

Surname						Other Names					
Centre Number						Candidate Number					
Candidate Signature											

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General Certificate of Secondary Education
June 2004



MATHEMATICS (SPECIFICATION A) 3301/11
Intermediate Tier
Paper 1 Non-Calculator

Tuesday 8 June 2004 1.30 pm to 3.30 pm

<p>In addition to this paper you will require: mathematical instruments. You must not use a calculator.</p>	
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For Examiner's Use	
Pages	Mark
3	
4 – 5	
6 – 7	
8 – 9	
10 – 11	
12 – 13	
14 – 15	
16 – 17	
18 – 19	
20	
TOTAL	
Examiner's Initials	

Time allowed: 2 hours

Instructions

- Use blue or black ink or ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions in the spaces provided.
- Do all rough work in this booklet.

Information

- The maximum mark for this paper is 100.
- Mark allocations are shown in brackets.
- Additional answer paper, graph paper and tracing paper will be issued on request and must be tagged securely to this answer booklet.
- The use of a calculator is **not** permitted.

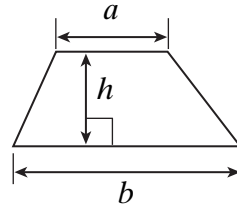
Advice

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

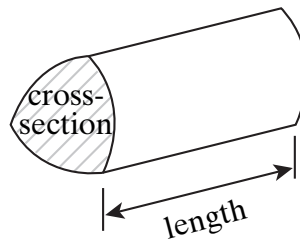
Formulae Sheet: Intermediate Tier

You may need to use the following formulae:

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** Mr Smith is collecting money for a school trip.
All pupils pay the same amount.
He keeps a record of what he collects in this table.

Day	Number of pupils	Amount collected
Monday	16	£48
Tuesday		£36
Wednesday	20	

Complete Mr Smith's table.

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(3 marks)

- 2** Sharon travels from Leeds to London in her car.
The distance she travels is 200 miles.
The journey takes her 4 hours.
Find Sharon's average speed.

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Answer (3 marks)

Turn over ►

3

60% of £40

 $\frac{2}{5}$ of £55

Which is the larger amount?

You **must** show your working.

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Answer (4 marks)

4 (a) Simplify $5x + 3y - 2x + 4y$

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Answer (2 marks)

(b) Find the value of $5p + 2q$ when $p = 4$ and $q = -7$

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Answer (2 marks)

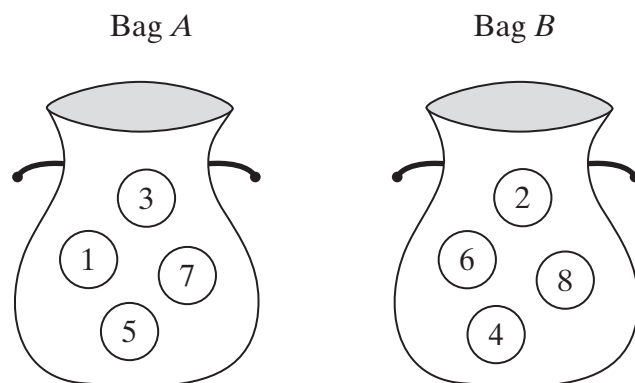
(c) Find the value of $u^2 - v^2$ when $u = 5$ and $v = 3$

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Answer (2 marks)

- 5 Two bags, *A* and *B*, each contain four numbered discs that are all the same size.



- (a) A disc is drawn at random from bag *A* and a disc is drawn at random from bag *B*. A score is obtained by adding the numbers on the two discs. Complete the table to show all the possible scores.

Bag *A*

+	1	3	5	7
2	3	5		
4				
6				
8				

Bag *B*

(2 marks)

- (b) Find the probability of scoring less than 9.

