

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

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Forename(s)

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Candidate signature

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# GCSE APPLICATIONS OF MATHEMATICS (LINKED PAIR)

# F

Foundation Tier    Unit 2    Geometry and Measures

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Thursday 10 November 2016    Morning    Time allowed: 1 hour 30 minutes

## Materials

For this paper you must have:

- a calculator
- mathematical instruments.



## 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. 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.

## 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, 15 and 16. 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 book.

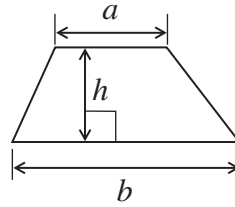
## Advice

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

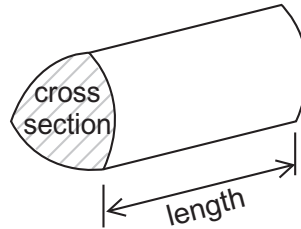


**Formulae Sheet: Foundation Tier**

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

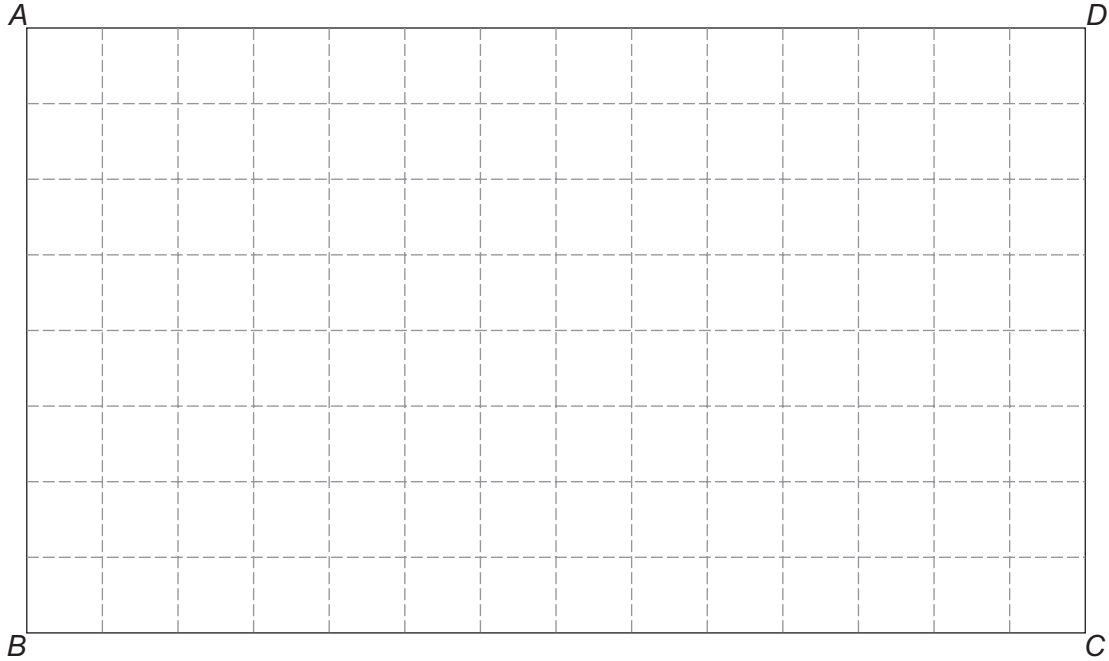


**Volume of prism** = area of cross section  $\times$  length



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

- 1 Rectangle  $ABCD$  shows a scale drawing of a plan of a garden.



The edges of a path in the garden are

the line  $BD$

and

the line joining the midpoint of  $BC$  to the midpoint of  $CD$ .

Draw the edges of the path on the plan.

[3 marks]



2 Here is a bus timetable.

Newcastle	0930	1000	1030	1100	1130
Coast Road	0941	1011	1041	1111	1141
High Farm	0948	1018	1048	1118	1148
Norham Road	1002	1032	1102	1132	1202
North Shields	1012	1042	1112	1142	1212

2 (a) Ollie is getting a bus from Newcastle.  
He wants to be in North Shields before 1125

Circle the **latest** bus he can get from Newcastle.

[1 mark]

0930                      1000                      1030                      1100

2 (b) Ollie says,

“A bus from Newcastle to North Shields takes less than three-quarters of an hour.”

Is he correct?  
Tick a box.

