



Centre Number

71	
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Candidate Number

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General Certificate of Secondary Education  
January 2015

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## Mathematics

Unit T2  
(With calculator)  
Foundation Tier  
[GMT21]



MV18
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FRIDAY 9 JANUARY, 9.15 am–10.45 am

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### TIME

1 hour 30 minutes, plus your additional time allowance.

### 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.**

Complete in blue or black ink only.

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 at the end of each question 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

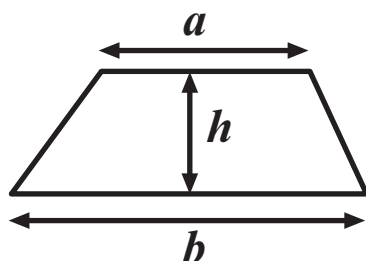
**Questions 7 and 16.**

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

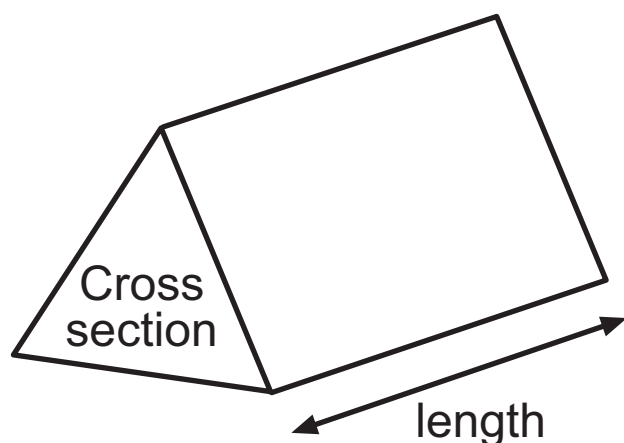
The Formula Sheet is on page 3.

# Formula Sheet

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



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



- 1 (a) Write down the next two prime numbers after 53  
[2 marks]

Answer \_\_\_\_\_ , \_\_\_\_\_

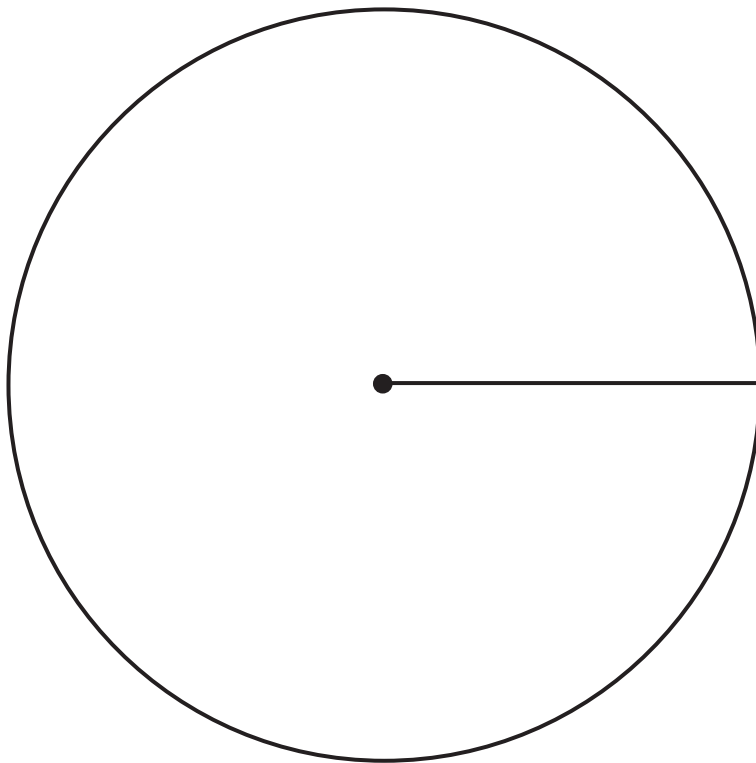
- (b) Find the cube root of 27 [1 mark]

Answer \_\_\_\_\_

- 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 marks]



- 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, [1 mark]

Answer \_\_\_\_\_

- (ii) the median of the marks, [1 mark]

Answer \_\_\_\_\_

- (iii) the range of the marks. [1 mark]