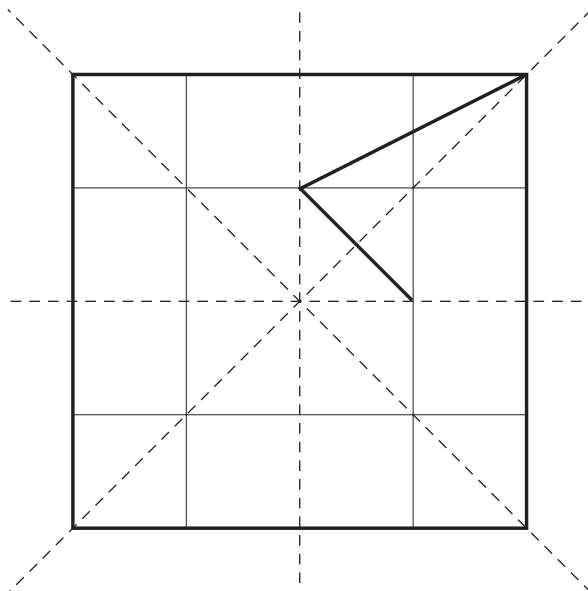
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Answer (2 marks)

TURN OVER FOR THE NEXT QUESTION

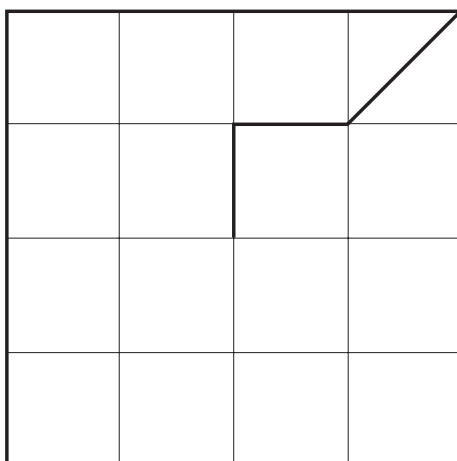
Turn over ►

- 6 (a) A pattern has four lines of symmetry.
Part of the pattern is shown below.
Complete the pattern.



(2 marks)

- (b) A different pattern has rotational symmetry of order 4 and no line symmetry.
Part of the pattern is shown below.
Complete the pattern.



(2 marks)

7 Solve these equations

(a) $4x - 7 = 5$

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Answer $x =$ (2 marks)

(b) $2(y + 5) = 28$

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Answer $y =$ (3 marks)

(c) $7z + 2 = 9 - 3z$

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Answer $z =$ (3 marks)

- 8** Heather is revising fractions for her homework.
This is how she answers one of the questions.

$$\frac{1}{2} + \frac{1}{3} = \frac{2}{5}$$

Heather is wrong.

Show the correct way to work out $\frac{1}{2} + \frac{1}{3}$

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(3 marks)

Turn over ►

- 9** Bob and Mary win £250 on the Premium Bonds.
They share the money in the ratio 1 : 4

(a) How much money does each person receive?

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Answer Bob £, Mary £ (2 marks)

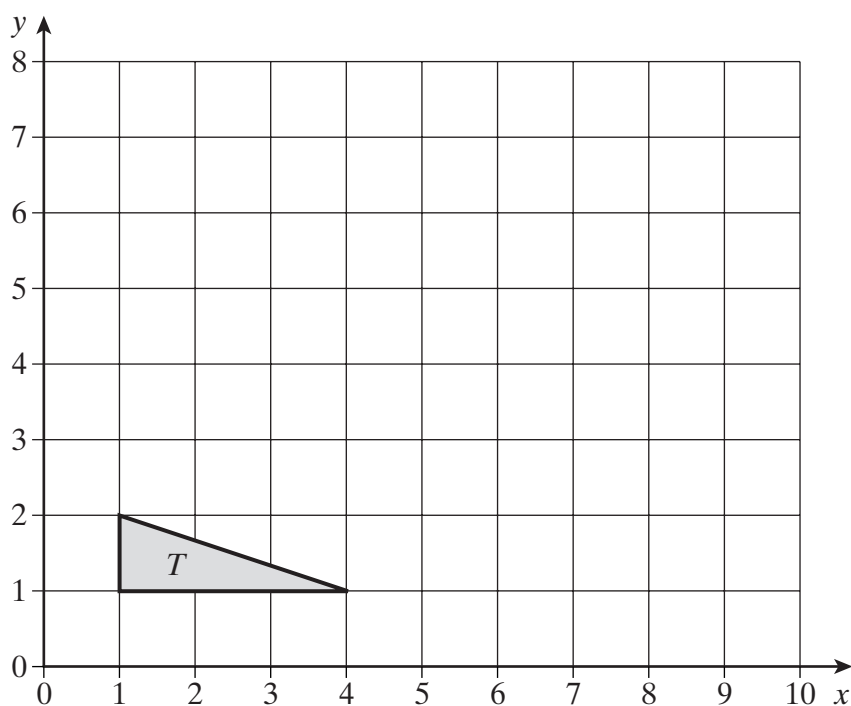
(b) What percentage of the £250 does Mary receive?

