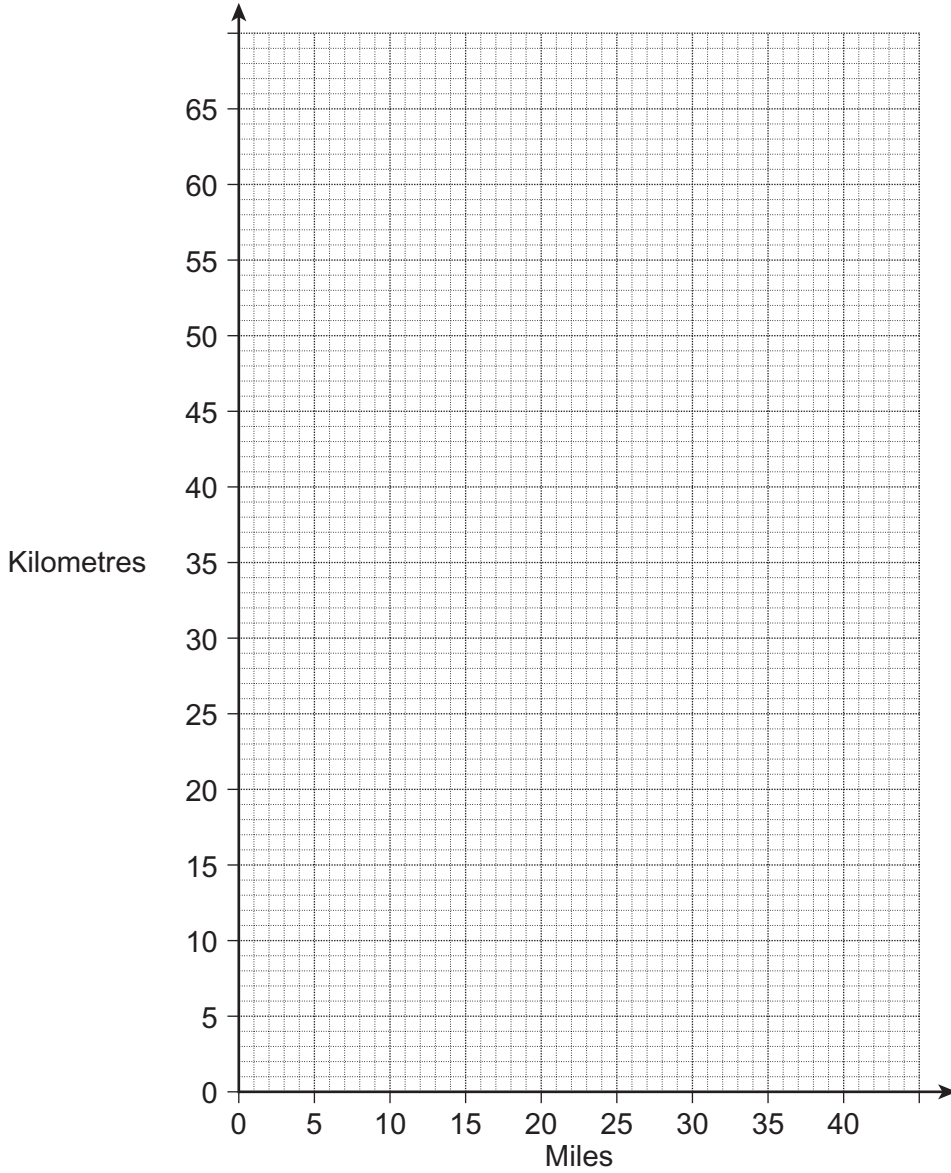
Turn over for the next question



7 (a)

Miles	0	20	40
Kilometres	0	32	64

Draw the conversion graph for miles and kilometres.



(2 marks)

7 (b) Convert 35 miles to kilometres.

