



General Certificate of Secondary Education
January 2020

Centre Number

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Candidate Number

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Mathematics

Unit M2
(With calculator)
Foundation Tier



[GMC21]

GMC21

MONDAY 13 JANUARY, 9.15am–11.00am

TIME

1 hour 45 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

You must answer the questions in the spaces provided.

Do not write outside the boxed area on each page or on blank pages.

Complete in black ink only. **Do not write with a gel pen.**

Answer **all twenty-eight** questions.

All working should be clearly shown in the spaces provided. Marks may be awarded for partially correct solutions.

You **may** use a calculator for this paper.

INFORMATION FOR CANDIDATES

Functional Mathematics is assessed in this unit.

The total mark for this paper is 100.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

You should have a calculator, ruler, compasses and a protractor.

The Formula Sheet is on page 2.

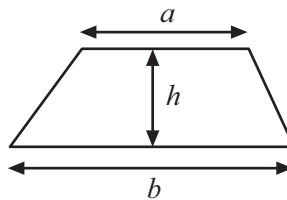
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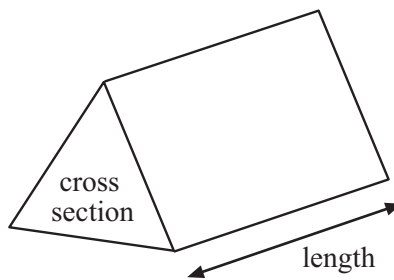
28GMC2101

Formula Sheet

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



$$\text{Volume of prism} = \text{area of cross section} \times \text{length}$$



1 The table shows information about eight different cameras.

Name of camera	Price (£)	Weight (g)	Battery life (shots)	Resolution (megapixels)	Touchscreen
Tinon 10	479	460	260	24	Yes
Tinon 20	605	510	400	28	No
Fiji F1	345	390	366	12	No
Fiji F2	380	360	450	18	Yes
Nika N400	750	625	300	20	No
Nika N500	879	775	365	24	No
Olympia OL	399	375	240	16	Yes
Olympia OM	549	390	275	20	No

Stan wants to buy a camera with
a resolution of at least 20 megapixels and
a weight under 500 g.

Write down the names of the two cameras that he could buy.

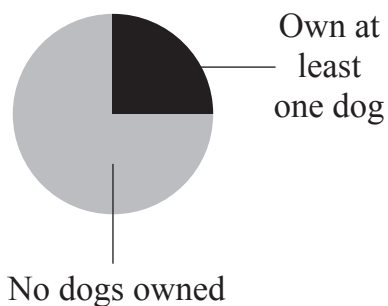
Answer _____ and _____ [1]

[Turn over

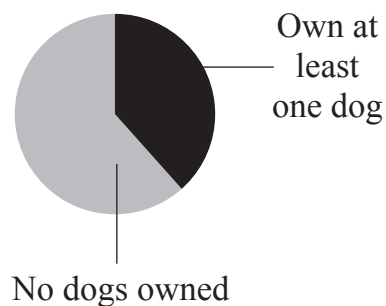


- 2 The pie charts show the proportion of households in the UK in 2017 that owned dogs. The number of households in each country is also shown.

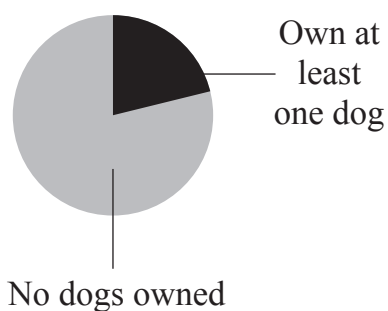
England
(22 million households)



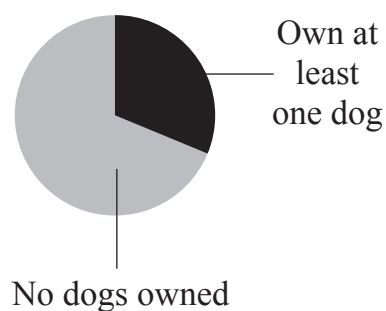
Northern Ireland
(800 000 households)



Scotland
(2.4 million households)



Wales
(1.3 million households)



- (a) What percentage of households in England own at least one dog?