Yes

No

Give a reason for your answer.

[2 marks]

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- 2 (c)** Amy is at the bus stop at **High Farm**.  
She looks at her watch.



How many minutes does she have to wait for the next bus?

**[2 marks]**

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Answer \_\_\_\_\_ minutes

**Turn over for the next question**



**3** To draw a logo, follow these steps.

**Step 1** Draw a square with side length 10 cm

**Step 2** Draw a circle, with radius 5 cm, inside the square.

**Step 3** On the circle, draw a vertical diameter and a horizontal diameter.

**Step 4** Shade the top right quarter of the circle.

Draw the logo on the centimetre grid.

**[4 marks]**



4 Andy and Bev have these coins between them.



Andy has six of the coins.  
Bev has two of the coins.  
Andy has five times as much money as Bev.

Which two coins does Bev have?

[3 marks]

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Answer \_\_\_\_\_ and \_\_\_\_\_



- 5 Here is Vikram's homework.  
His teacher has correctly marked the first two parts.

Complete the marking.

[4 marks]

A rectangle has all **sides** equal.

x

A square has **four** right-angles.

✓

A rhombus has all **sides** equal.

\_\_\_\_\_

A square has **four** lines of symmetry.

\_\_\_\_\_

A parallelogram has rotational symmetry of order **four**.

\_\_\_\_\_

A trapezium has one pair of **parallel** sides.

\_\_\_\_\_

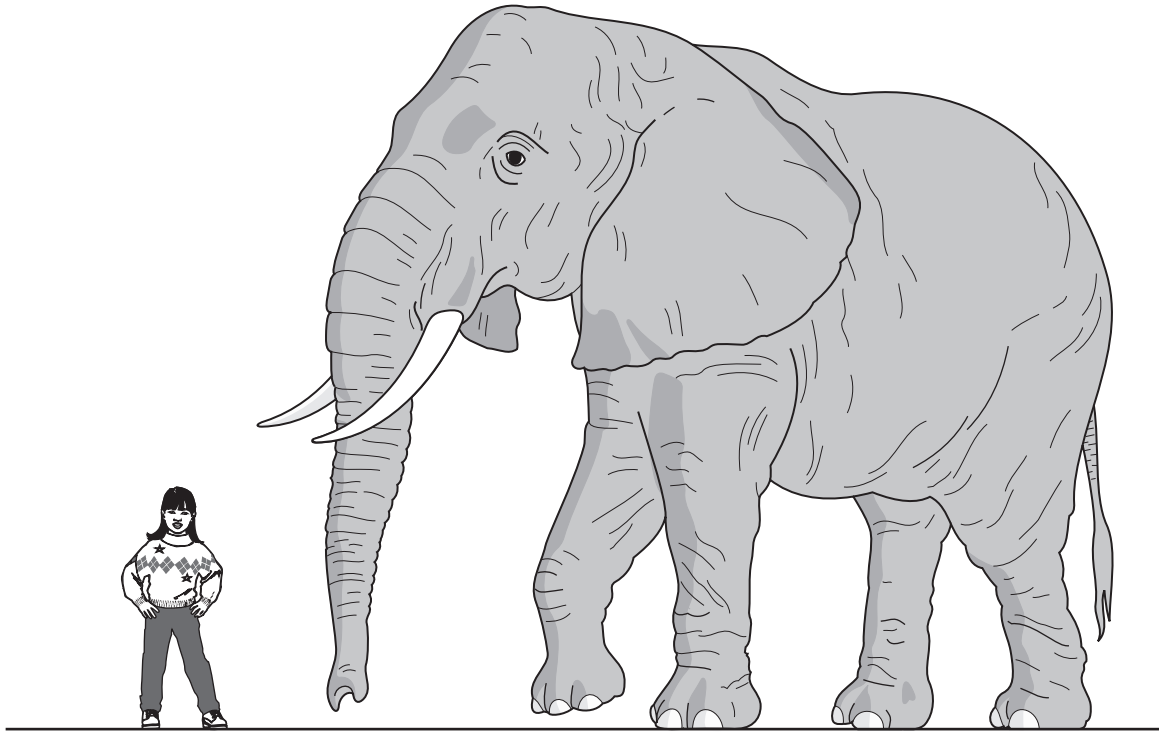
The four angles of a quadrilateral add up to **180°**

\_\_\_\_\_





- 6 The diagram shows a child standing next to an elephant.