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Answer % (2 marks)

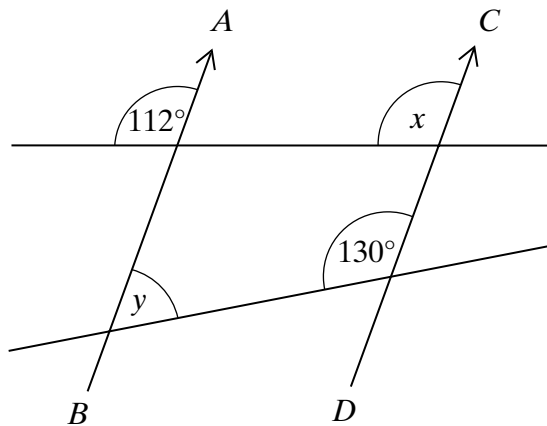
- 10** The vertices of triangle T are (1, 1), (1, 2) and (4, 1).



Enlarge triangle T by scale factor 2, with (0, 0) as the centre of enlargement.

(3 marks)

- 11** In the diagram, AB is parallel to CD .



Not drawn accurately

- (a) State the value of x .
Give a reason for your answer.

Answer degrees

Reason

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(2 marks)

- (b) Find the value of y .

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Answer degrees (2 marks)

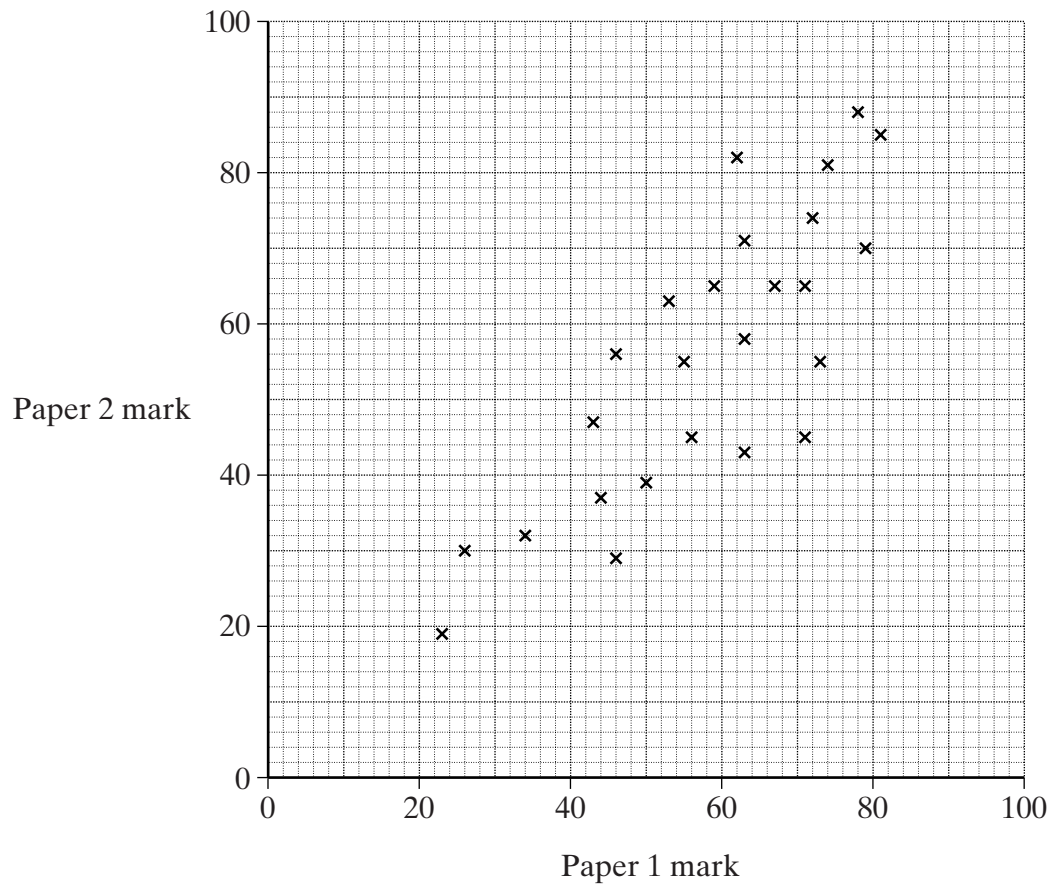
- 12** Mount Everest is 8848 m high to the nearest metre.
What is its smallest possible height in kilometres?