Answer _____ % [1]

- (b) About what fraction of households in Wales own at least one dog?

Answer _____ [1]



(c) $\frac{3}{8}$ of the households in Northern Ireland own at least one dog.

How many households is this?

Answer _____ households [1]

(d) Three friends were asked which country in the UK has the most households owning dogs.

Northern Ireland, since its pie chart shows the most



Orla

There is not enough information to tell



Paul

England, as it has far more households



Rebecca

Circle the person you agree with.

Orla

Paul

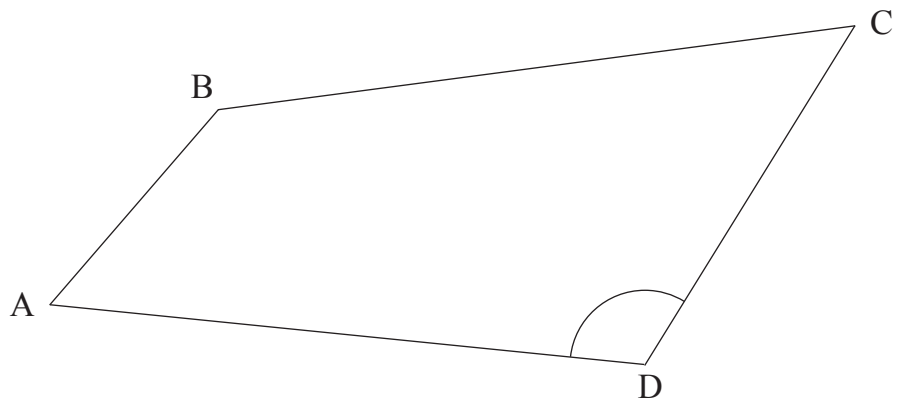
Rebecca

[1]

[Turn over



6



(a) Measure the length of the line BC in mm.

Answer _____ mm [2]

(b) Measure the size of angle CDA.

Answer _____ ° [1]



7 Insert the correct symbol in each box below.

< > =

(a) 375 mm 37.5 cm

(b) 600 g 6 kg

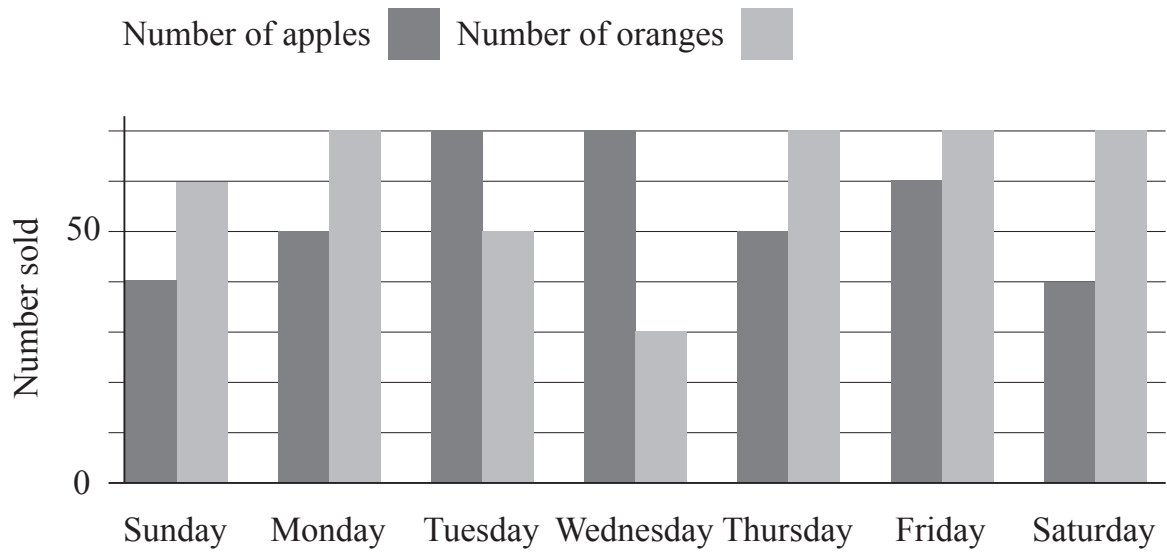
(c) 27 litres 26 900 ml

(d) 310 mins 5 hours

[4]



- 8 The dual bar chart shows how many apples and oranges were sold in a fruit shop last week.