The height of the child is 112 cm

Estimate the height of the elephant.  
Give your answer in metres.  
You **must** show your working.

[3 marks]

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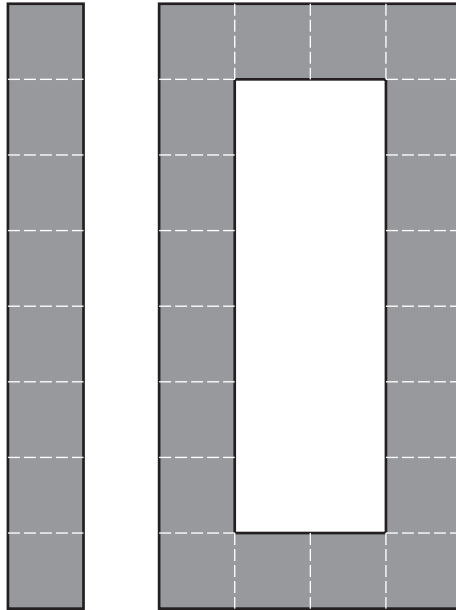
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Answer \_\_\_\_\_ m



- 7 Rani sells numbers cut from sheets of wood.  
The number 10 is shown.

Each square has an area of  $1 \text{ cm}^2$



- 7 (a) Work out the total shaded area.

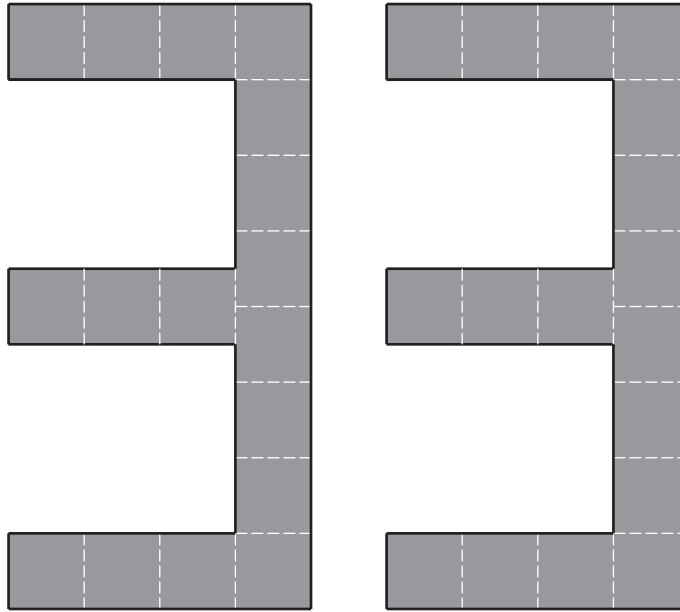
[1 mark]

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Answer \_\_\_\_\_  $\text{cm}^2$



- 7 (b) Rani charges a fixed amount for each  $\text{cm}^2$   
She charges £11.48 for the number 10



How much does she charge for the number 33?

[3 marks]

