Rewarding Learning

Centre Number

Candidate Number

General Certificate of Secondary Education
January 2015

Mathematics

Unit T2
(With calculator)
Foundation Tier

[GMT21]

GMT21

FRIDAY 9 JANUARY, 9.15 am–10.45 am

TIME

1 hour 30 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 box, around each page, on blank pages or tracing paper.
Complete in blue or black ink only. **Do not write with a gel pen**.
Answer **all twenty-eight** questions.
Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.
You **may** use a calculator for this paper.

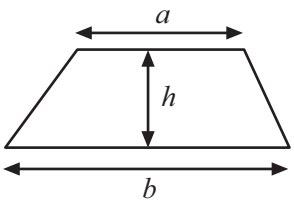
INFORMATION FOR CANDIDATES

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.
Functional Elements will be assessed in this paper.
Quality of written communication will be assessed in **Questions 7 and 16**.
You should have a calculator, ruler, compasses and a protractor.
The Formula Sheet is on page 2.

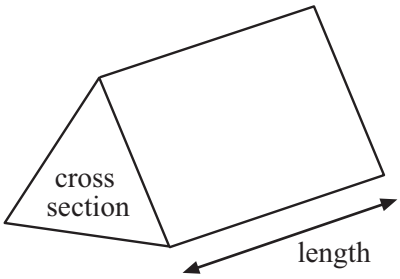
9311

Formula Sheet

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



Volume of prism = area of cross section × length



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(Questions start overleaf)

1 **(a)** Write down the next two prime numbers after 53

Answer _____ , _____ [2]

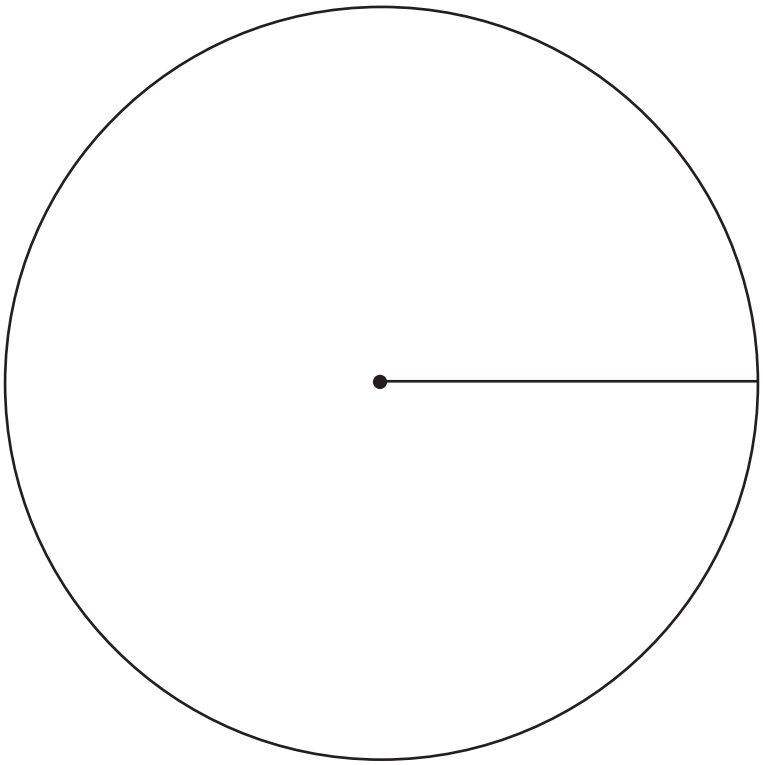
(b) Find the cube root of 27

Answer _____ [1]

2 The table below gives information on the sports played by boys after school.

Sport	Football	Rugby	Hockey	Tennis
Number of boys	26	8	12	14
Angle				

Draw a clearly labelled pie chart for this information.



[4]

3 27 girls did a test.
The stem and leaf diagram shows their marks.

0	1	3	4			
1	4	4	5	6		
2	0	1	3	5	7	7
3	2	4	4	6	6	6
4	4	5	8	9		
5	0	0	3	5		

key 1 | 4 means 14 marks

(a) Find

(i) the mode of the marks,

Answer _____ [1]

(ii) the median of the marks,

Answer _____ [1]

(iii) the range of the marks.