The owner says

“I sold 50 more oranges than apples last week.”

Is he correct?

You must explain your answer.

Answer _____ because _____ [3]



9 8500 tickets for a concert are sold.

The organisers think that 40% of the ticket holders will turn up more than an hour before the start.

How many ticket holders will this be?

Answer _____ [2]

10	Silverside	costs	£4.90 per kg
	Topside	costs	£5.75 per kg
	Fillet	costs	£13.00 per kg

Martin buys 4.5 kg of Fillet.

He also buys some Silverside.

The total cost is £92.31

How much Silverside does he buy?

Answer _____ kg [4]

[Turn over

12506



28GMC2111

11 (a) Calculate the value of $\frac{2}{0.4^2}$

Answer _____ [2]

(b) Calculate the cube of 6

Answer _____ [1]

(c)

36	1	19	49	10	39	15	31
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From the numbers in the list, write down all the

(i) prime numbers,

Answer _____ [1]

(ii) square numbers.

Answer _____ [1]

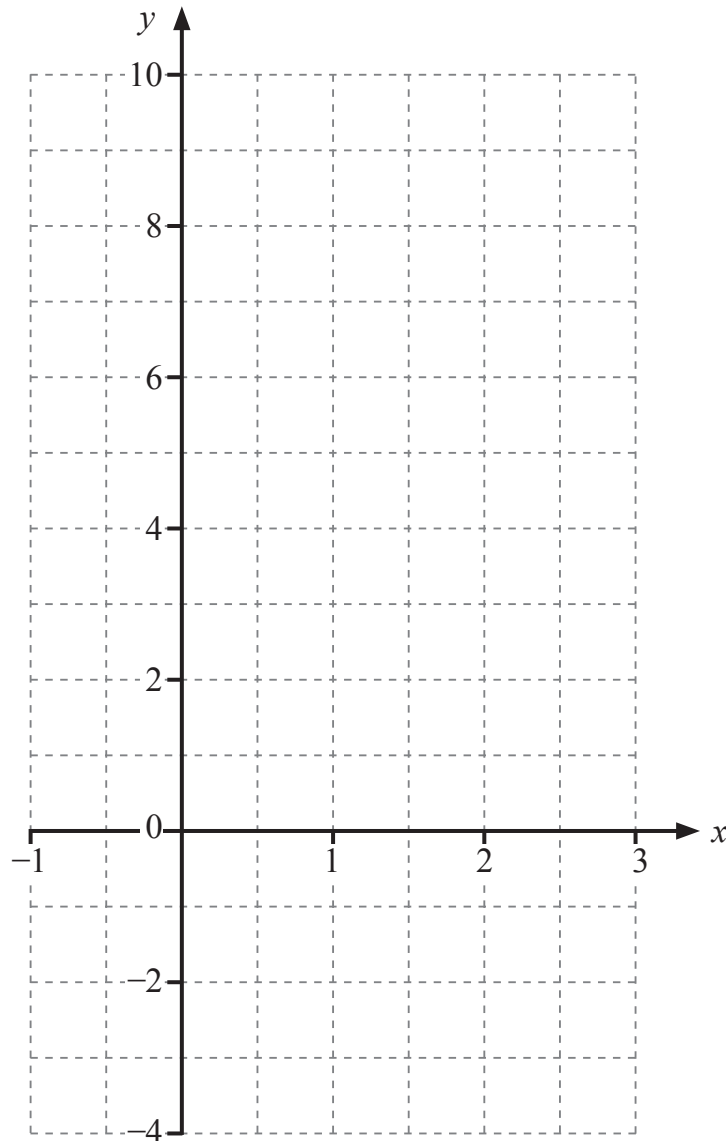


12 (a) Complete the table below for $y = 4x - 3$

x	1	2	3
y			

[1]

(b) Draw the line $y = 4x - 3$ on the grid below



[2]