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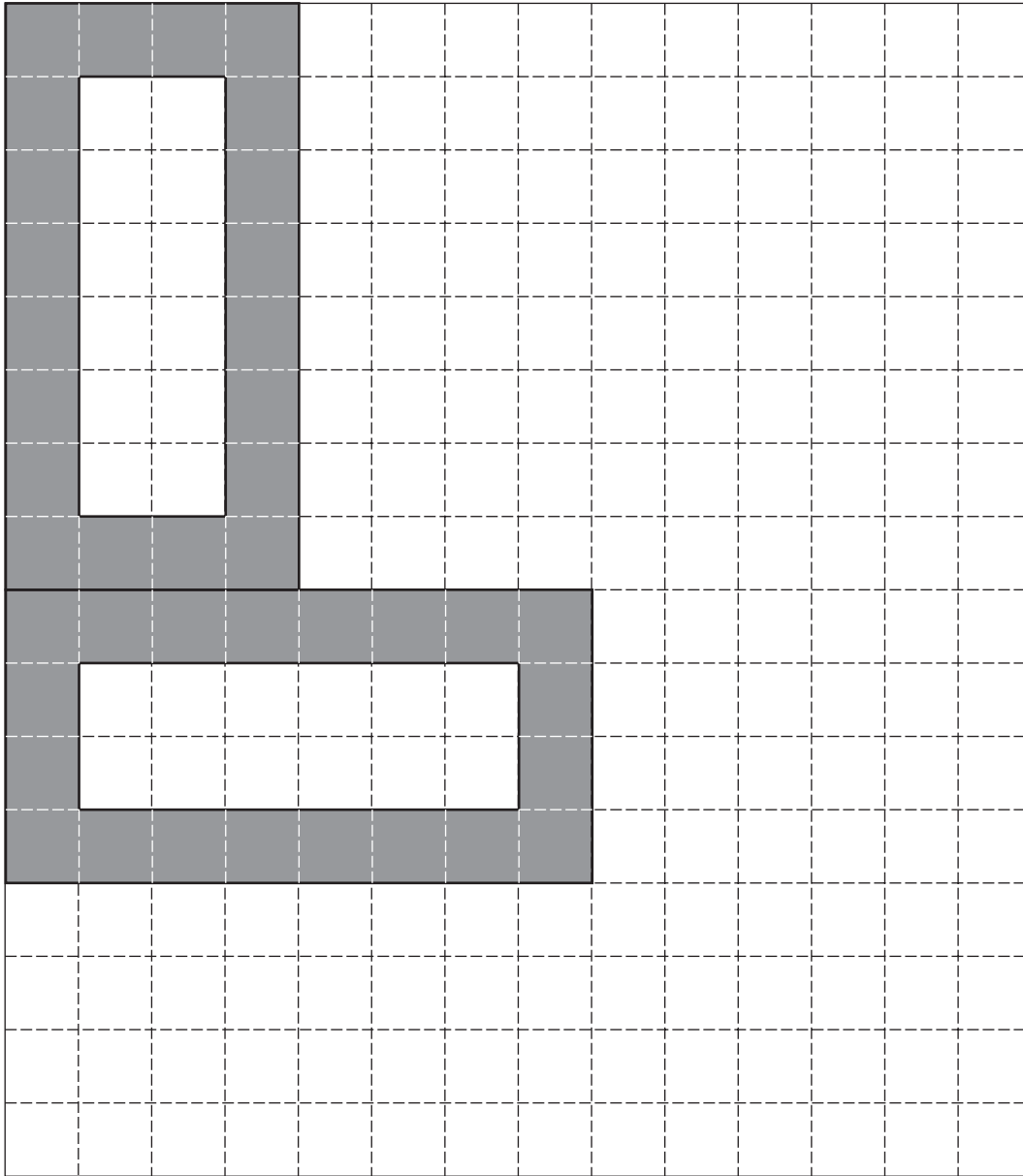
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Answer £ \_\_\_\_\_

Question 7 continues on the next page



- 7 (c) Rani makes the number 0 from a 14 cm by 16 cm sheet of wood.  
This is how she starts.



Show how she can cut the largest number of 0s from the sheet.

[2 marks]



8

The diagram shows points  $P$  and  $Q$ .

A ship,  $S$ , is on a bearing

$035^\circ$  from  $P$

and

$310^\circ$  from  $Q$ .

Using a protractor and ruler, show the position of  $S$  on the diagram.

[2 marks]

North



$P$

North



$Q$

Turn over for the next question

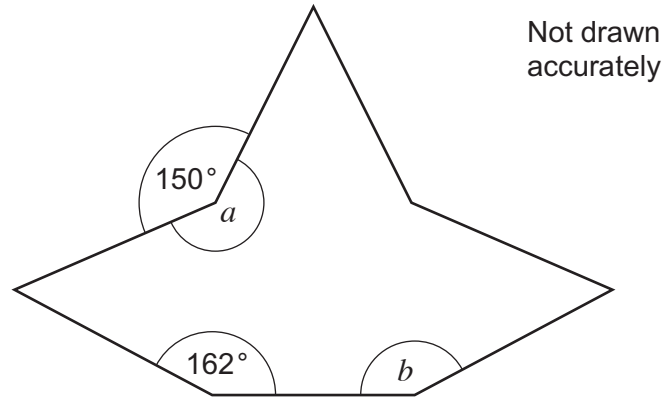
4

Turn over ►



9 Mike makes designs from wire.

9 (a) In this design, there is one vertical line of symmetry.