Answer _____ [1]

The marks for 27 boys in the same test are shown.

12	12	24	26	26	26	27
30	35	36	36	38	39	39
40	42	43	44	47	52	54
56	56	58	58	59	59	

(b) Complete a back to back stem and leaf diagram below for the boys.
The first two rows of the marks have already been entered.

Boys								Girls					
							0	1	3	4			
					2	2	1	4	4	5	6		
		7	6	6	6	4	2	0	1	3	5	7	7
9	9	8	6	6	5	0	3	2	4	4	6	6	6
							4	4	5	8	9		
							5	0	0	3	5		

key 2 | 1 means 12 marks key 1 | 4 means 14 marks

[2]

(c) By using the stem and leaf diagram decide whether the boys or girls did better in the test. Give a reason for your answer.

The _____ did better in the test because _____

_____ [2]

[Turn over

4 A fish tank is a cuboid.

The tank has a length of 9 metres, a width of 4 metres and a height of 3 metres.

The fish tank is filled with 99 m^3 of water.
What is the depth of water in the tank?

Answer _____ metres [2]

5 The Eurostar train leaves London at 11 24 (London time) and arrives in Paris at 14 47 (Paris time).

The time in Paris is 1 hour ahead of the time in London.
How long does the journey take?

Answer _____ [3]

6 Work out the size of the angle w.

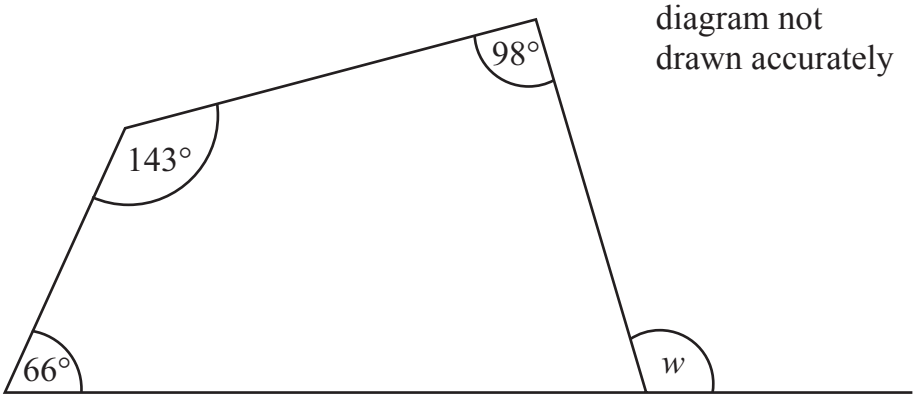


diagram not drawn accurately

Answer $w =$ _____ ° [3]

Quality of written communication will be assessed in this question.

7 A smartphone costs £375

Jill pays a deposit of £95 for this smartphone.

She then pays £35 each month.

How many months will it take before she has paid for the smartphone?

Show your working clearly.

Answer _____ months [3]

8 **(a)** Explain the meaning of 3^4

Answer _____ [1]

(b) Calculate $3^4 \times 5^3$

Answer _____ [1]

(c) Calculate $4.2^2 + \sqrt{3.61}$

Answer _____ [2]

9 **(a)** Find the value of $5x + 6y$ when $x = 9$ and $y = -2$

Answer _____ [2]

(b) Solve $7x - 9 = 47$

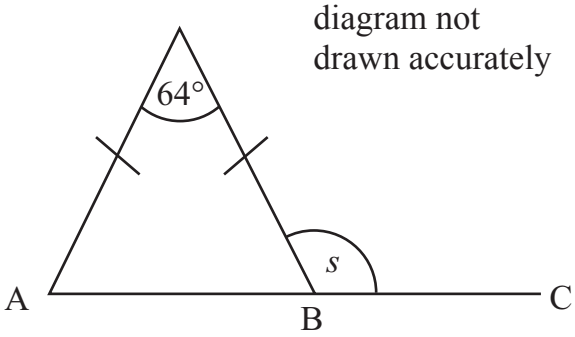
Answer x = _____ [2]

(c) In the spaces provided, write down the next two numbers in the sequence

23, 21, 17, 11, _____ , _____ [2]

[Turn over

10 The triangle shown is isosceles. ABC is a straight line.



Work out the size of the angle s.