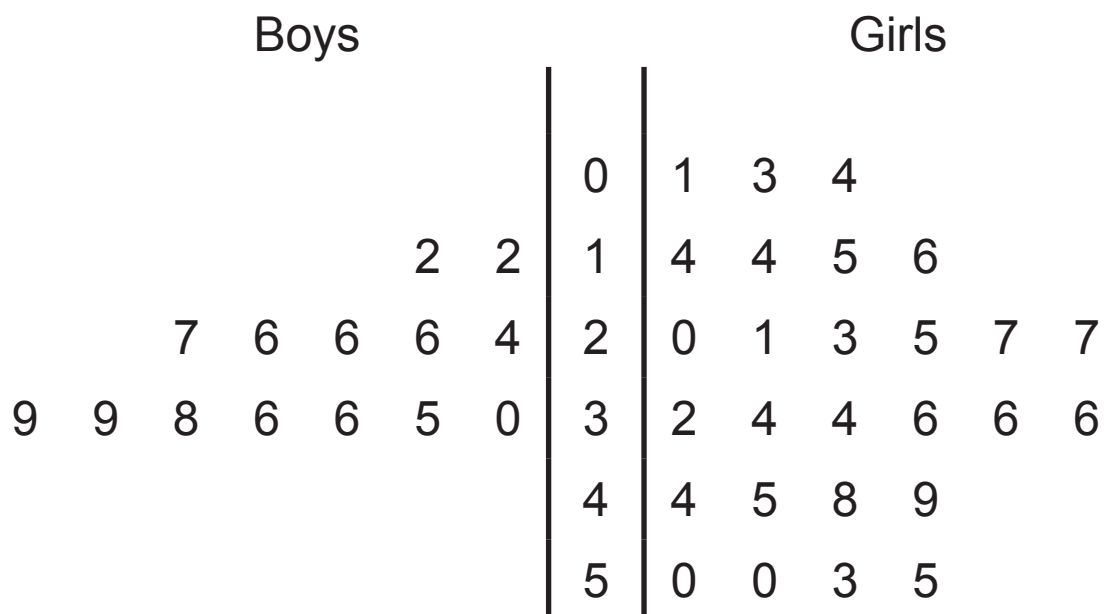
Answer \_\_\_\_\_

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. [2 marks]

The first two rows of the marks have already been entered.



key 2 | 1 means 12 marks

key 1 | 4 means 14 marks

**(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. [2 marks]

The \_\_\_\_\_ did better in the test because

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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  $99\text{m}^3$  of water.

What is the depth of water in the tank? [2 marks]

Answer \_\_\_\_\_ metres

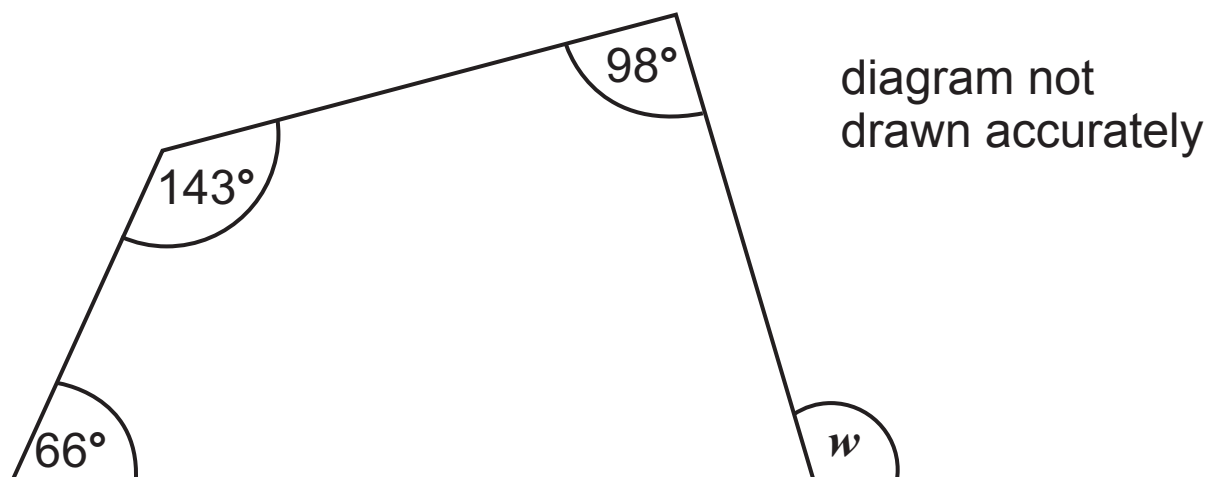


- 5** The Eurostar train leaves London at 11 24 (London time) and arrives in Paris at 14 47 (Paris time).