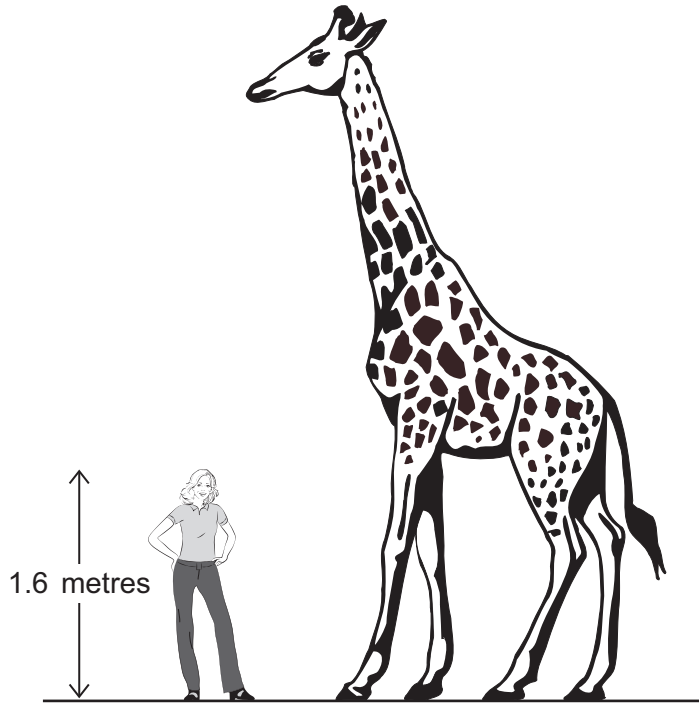
Answer km (1 mark)

7 (c) Convert 24 kilometres to miles.

Answer miles (1 mark)



8 The diagram shows a woman standing beside a giraffe.



Estimate, in metres, the height of the giraffe.
You **must** show your working.

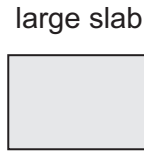
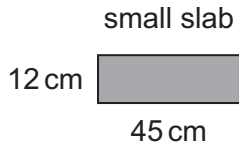
.....
.....

Answer metres (2 marks)

Turn over for the next question

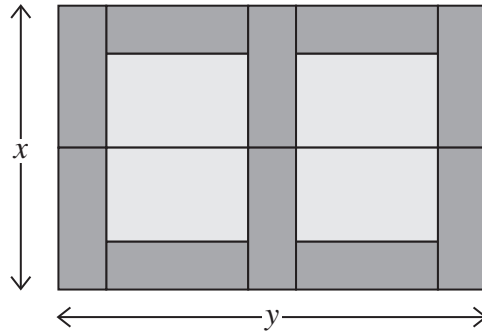


9 Two sizes of rectangular slab are shown.



Not drawn accurately

10 small slabs and 4 large slabs make this pattern.



Not drawn accurately

9 (a) Work out the value of x .

.....

Answer cm (1 mark)

9 (b) Show that the value of y is 126 cm.

.....

(2 marks)

9 (c) Work out the length and width of a large slab.

.....

Length = cm

Width = cm

(3 marks)

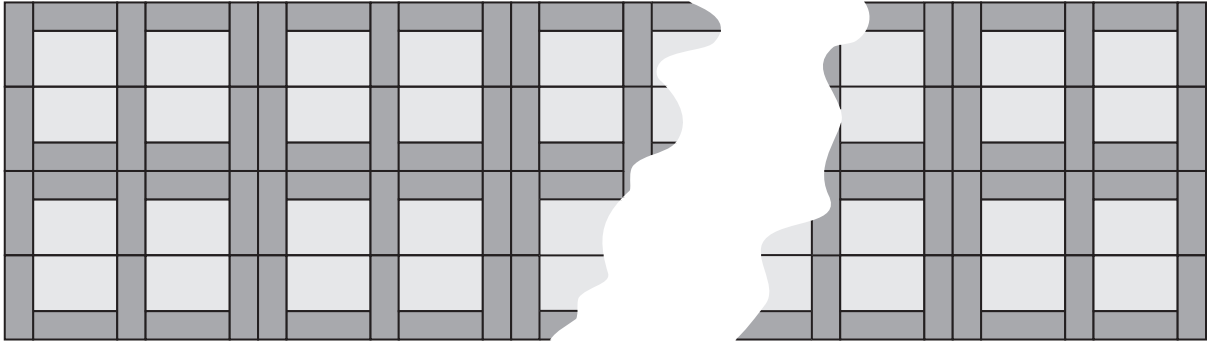


9 (d) The slabs are used to make a path as shown.