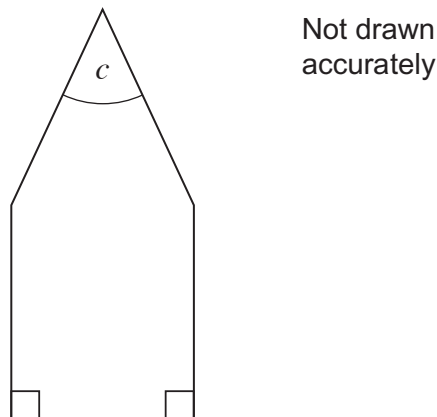


Work out the sizes of angles  $a$  and  $b$ .

[2 marks]

$a =$  \_\_\_\_\_ degrees     $b =$  \_\_\_\_\_ degrees

9 (b) In this design, all 5 sides are equal.



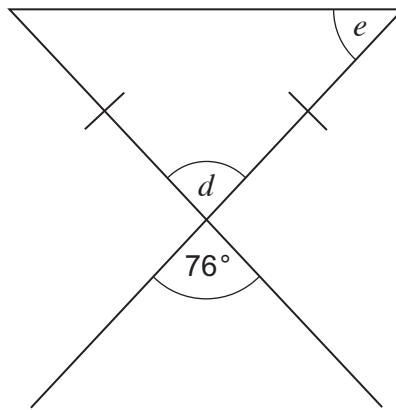
Work out the size of angle  $c$ .

[1 mark]

$c =$  \_\_\_\_\_ degrees



9 (c) In this design, the triangle is isosceles.



Not drawn  
accurately

Work out the size of angles  $d$  and  $e$ .

[3 marks]

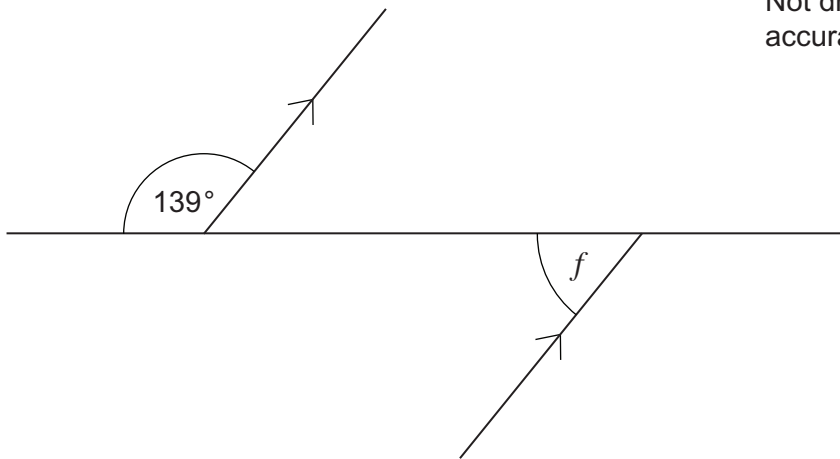
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$d =$  \_\_\_\_\_ degrees     $e =$  \_\_\_\_\_ degrees

9 (d) In this design, two lines are parallel.



Not drawn  
accurately

Work out the size of angle  $f$ .

[2 marks]