The time in Paris is 1 hour ahead of the time in London.  
How long does the journey take? [3 marks]

Answer \_\_\_\_\_

- 6 Work out the size of the angle  $w$ . [3 marks]



Answer  $w =$  \_\_\_\_\_ °

**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? [3 marks]

**Show your working clearly.**

Answer \_\_\_\_\_ months

8 (a) Explain the meaning of  $3^4$  [1 mark]

Answer \_\_\_\_\_

(b) Calculate  $3^4 \times 5^3$  [1 mark]

Answer \_\_\_\_\_

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

Answer \_\_\_\_\_

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

Answer \_\_\_\_\_

- (b) Solve  $7x - 9 = 47$  [2 marks]

Answer  $x =$  \_\_\_\_\_

- (c) In the spaces provided, write down the next two numbers in the sequence [2 marks]

23, 21, 17, 11, \_\_\_\_\_ , \_\_\_\_\_

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

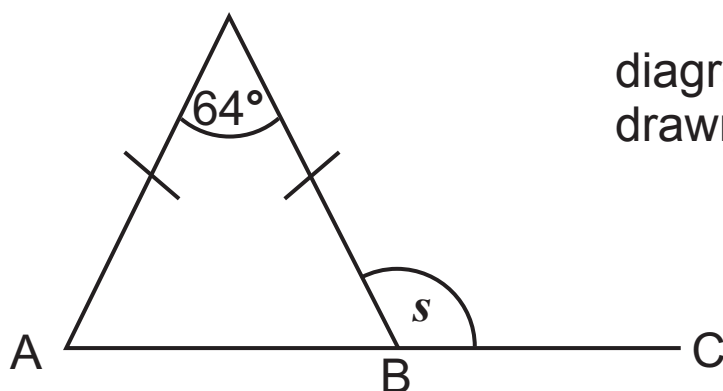


diagram not  
drawn accurately

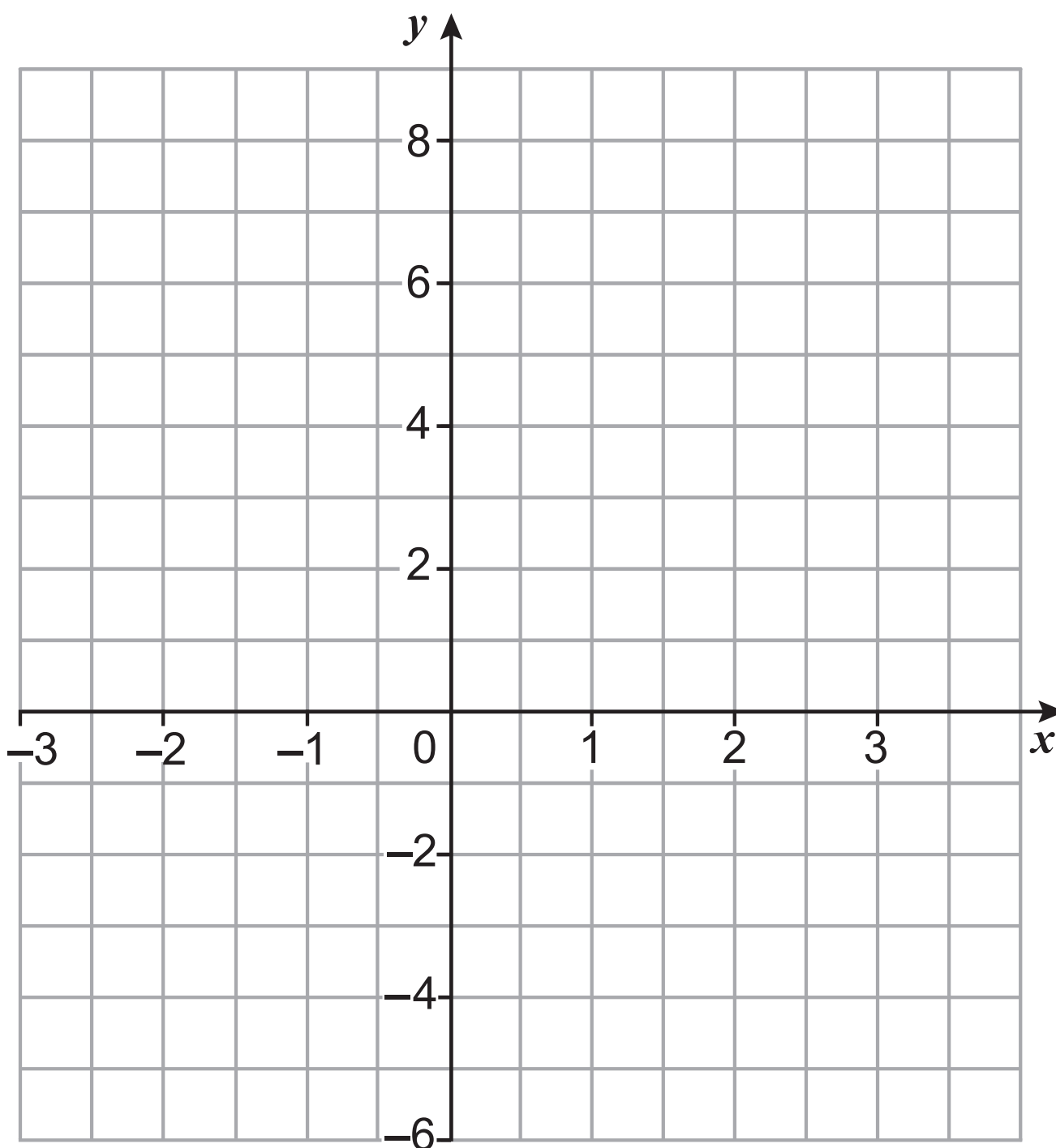
Work out the size of the angle  $s$ . [3 marks]