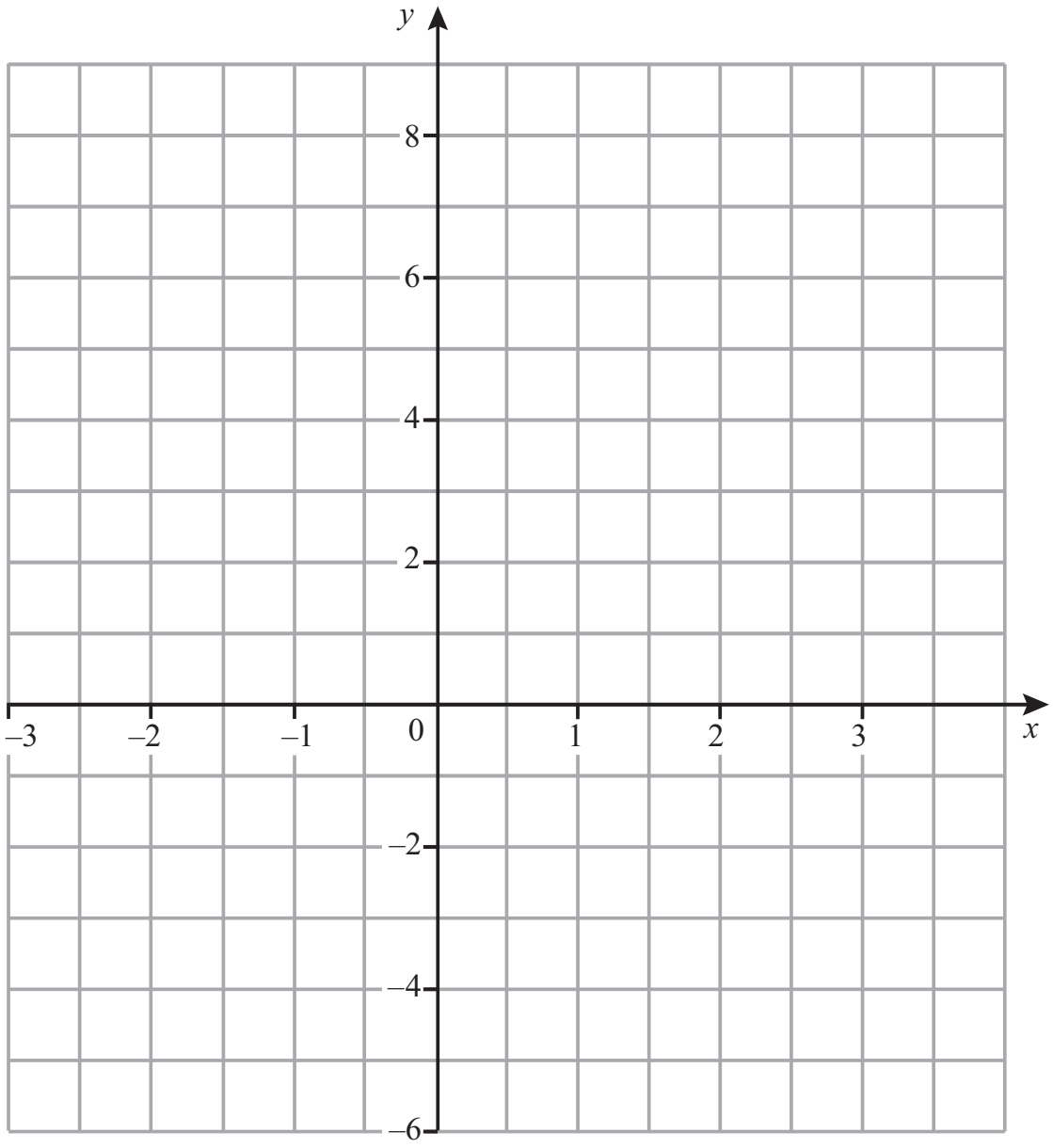
Answer s = _____ ° [3]