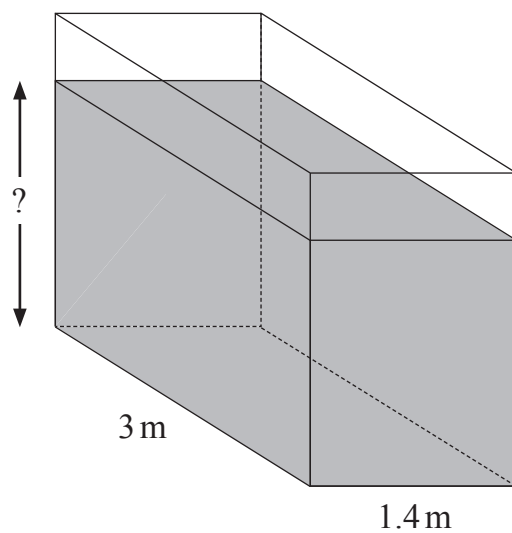
[Turn over



13 A tank is in the shape of a cuboid, as shown below.

The tank is used to store 11.13 m^3 of liquid.

How deep is the liquid in the tank?



Answer _____ m [3]



14 Work out the size of the angle marked x in the diagram below.

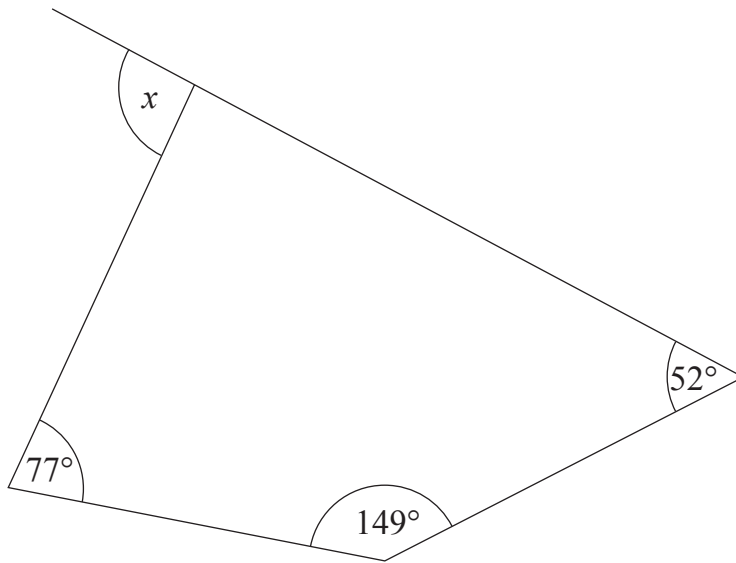


diagram not
drawn accurately

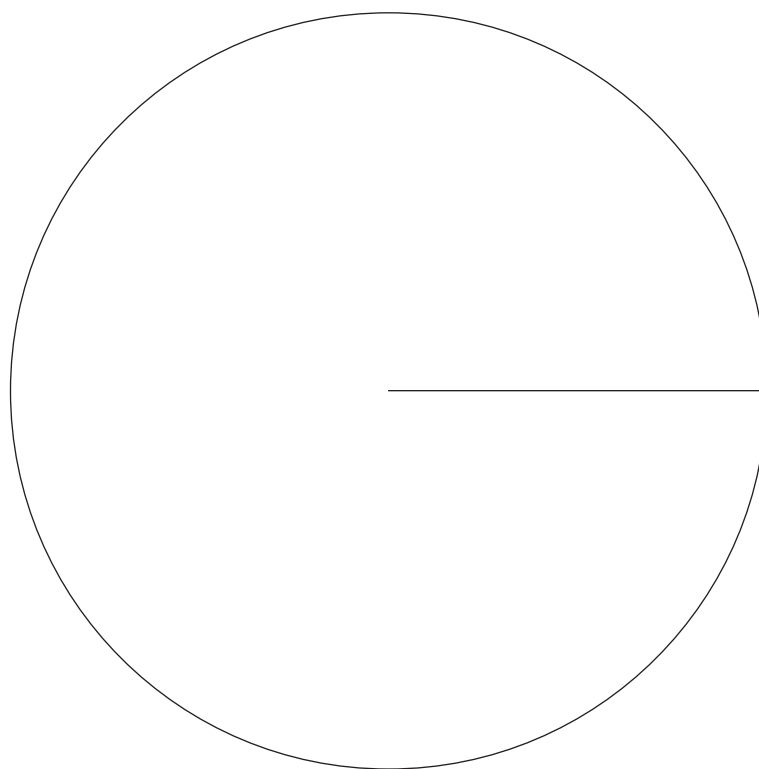
Answer _____ $^\circ$ [3]



15 The total sales figures for a supermarket one month are shown below.

Department	Total Sales (£1000s)	
Food	65	
Electrical	32	
Clothing	46	
Household	23	
Health & Beauty	14	

Draw a pie chart to show this information.