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Answer km (2 marks)

Turn over ►

- 13** Mrs Millington gives her class two mock GCSE examination papers. The scatter graph shows the results.



- (a) Write down the highest mark scored on Paper 2.

Answer marks (1 mark)

- (b) Describe the relationship shown on the scatter graph.

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(1 mark)

- (c) Draw a line of best fit on the scatter graph.

(1 mark)

- (d) Kay was absent for Paper 2, but scored a mark of 56 on Paper 1. Use your line of best fit to estimate Kay's mark on Paper 2.

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Answer marks (1 mark)

- 14** Tom, Sam and Matt are counting drum beats.

Tom hits a snare drum every 2 beats.

Sam hits a kettle drum every 5 beats.

Matt hits a bass drum every 8 beats.

Tom, Sam and Matt start by hitting their drums at the same time.

How many beats is it before Tom, Sam and Matt **next** hit their drums at the **same** time?

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Answer beats (2 marks)

- 15** Simplify

(a) $w^6 \times w^2$

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Answer (1 mark)

(b) $x^3 \div x^5$

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Answer (1 mark)

(c) $(y^3)^2$

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Answer (1 mark)

- 16** (a) Complete the table of values for $y = 2x^2 - 4x - 1$

x	-2	-1	0	1	2	3
y	15		-1		-1	5

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 (2 marks)

- (b) On the grid opposite, draw the graph of $y = 2x^2 - 4x - 1$ for values of x from -2 to +3.

(2 marks)