Answer  $s =$  \_\_\_\_\_  $^\circ$

**11 (a)** Complete the table for  $y = 5 - 3x$  [2 marks]

$x$	-1	0	1	2	3
$y = 5 - 3x$	8		2		-4

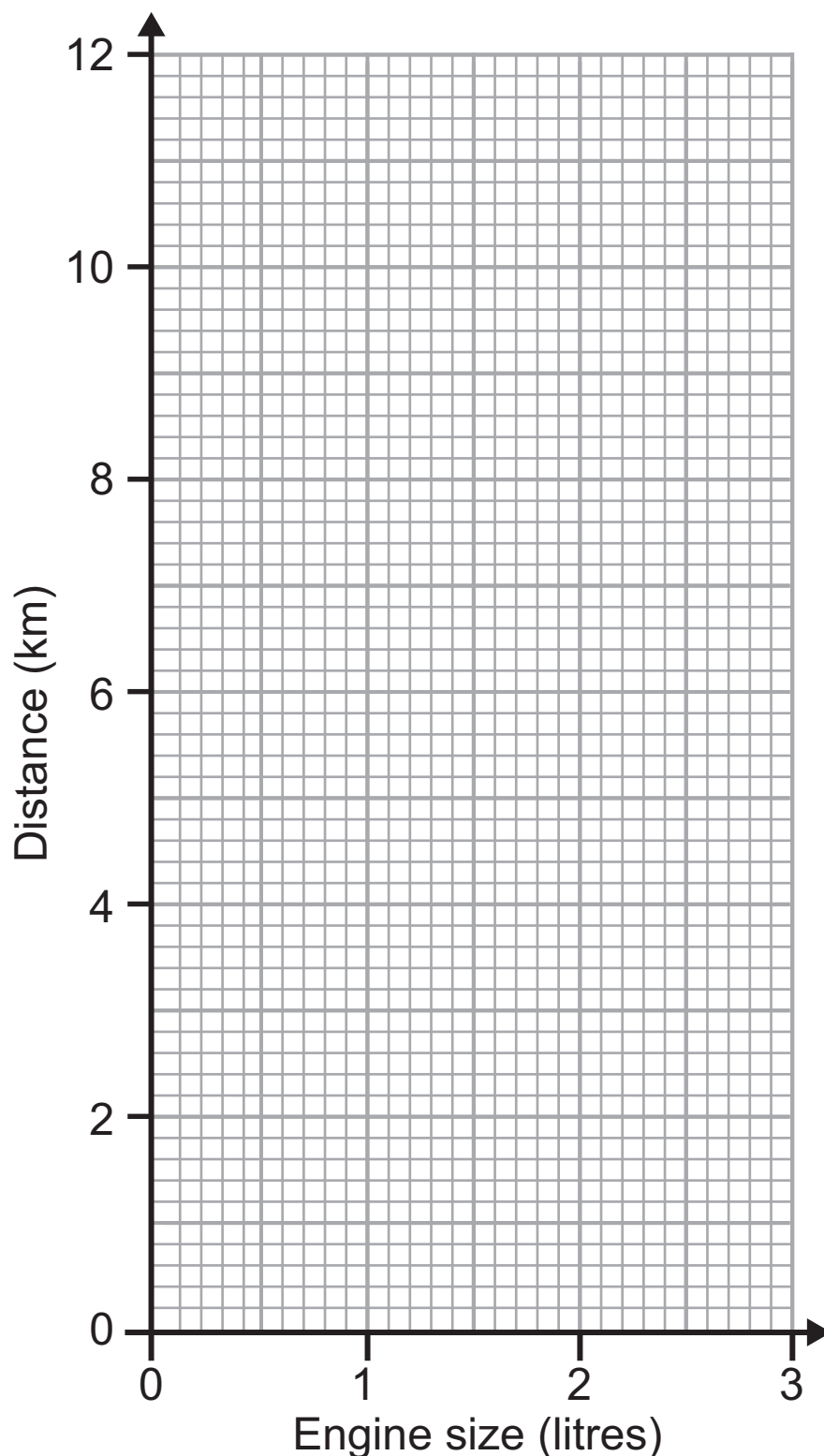
**(b)** Using values from the table, draw the graph of  $y = 5 - 3x$  [1 mark]