The path is 882 centimetres long.

← 126 cm →

Not drawn accurately



← 882 cm →

Work out the number of each slab used to make the path.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Number of small slabs

Number of large slabs

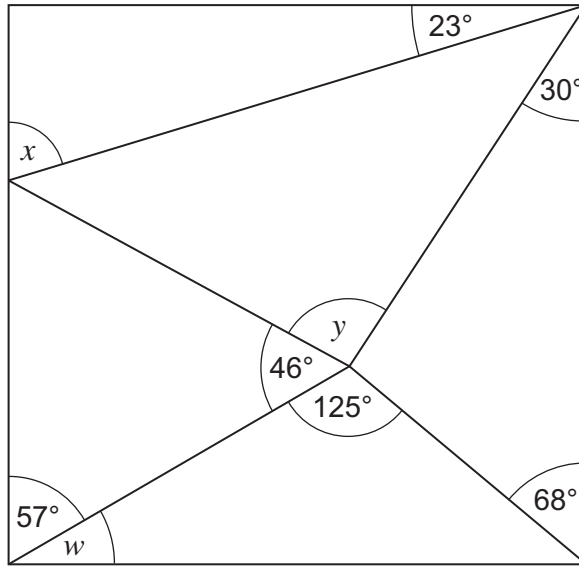
(5 marks)

11

Turn over ►



10 A mirror is made from triangles as shown. The mirror is a square.



Not drawn accurately

10 (a) Work out angle w .

.....

Answer degrees (1 mark)

10 (b) Work out angle x .

.....

.....

Answer degrees (2 marks)

10 (c) Work out angle y .

.....

.....

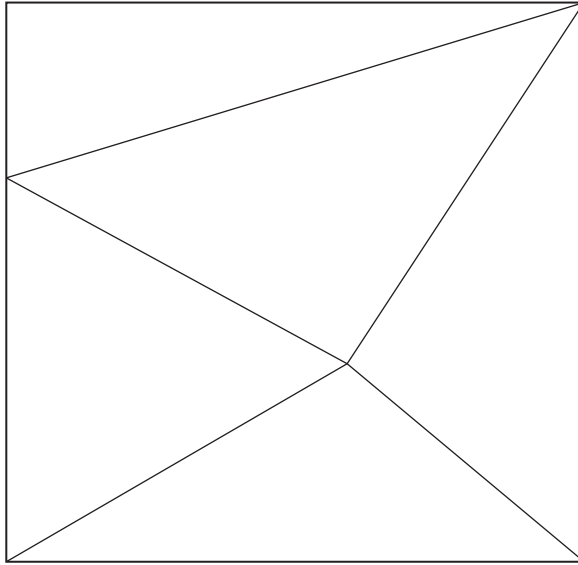
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.....

Answer degrees (3 marks)



10 (d) The area of the square mirror is 4900 cm^2 .



Not drawn
accurately

Work out the perimeter of the mirror.

.....

.....

.....

.....