[4]



16 A hotel has single, twin and family rooms.

It offers room only, bed and breakfast (B&B) or half board.

On Saturday night, all the rooms in the hotel were booked.

Some information is shown in this two-way table.

	Room only	B&B	Half board	
Single	2	1		4
Twin		4	3	
Family	1		6	10
	7			

How many rooms are in the hotel?

Answer _____ [3]

[Turn over



17 Streetwise Youth Club has 86 members.

59 of the members attended last week.

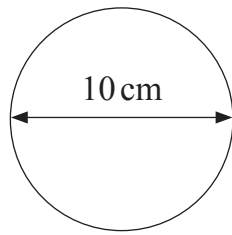
What percentage attended last week?

Give your answer to 1 decimal place.

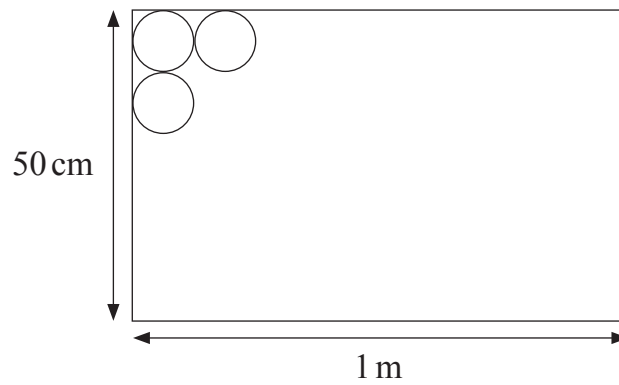
Answer _____ % [3]



18 Circles with diameter 10 cm are cut from a sheet of plastic as shown below.



diagrams not
drawn accurately



(a) Calculate the area of each circle.

Answer _____ cm^2 [2]

(b) How many circles can be cut from the sheet of plastic?

Answer _____ [2]

(c) What is the area of the plastic left over after the maximum number of circles have been cut out?

Answer _____ cm^2 [3]

[Turn over



19 Julie works on a market stall.
One Saturday she has 42 boxes of candles to sell.
Each box cost her £2.40
There are 18 candles in each box.

During the day she sells 34 boxes at £3.60 each.
In the last hour she starts to sell the remaining candles individually at 35p each.

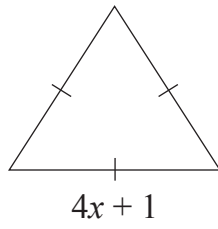
At the end of the day she has only 12 candles left.
Calculate the profit she made that day.

Answer £ _____ [6]

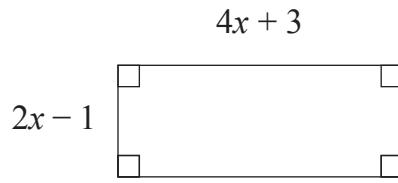


20 Which of these shapes has the greatest perimeter?

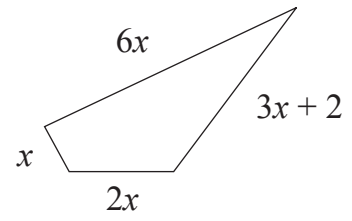
Show all your working.



Shape A



Shape B



Shape C

Answer Shape _____ [4]

[Turn over



- 21 A shop sells 80 gift vouchers valued at £5, £10, £20, £50 or £100
The table shows the number of each sold one weekend.

Price of gift voucher	Number of vouchers sold	
£5	34	
£10	26	
£20	9	
£50	7	
£100	4	

The shopkeeper states “on average people spend at least £15 on a gift voucher”.

By finding all three averages (mode, median, mean), which average makes her statement correct?

Answer _____ because _____
_____ [5]



22 BMI (Body Mass Index) is calculated using the formula

$$\text{BMI} = \frac{w}{h^2}$$

where w = weight in kilograms and h = height in metres.