**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 marks]





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

**(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.  
[1 mark]

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

**(d)** Describe the correlation in this scatter graph. [1 mark]

Answer \_\_\_\_\_

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

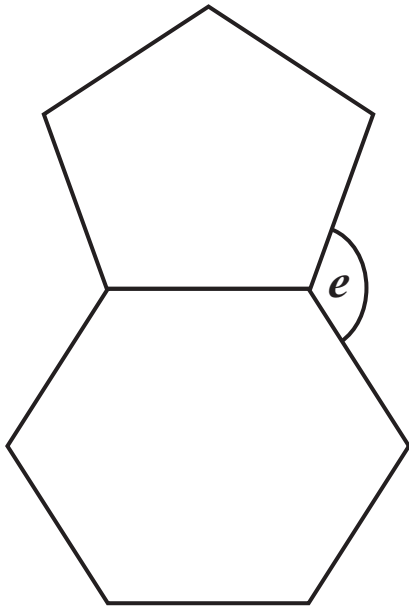


diagram not  
drawn accurately

Calculate the size of the angle marked  $e$ . [4 marks]

**Show all your working.**

Answer  $e =$  \_\_\_\_\_  $^{\circ}$

14 ABCD is a parallelogram.

Angle DAB =  $125^\circ$

Angle ADB =  $37^\circ$

Angle CEB =  $51^\circ$

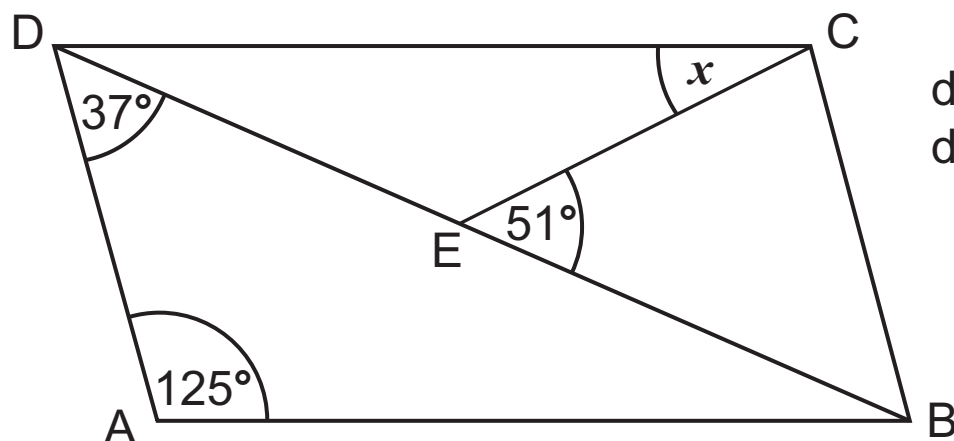


diagram not  
drawn accurately

Calculate the size of the angle  $x$ . [4 marks]

Answer  $x =$  \_\_\_\_\_  $^\circ$

## 15 Factorise

(a)  $8x + 12$  [1 mark]