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$f =$  \_\_\_\_\_ degrees

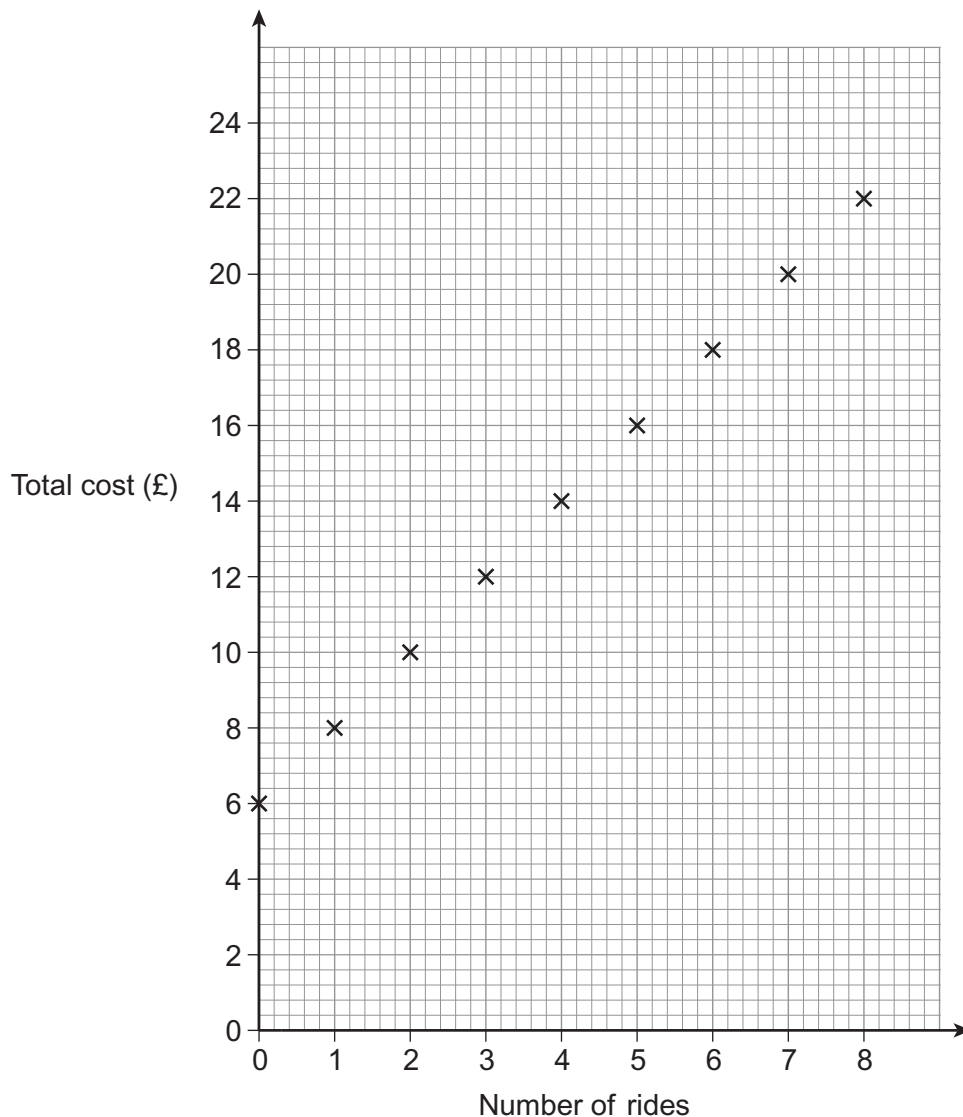
8
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Turn over ►



**10** To visit a fairground, each person pays a charge to enter and an extra amount for each ride they go on.

The graph shows the total cost for one person to enter and go on up to 8 rides.



**10 (a)** How much is the charge to enter?

**[1 mark]**

Answer £ \_\_\_\_\_





10 (b) How much is the extra amount for each ride?

[1 mark]

Answer £ \_\_\_\_\_

10 (c) Mrs Smith and her two children visit the fairground.

They have £40 to spend between them.

Mrs Smith will **not** go on any rides.

Each child will go on the same number of rides.

Work out the **greatest** number of rides each child can go on.

[3 marks]

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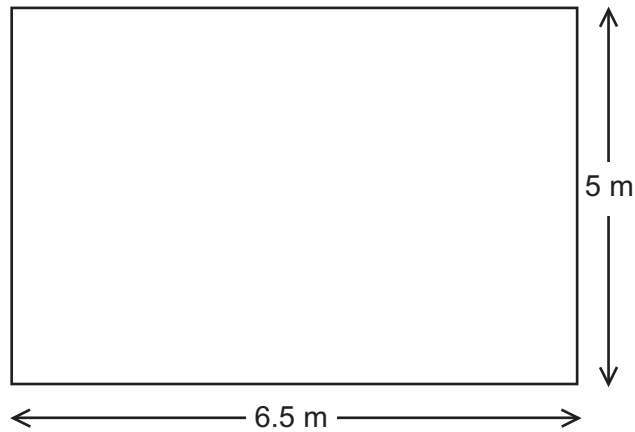
Answer \_\_\_\_\_

**Turn over for the next question**



**\*11**

A rectangular floor measures 6.5 metres by 5 metres.