11 **(a)** Complete the table for $y = 5 - 3x$

x	–1	0	1	2	3
$y = 5 - 3x$	8		2		–4

[2]

(b) Using values from the table, draw the graph of $y = 5 - 3x$



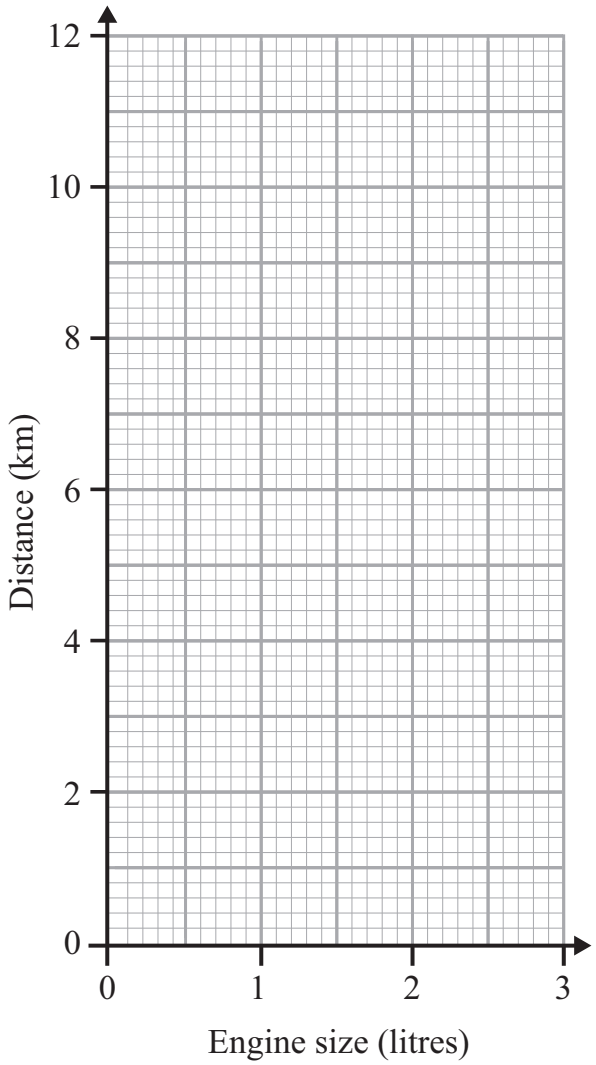
[1]

[Turn over

12 The table shows the engine size (litres) of different cars and the distance (km) that the cars can travel on one litre of petrol.

Engine size	1.0	1.8	2.4	1.2	2.1	1.5	2.7
Distance	12	8.6	5	9.4	5.9	10.2	3.8

(a) Draw a scatter graph. [2]



(b) Draw a line of best fit. [1]

(c) Another car travels 7 km on one litre of petrol. Use your line of best fit to estimate the engine size of this car.

Answer _____ litres [1]

(d) Describe the correlation in this scatter graph.

Answer _____ [1]

13 The diagram shows a regular pentagon placed on top of a regular hexagon.

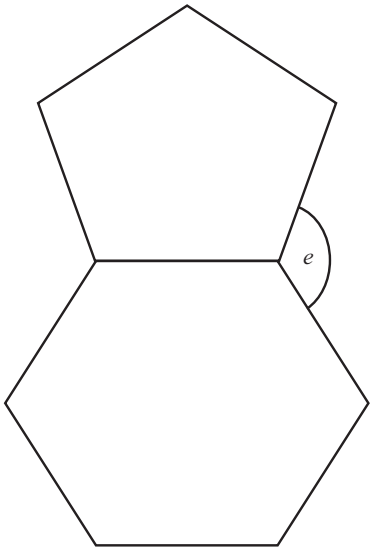


diagram not drawn accurately

Calculate the size of the angle marked e.

Show all your working.