Answer \_\_\_\_\_

(b)  $x^2 + 7x$  [1 mark]

Answer \_\_\_\_\_

**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	buy 3 and get
every ten packets	one more free

Which is better value? [4 marks]

**Show your working clearly.**

Answer \_\_\_\_\_

**17** Complete the spaces **(a)**, **(b)**, **(c)** and **(d)** on the electricity bill. [5 marks]

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) £

**18 (a)** Write the recurring decimal  $0.375375375\dots$  using dot notation. [1 mark]

Answer \_\_\_\_\_

**(b)** Write  $0.\dot{2}\dot{8}$  correct to 4 decimal places. [1 mark]

Answer \_\_\_\_\_

**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. [2 marks]

Answer \_\_\_\_\_

**(b)** Write down the first 3 terms of the sequence whose  $n^{\text{th}}$  term is  $n^2 + 3$  [2 marks]

Answer \_\_\_\_\_ , \_\_\_\_\_ , \_\_\_\_\_



**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.  
[2 marks]

Answer (\_\_\_\_\_ , \_\_\_\_\_)

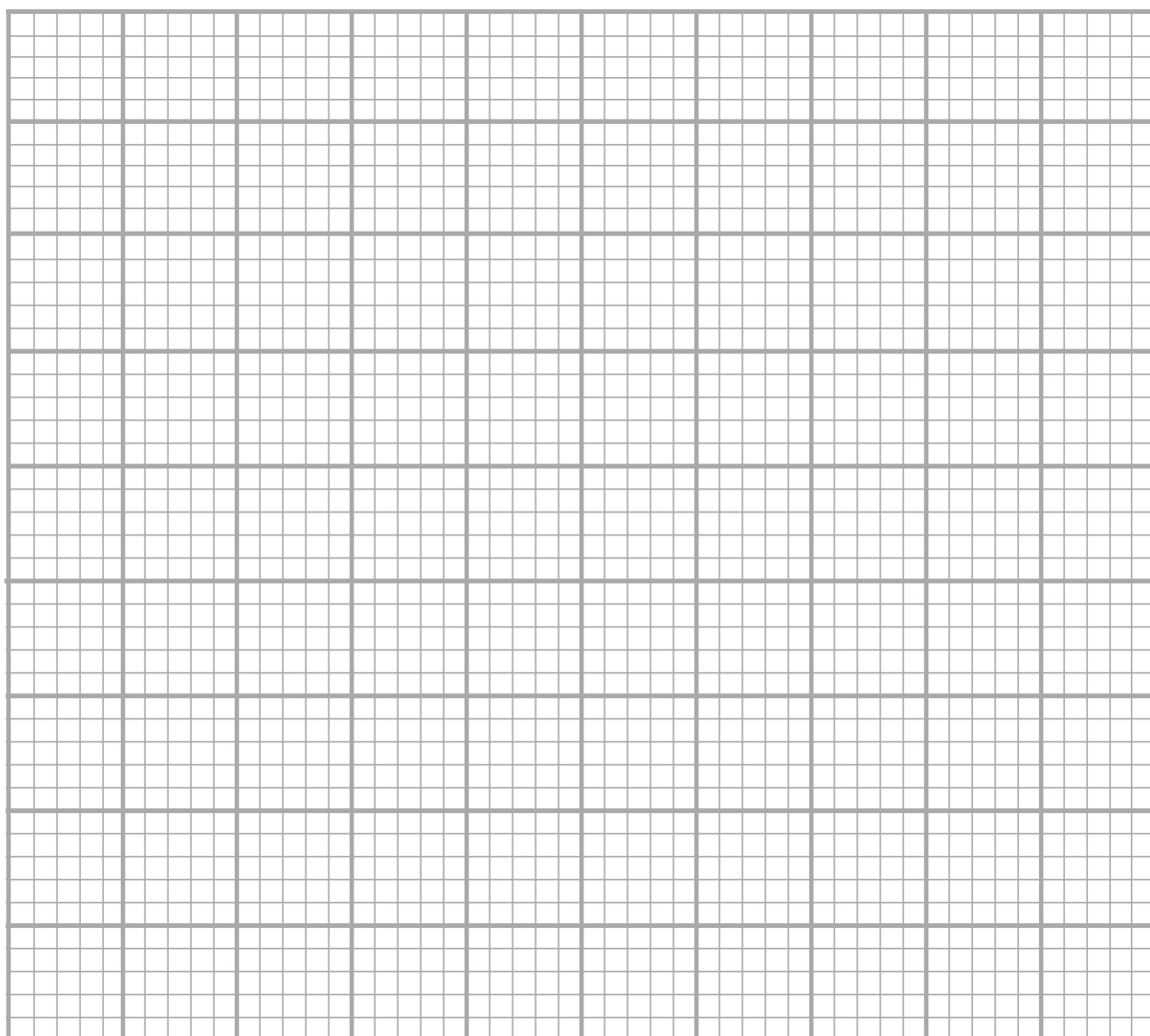
- 21** The masses of some stones found on a beach are shown in the table.