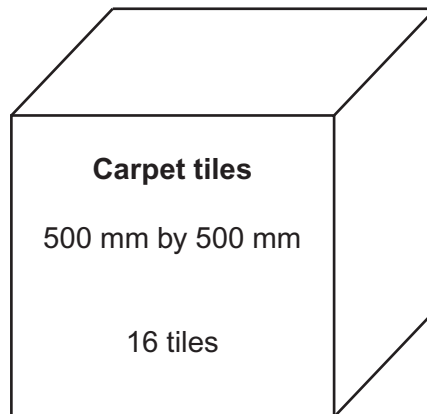


Not drawn  
accurately

Leo wants to buy carpet tiles to cover the floor.

He buys the tiles in packs of 16

Each tile is a square with side length 500 millimetres.



1 m = 1000 mm

How many packs of tiles does he need to buy?  
You **must** show your working.

**[5 marks]**

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Answer \_\_\_\_\_

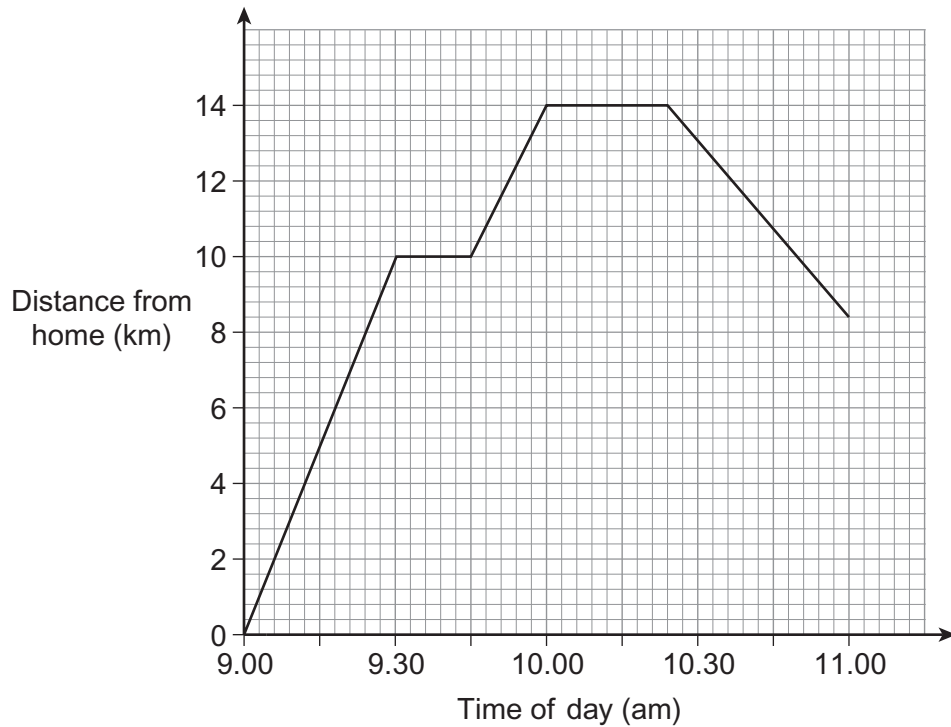
**Turn over for the next question**

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**Turn over** ▶



- 12 A cyclist leaves home at 9.00 am  
The graph shows her journey for two hours.



- 12 (a) Work out the **total** time, in minutes, that the cyclist was at rest.

[2 marks]

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Answer \_\_\_\_\_ min

- 12 (b) How far from home was the cyclist at 11.00 am?  
Circle your answer.

[1 mark]

8.1 km

8.2 km

8.4 km

8.5 km



- 12 (c)** Work out the speed of the cyclist between 9.00 am and 9.30 am  
Give your answer in km/h

[2 marks]

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Answer \_\_\_\_\_ km/h

- 13** Sophie makes pink paint by mixing red paint and white paint.

For **light** pink she mixes red and white in the ratio 1 : 3

For **dark** pink she mixes red and white in the ratio 2 : 1

She has 20 litres of **light** pink.

She adds some red to make **dark** pink.

How much red does she add?

[4 marks]

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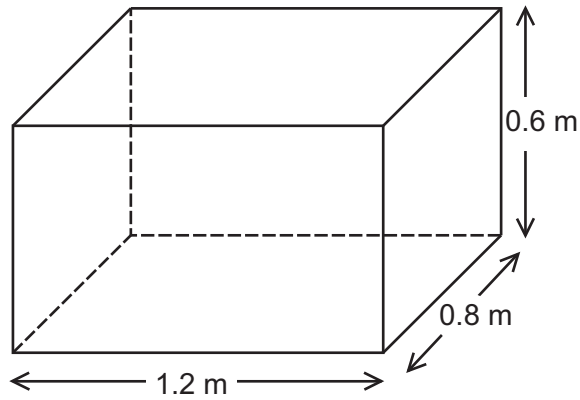
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Answer \_\_\_\_\_ litres



- 14** Rob makes garden storage boxes from wood.  
Each box is a cuboid with a lid.