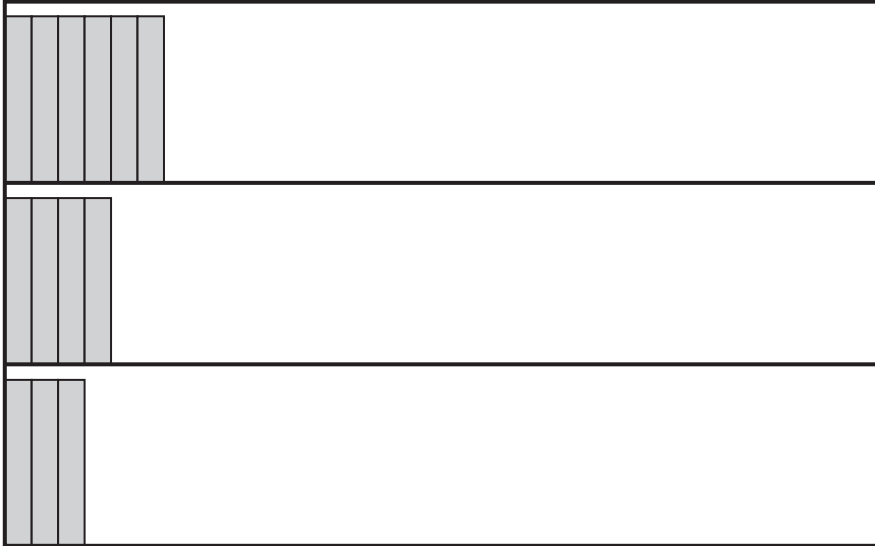
.....

Answer cm (3 marks)



***11** Textbooks are stored on three shelves.

Each shelf is 80 centimetres long.
Each textbook is 25 millimetres wide.



Not drawn
accurately

Can 100 textbooks be stored on these shelves?
You **must** show your working.

.....

.....

.....

.....

.....

.....

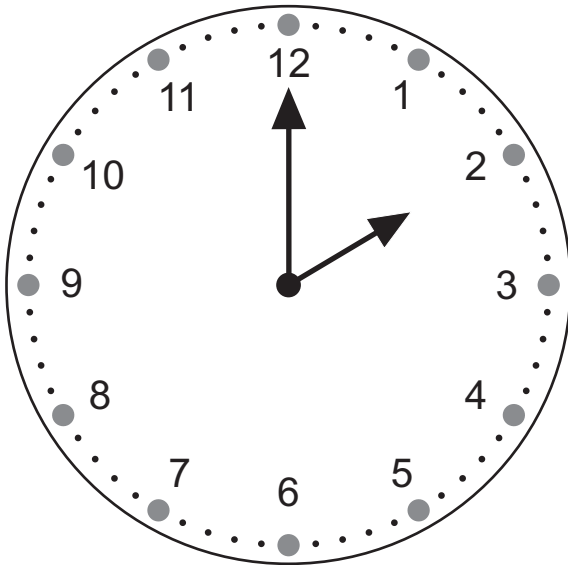
.....

(4 marks)

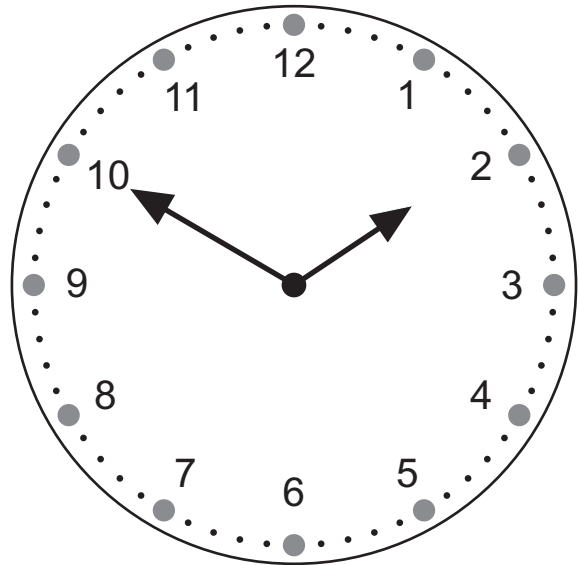


12 When the correct time was 2.00 pm, my clock showed 1.50 pm.

Correct time



My clock



My clock gains two minutes every hour.

Later the same day, the correct time is 11.00 pm.

What time does my clock show?
You **must** show your working.

.....

.....

.....