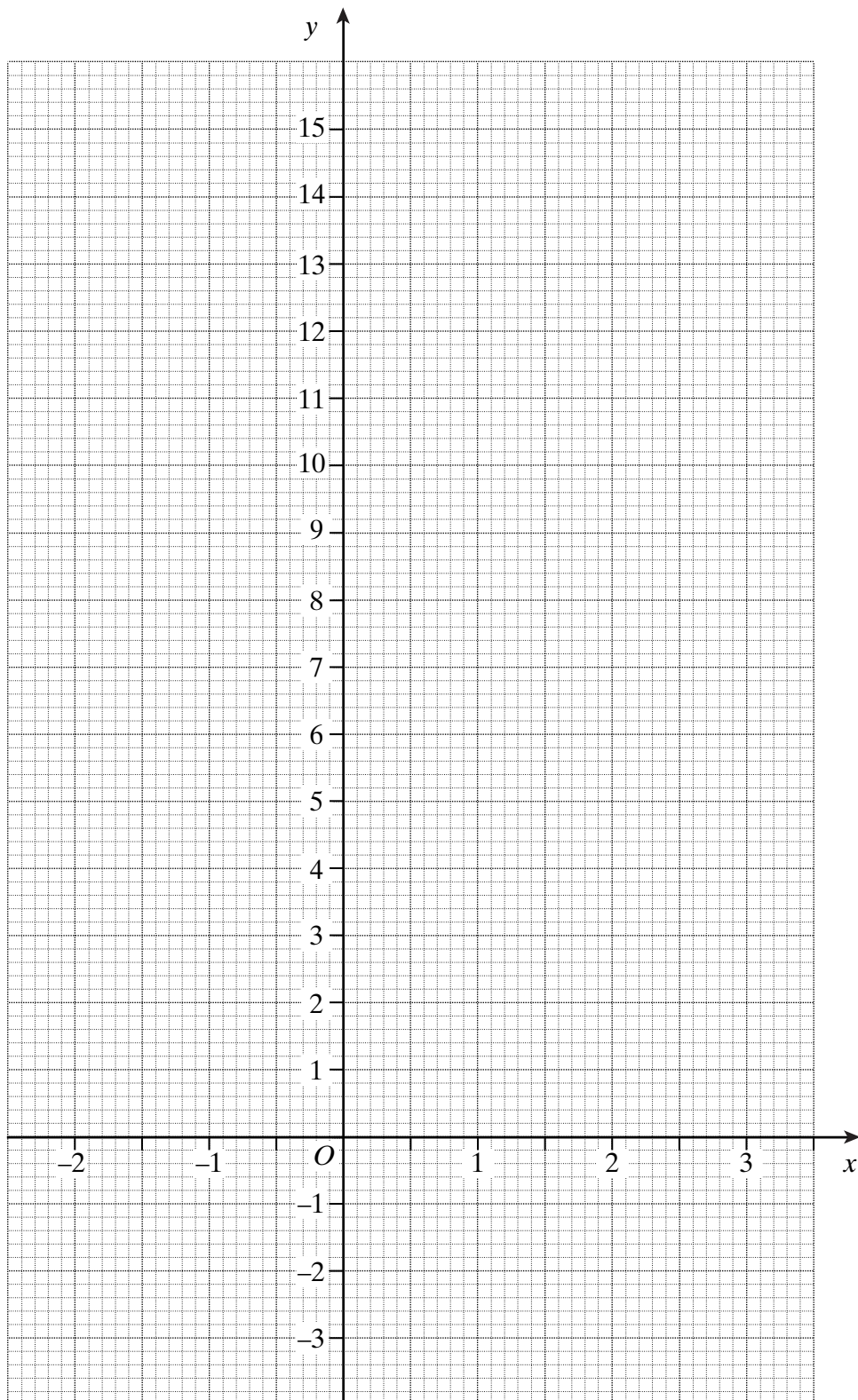
- (c) An approximate solution of the equation $2x^2 - 4x - 1 = 0$ is $x = 2.2$

- (i) Explain how you can find this from the graph.

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 (1 mark)

- (ii) Use your graph to write down another solution of this equation.

Answer $x =$ (1 mark)



Turn over ►

- 17** The table shows the distances travelled to school by 50 pupils living in a town.

Distance travelled, d (km)	Frequency
$0 < d \leq 2$	12
$2 < d \leq 4$	18
$4 < d \leq 6$	10
$6 < d \leq 8$	8
$8 < d \leq 10$	2

- (a) Calculate an estimate of the mean distance travelled to school by these pupils.