- 14 (a)** Show that the total surface area of the outside of one box is  $4.32 \text{ m}^2$

**[2 marks]**

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- 14 (b)** Rob covers the outside of each box with wood preserver.  
Here are the instructions for using the wood preserver.

Cover each surface **three** times

Each litre covers  $6.5 \text{ m}^2$  once

Rob has 15 litres of wood preserver.

Is this enough to cover 8 boxes?  
You **must** show your working.

**[3 marks]**

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**Turn over for the next question**



- 15** Pam has 80 beads.  
Ellie has 44 beads.

Ellie gives  $x$  beads to Pam.

- 15 (a)** How many beads do Pam and Ellie now have?  
Tick a box.

[1 mark]

Pam has  $(80 + x)$  beads   
Ellie has  $(44 + x)$  beads

Pam has  $(80 + x)$  beads   
Ellie has  $(44 - x)$  beads

Pam has  $(80 - x)$  beads   
Ellie has  $(44 + x)$  beads

Pam has  $(80 - x)$  beads   
Ellie has  $(44 - x)$  beads

- \*15(b)** Pam now has three times as many beads as Ellie.

Set up and solve an equation to work out how many beads Ellie gives to Pam.

[4 marks]

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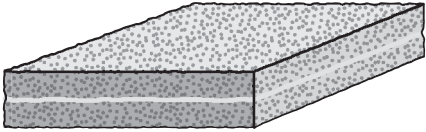
Answer \_\_\_\_\_





**\*16** Shalina makes two cakes.

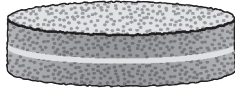
**Cake A**



Cuboid measuring  
22 cm by 15 cm by 5 cm

Cost of ingredients is £3.96

**Cake B**



Cylinder of base radius 10 cm  
and height 5 cm

The cost of the ingredients, per  $\text{cm}^3$ , is the same for each cake.  
Shalina wants to sell cake B and make 50% profit on the cost of its ingredients.

How much should she sell cake B for?

**[6 marks]**

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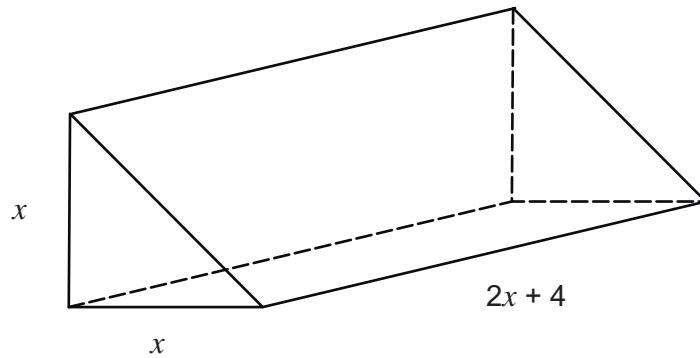
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Answer £ \_\_\_\_\_



17

A box is a triangular prism.  
All dimensions are in centimetres.



The formula for the volume of the box,  $V \text{ cm}^3$ , is

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

Use trial and improvement to work out the value of  $x$  when  $V = 780$   
Give your answer to one decimal place.

Use the table opposite for your trials.  
You **must** show your working.

[4 marks]



$x$	$x^3 + 2x^2$	$V$	Comment
8	$8^3 + 2 \times 8^2$ $= 512 + 128$	640	Too small

Answer = \_\_\_\_\_

**Turn over for the next question**



**18** One patty and one bread roll are used to make a vegetable burger.

Patties are sold in packs of 15  
Each pack costs £8.24

Bread rolls are sold in packs of 20  
Each pack costs £3.25

Nick buys the same number of patties as bread rolls.  
He buys enough to make **more than** 100 vegetable burgers.

Work out the least amount he could pay.

**[3 marks]**

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Answer £ \_\_\_\_\_

**END OF QUESTIONS**

**3**

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