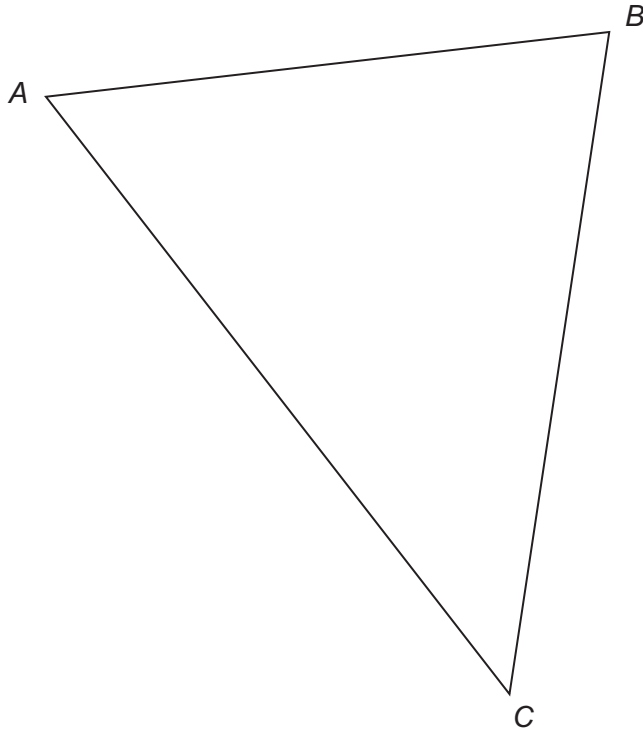
.....

.....

Answer (4 marks)



13 Here is a scale drawing of a field.



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

Answer cm (1 mark)

13 (b) The actual length of AC is 160 metres.

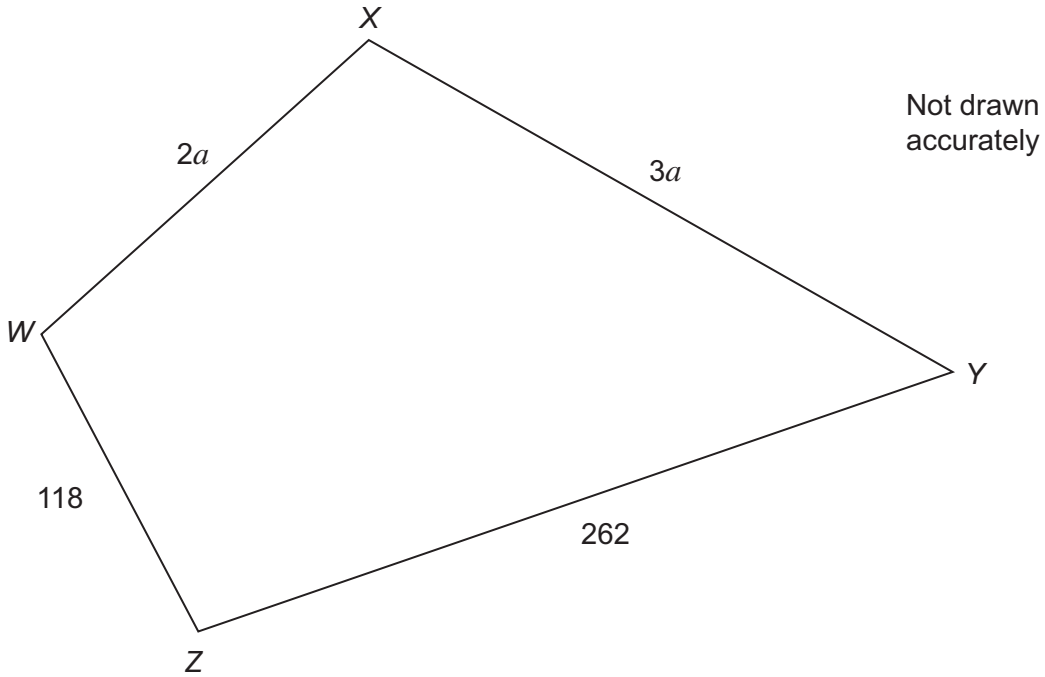
Work out the actual length of AB.