Answer e = _____ ° [4]

[Turn over

14 ABCD is a parallelogram.

Angle DAB = 125°

Angle ADB = 37°

Angle CEB = 51°

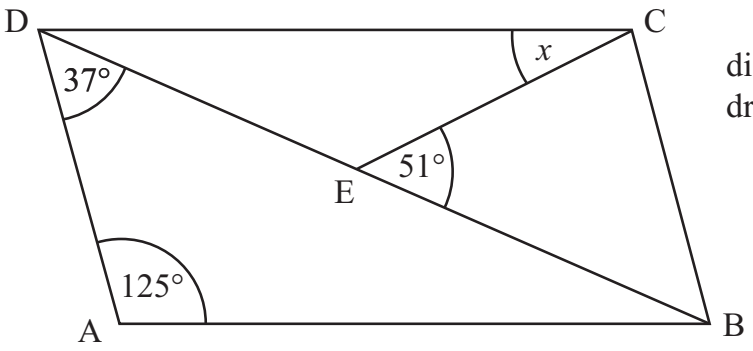


diagram not drawn accurately

Calculate the size of the angle x.

Answer x = _____ ° [4]

15 Factorise

(a) $8x + 12$

Answer _____ [1]

(b) $x^2 + 7x$

Answer _____ [1]

Quality of written communication will be assessed in this question.

16 Joanne is having a party. She needs forty packets of crisps.
A single packet of crisps costs 30 pence in each of two local stores.
Each store has a special offer on packets of crisps.

Bargain Store	Discount Store
20% off every ten packets	buy 3 and get one more free

Which is better value?

Show your working clearly.

Answer _____ [4]

17 Complete the spaces **(a)**, **(b)**, **(c)** and **(d)** on the electricity bill.

Northern Electricity					
	Meter Reading				
Date	Current units	Previous units	Units used	Price per unit	Total (£)
30 June	43458	42763	**(a)**	15 pence	**(b)** £
				VAT @ 5%	**(c)** £
				Total Charge	**(d)** £

[5]

18 **(a)** Write the recurring decimal 0.375375375... using dot notation.

Answer _____ [1]

(b) Write $0.\dot{2}\dot{8}$ correct to 4 decimal places.

Answer _____ [1]

19 **(a)** A toy lorry has 6 wheels and a toy car has 4 wheels.

Write down an expression for the **total** number of wheels on x lorries and y cars.

Answer _____ [2]

(b) Write down the first 3 terms of the sequence whose n^{th} term is $n^2 + 3$

Answer _____ , _____ , _____ [2]

20 P is the point (2, 3) and Q is the point (–4, –1).

Work out the coordinates of the midpoint of the line PQ.

Answer (_____ , _____) [2]

[Turn over

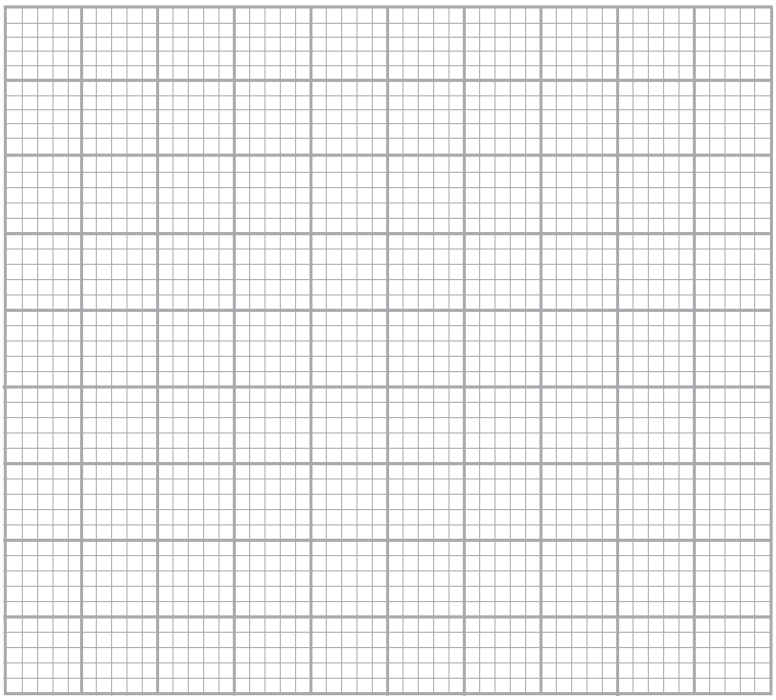
21 The masses of some stones found on a beach are shown in the table.