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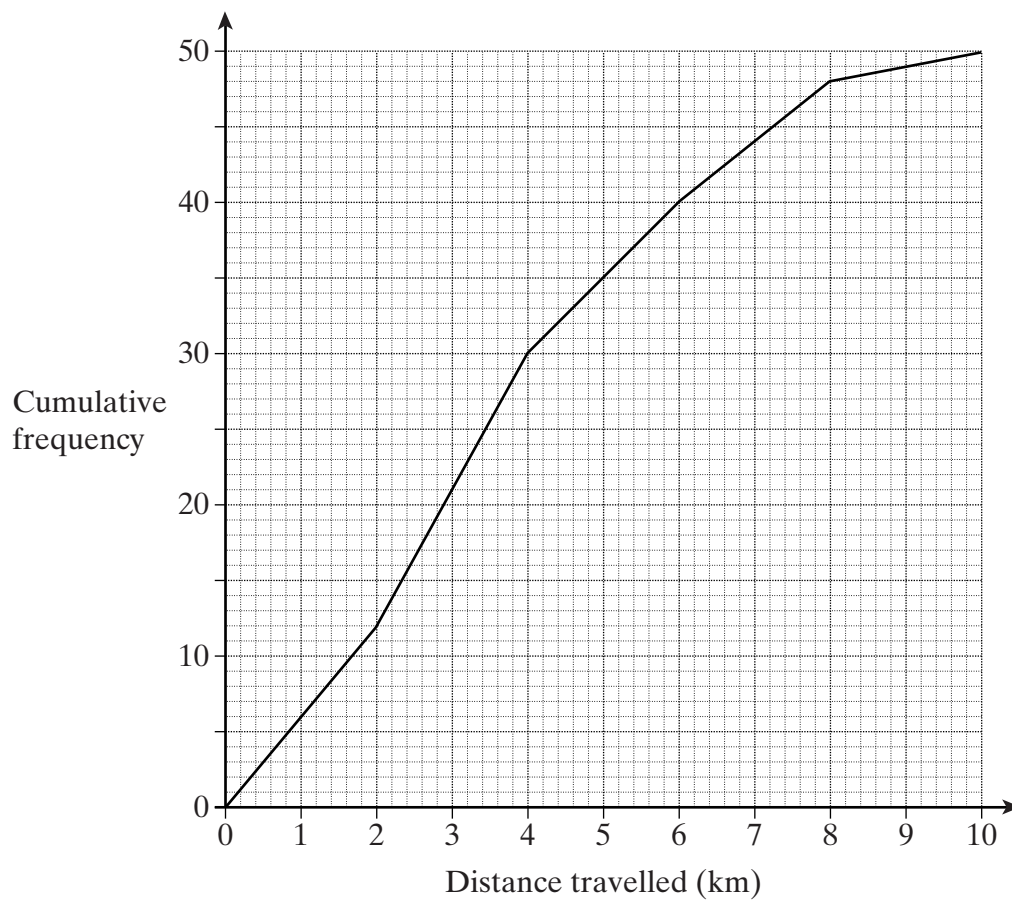
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Answer km (4 marks)

(b) The distances travelled are shown on the cumulative frequency diagram.



Use the cumulative frequency diagram to estimate

(i) the median,

Answer km (1 mark)

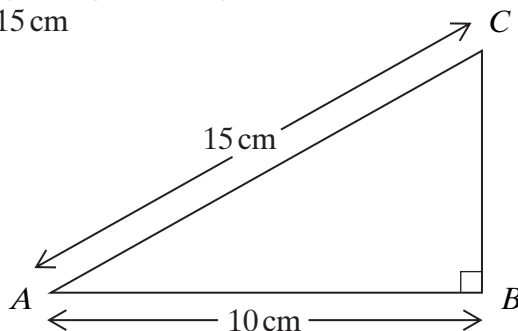
(ii) the interquartile range.

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Answer km (2 marks)

Turn over ►

- 18 (a) The diagram shows a right-angled triangle ABC .
 $AB = 10\text{ cm}$ and $AC = 15\text{ cm}$



Not drawn
accurately

Calculate the length of BC .
 Leave your answer as a square root.

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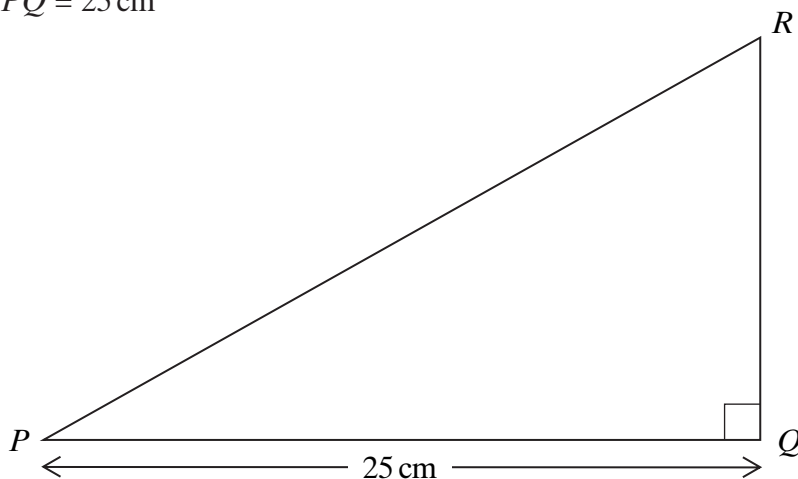
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Answer cm (3 marks)

- (b) Triangle PQR is similar to triangle ABC .
 Angle $CAB = \text{angle } RPQ$.
 $PQ = 25\text{ cm}$



Not to scale

Work out the length of PR .