.....
.....
.....
.....

Answer m (4 marks)



***14** Four straight paths with distances, in metres, are shown.



Amir walks along paths WX and XY .
Cath walks along paths WZ and ZY .
They both walk the same distance.

Set up and solve an equation to find the value of a .

.....

.....

.....

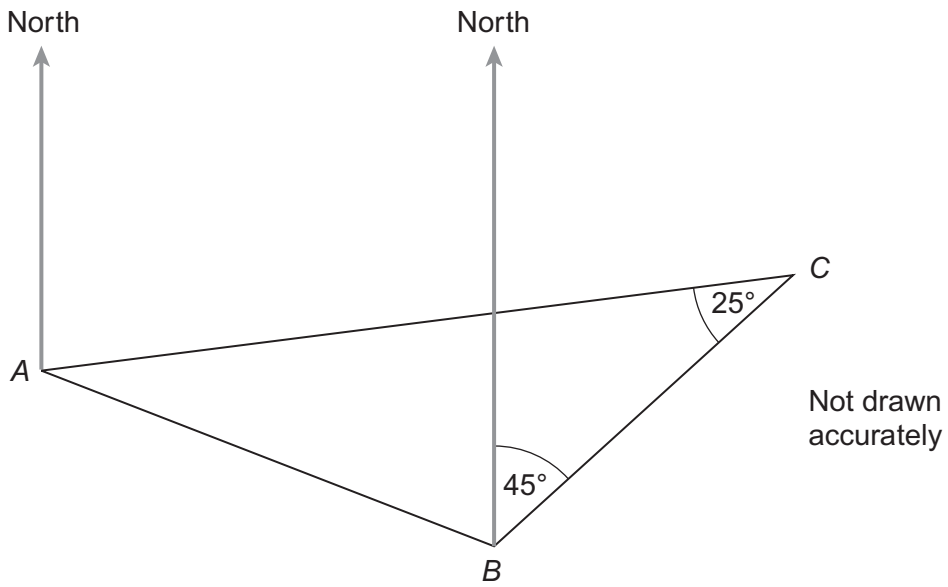
.....

.....

$a = \dots\dots\dots$ (4 marks)



***15 (a)** The diagram represents a cross-country course.



Work out the three-figure bearing of C from A.
You **must** show your working.

.....

.....

.....

Answer° (3 marks)

15 (b) Steve completes the course in 15 minutes.
He runs at an average speed of 8 miles per hour.

How many miles does he run?

.....

.....

Answer miles (2 marks)



16 Pink paint is made by mixing white paint and red paint in the ratio 5 : 3
32 litres of pink paint are made.

How much white paint is used?

.....

.....

.....

.....

Answer litres (3 marks)

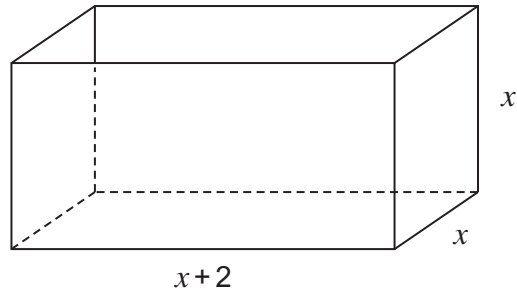
Turn over for the next question

8

Turn over ►



- 17 A storage box is a cuboid.



The formula for the volume, $V \text{ m}^3$, is

$$V = x^3 + 2x^2$$

The volume is 5 m^3 .

Use trial and improvement to work out the value of x .
Give your answer to **two** decimal places.

Use the table opposite for your trials.



x	$x^3 + 2x^2$	V	Comment
1.3	$1.3^3 + 2 \times 1.3^2$ $= 2.197 + 3.38$	5.577	Too big

$x = \dots\dots\dots$ m (4 marks)

END OF QUESTIONS

4



There are no questions printed on this page

**DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED**