Mass (g)	Number of stones
$10 < m \leqslant 20$	33
$20 < m \leqslant 30$	88
$30 < m \leqslant 40$	57
$40 < m \leqslant 50$	52
$50 < m \leqslant 60$	43
$60 < m \leqslant 70$	17
$70 < m \leqslant 80$	10

(a) Which interval contains the median mass?

Answer _____ [1]

(b) Draw a frequency polygon to represent the data. [4]



22 **(a)** Simplify $\frac{2^8}{2^2}$, leaving your answer in index form.

Answer _____ [1]

(b) Expand and simplify $4(x - 2) + 3(2x + 3)$

Answer _____ [2]

[Turn over

23 In a group of golfers there are 37 males and 23 females.
19 of the males are wearing glasses and 14 of the females are wearing glasses.
What percentage of the group are wearing glasses?

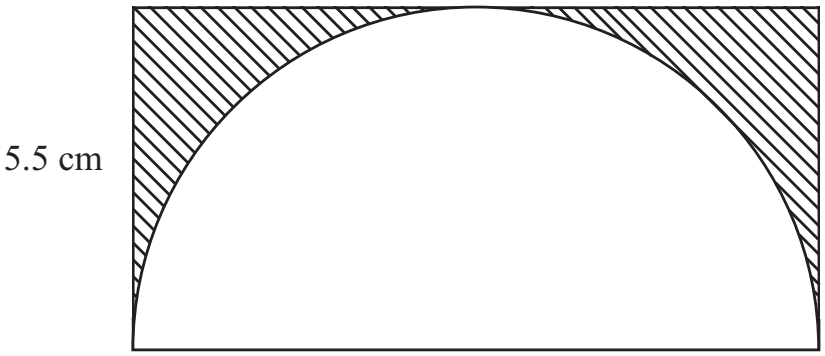
Answer _____ % [3]

24 Write 600 as a product of prime factors.

Express your answer in index notation.

Answer _____ [3]

25 The diagram shows a semicircle inside a rectangle.



Work out the area of the shaded region.

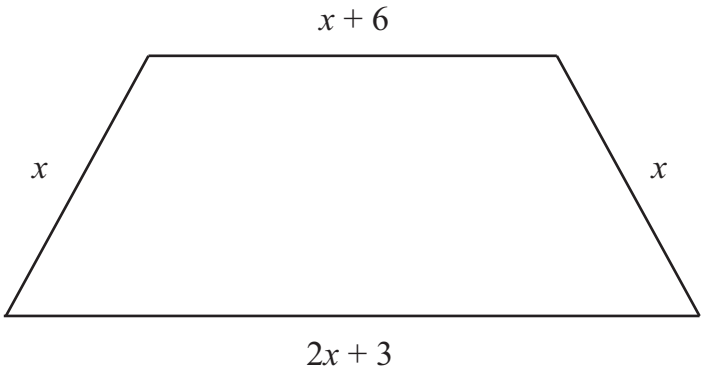
Answer _____ cm^2 [3]

26 A sheet of paper measures 297 mm by 210 mm.
Work out the length between diagonally opposite corners.

Answer _____ mm [3]

27 **(a)** Write an expression, in terms of x, for the perimeter of the trapezium shown.

Give your answer in its simplest form.



Answer _____ [2]

(b) The perimeter of this trapezium is 34 cm.

(i) Using the perimeter, write down an equation in terms of x.

Equation _____ [1]

(ii) Solve the equation to find x.

Answer x = _____ [1]

[Turn over

28 A solution to the equation $x^3 - 4x = 26$ lies between 3 and 4
Use trial and improvement to solve this equation.
Give your answer correct to 1 decimal place.
Show each stage of your working.

x	$x^3 - 4x$	

Answer $x =$ _____ [3]

THIS IS THE END OF THE QUESTION PAPER

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