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

- (a)** Which interval contains the median mass? [1 mark]

Answer \_\_\_\_\_

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



**22 (a)** Simplify  $\frac{2^8}{2^2}$ , leaving your answer in index form. [1 mark]

Answer \_\_\_\_\_

**(b)** Expand and simplify  $4(x - 2) + 3(2x + 3)$  [2 marks]

Answer \_\_\_\_\_

- 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?  
[3 marks]

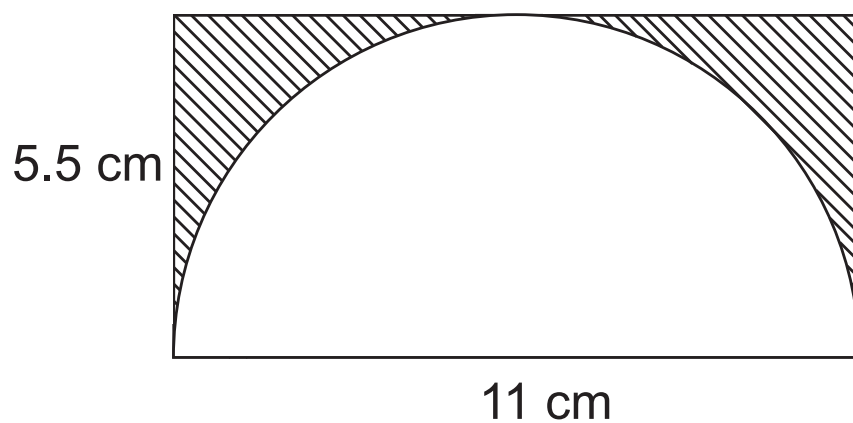
Answer \_\_\_\_\_ %

- 24** Write 600 as a product of prime factors.

Express your answer in index notation. [3 marks]

Answer \_\_\_\_\_

**25** The diagram shows a semicircle inside a rectangle.



Work out the area of the shaded region. [3 marks]

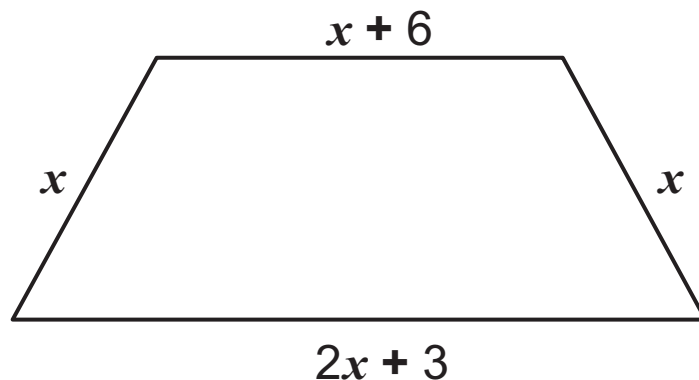
Answer \_\_\_\_\_  $\text{cm}^2$

- 26** A sheet of paper measures 297 mm by 210 mm.  
Work out the length between diagonally opposite corners.  
[3 marks]

Answer \_\_\_\_\_ mm

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

Give your answer in its simplest form. [2 marks]



Answer \_\_\_\_\_



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

- (i)** Using the perimeter, write down an equation in terms of  $x$ . [1 mark]

Equation \_\_\_\_\_

- (ii)** Solve the equation to find  $x$ . [1 mark]

Answer  $x =$  \_\_\_\_\_

**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. [3 marks]

$x$	$x^3 - 4x$	

Answer  $x =$  \_\_\_\_\_

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**THIS IS THE END OF THE QUESTION PAPER**

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For Examiner's use only	
Question Number	Marks
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<b>Total Marks</b>	
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Examiner Number