Mark has a BMI of 22

His height is 1.83 m.

Calculate his weight.

Answer _____ kg [2]

23 Solve $5(3x - 2) = 7x + 4$

Answer $x =$ _____ [3]

[Turn over



24 (a) Find the highest common factor (HCF) of 24 and 40

Answer _____ [2]

(b) Write down two numbers, greater than 1, which have a lowest common multiple (LCM) of 48

Answer _____ , _____ [2]

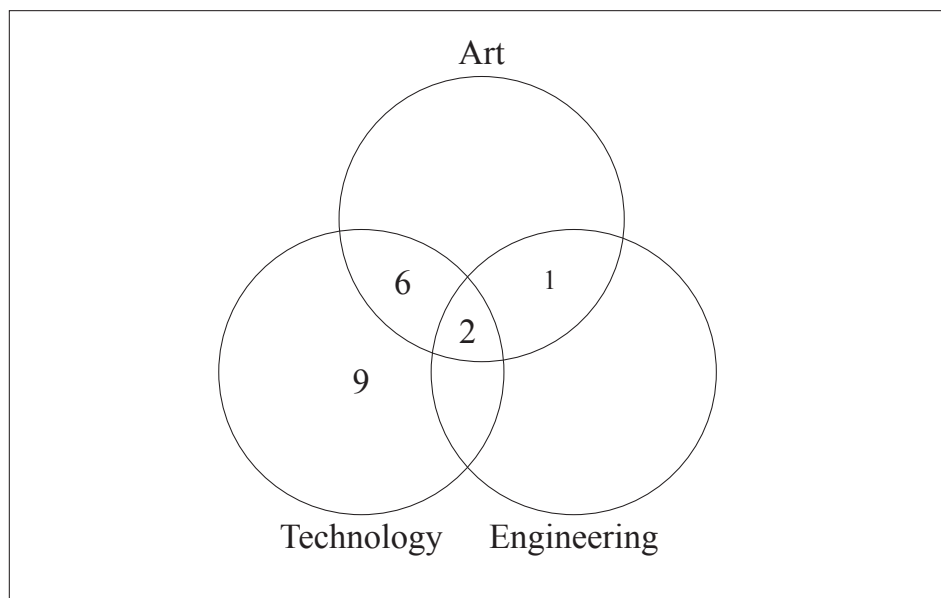


25 There are 35 students in a Form Class.

Some students study Art, some study Technology, some study Engineering and some study a combination of these subjects.

Some study none of these subjects.

The Venn diagram shows some information about the number of students studying the subjects.



5 students study Technology and Engineering.

14 students study Art.

8 students study Engineering.

(a) Use this information to complete the Venn diagram.

[4]

(b) Use the Venn diagram to calculate what percentage of Technology students also study Art but not Engineering.

Answer _____ % [2]

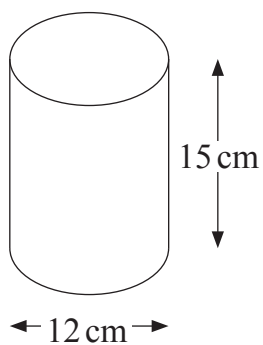
[Turn over



26 Work out the midpoint of the line PQ joining P(4, -6) and Q(8, 2).

Answer (_____ , _____) [2]

27 Calculate the volume of a cylinder with diameter 12 cm and height 15 cm.



Answer _____ cm³ [2]



28 A badge is made from a triangle and three-quarters of a circle as shown.

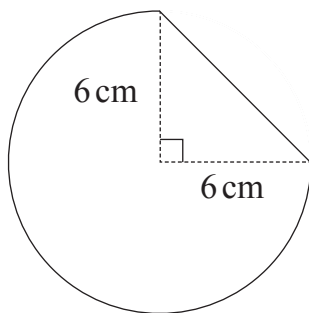


diagram not
drawn accurately

Work out the perimeter of the badge.

Answer _____ cm [6]

THIS IS THE END OF THE QUESTION PAPER



DO NOT WRITE ON THIS PAGE

For Examiner's use only	
Question Number	Marks
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Total Marks	
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Examiner Number

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