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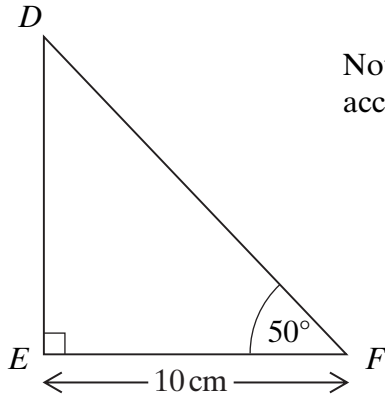
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Answer cm (3 marks)

- (c) The diagram shows a right-angled triangle DEF .
 $EF = 10$ cm
 Angle $F = 50^\circ$



Not drawn
accurately

Angle	Sine	Cosine	Tangent
40°	0.643	0.766	0.839
50°	0.766	0.643	1.192

Use the table of data to work out the length of DE .

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Answer cm (3 marks)

- 19 Use approximations to estimate the value of $\frac{316 \times 4.03}{0.198}$

You **must** show your working.

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Answer (3 marks)

Turn over ►

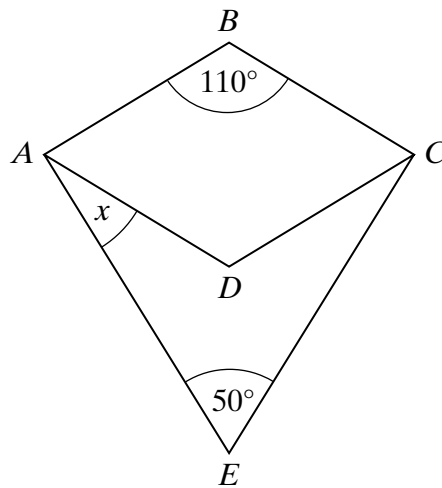
20 Factorise $x^2 - 10x + 25$

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Answer (2 marks)

21 $ABCD$ is a rhombus and $ABCE$ is a kite.



Not drawn accurately

Work out the value of x .

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Answer degrees (4 marks)

- 22** A special packet of breakfast cereal contains 20% more than a normal packet.
The special packet contains 600 g of cereal.
How much cereal does the normal packet contain?

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Answer g (3 marks)

- 23** Solve the simultaneous equations

$$\begin{aligned} 4x + 3y &= 14 \\ 2x + y &= 5 \end{aligned}$$

You **must** show your working.
Do **not** use trial and improvement.

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Answer $x =$, $y =$ (3 marks)

24 Here are six numbers written in standard form.

$$2.6 \times 10^5 \quad 1.75 \times 10^6 \quad 5.84 \times 10^0 \quad 8.2 \times 10^{-3} \quad 3.5 \times 10^{-1} \quad 4.9 \times 10^{-2}$$

(a) Write down the largest number.

Answer (1 mark)

(b) Write down the smallest number.

Answer (1 mark)

(c) Write 4.9×10^{-2} as an ordinary number.

Answer (1 mark)

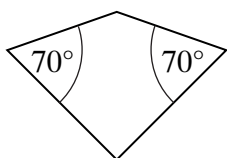
(d) Work out $2.6 \times 10^5 \div 0.1$
Give your answer in standard form.

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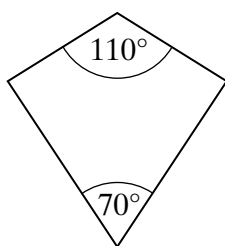
Answer (1 mark)

25 Which **one** of the following kites is a cyclic quadrilateral?
Give a reason for your answer.

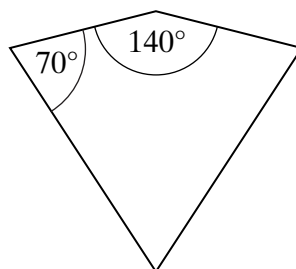
Kite 1



Kite 2



Kite 3



Not drawn accurately

Answer

Reason

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(2 marks)

END OF QUESTIONS