Surname		Other Names	
Centre Number			Candidate Number									
Candidate Signature												

For Examiner's Use

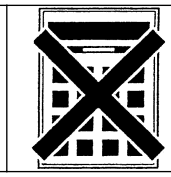
General Certificate of Secondary Education
June 2007

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

Monday 4 June 2007 1.30 pm to 3.30 pm

For this paper you must have:
- mathematical instruments.

You must **not** use a calculator.



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.
- Answer the questions in the spaces provided.
- Do all rough work in this book.

Information

- The maximum mark for this paper is 100.
- The marks for questions are shown in brackets.
- You may ask for more answer paper, graph paper and tracing paper. This must be tagged securely to this answer book.

Advice

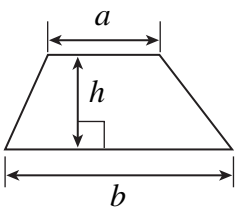
- In all calculations, show clearly how you work out your answer.

For Examiner's Use	
Pages	Mark
3	
4–5	
6–7	
8–9	
10–11	
12–13	
14–15	
16–17	
18–19	
20–21	
22	
TOTAL	
Examiner's Initials	

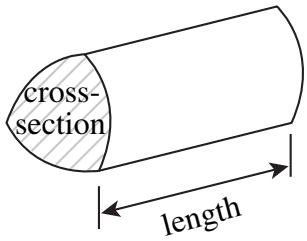
Formulae Sheet: Intermediate Tier

You may need to use the following formulae:

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



Volume of prism = area of cross-section × length

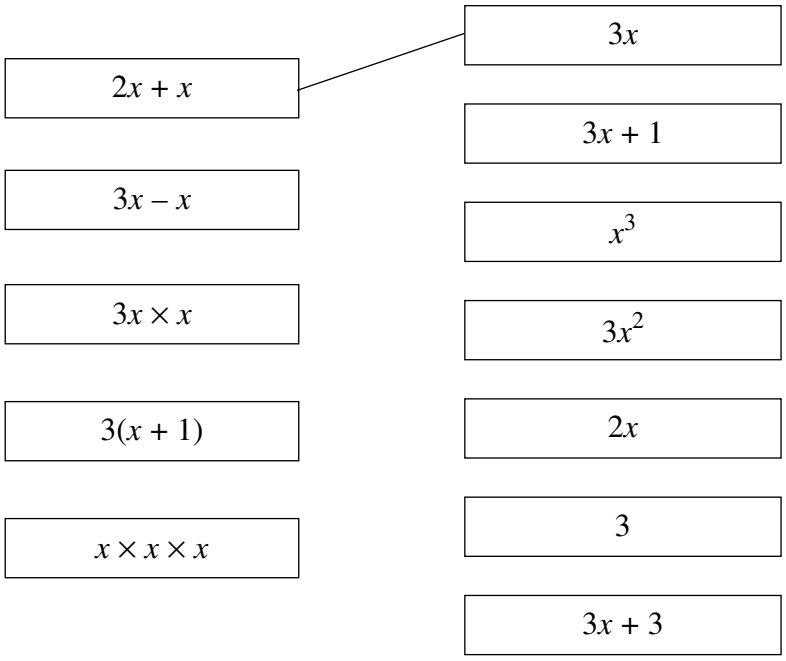


LEAVE MARGIN BLANK

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

1 (a) Two sets of algebraic expressions are shown below.

Draw a line from each expression on the left to the equivalent expression on the right. One line has already been drawn.



(4 marks)

(b) Simplify $3p + 5q + p - 2q$

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Answer ..... *(2 marks)*

Turn over for the next question

2 Howard has 400 marbles.
137 of the marbles are red.
128 of the marbles are white.
The rest of the marbles are blue.

(a) How many blue marbles does Howard have?

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Answer ..... *(2 marks)*

(b) Howard buys 20 more marbles.
He now has an equal number of each colour marble.

How many white marbles does Howard buy?

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Answer ..... *(3 marks)*

3 Sam buys six packets of wine gums.
He pays with a £5 note.
He gets £2.72 change.

How much is one packet of wine gums?

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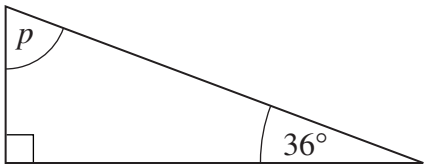
Answer ..... pence *(3 marks)*

4 (a) Work out the size of angle p.



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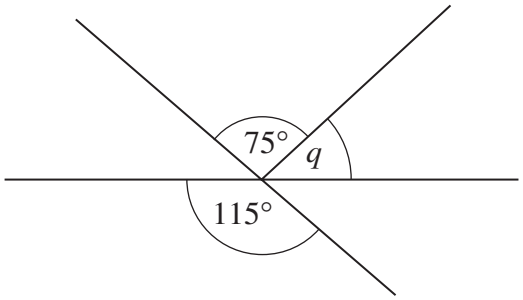
Answer p = ... degrees *(2 marks)*

(b) Work out the size of angle q.



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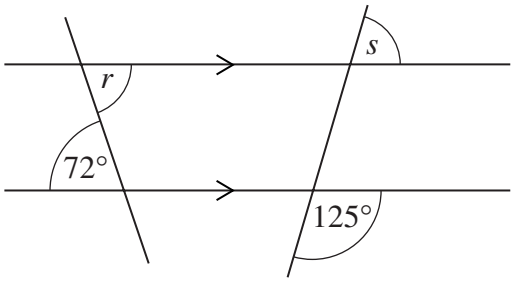
Answer q = ... degrees *(3 marks)*

(c) Work out the sizes of angles r and s.



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Answer r = ... degrees s = ... degrees *(2 marks)*

Turn over ▶

15

5 Complete the following table.

$x = 8$	$3x = 24$
$y =$ ……	$4y = 20$
$3z = 12$	$5z =$ ……

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(3 marks)

6 The table shows Ann's marks in two tests.

Test	**Mark**
1	60 out of 80
2	70 out of 100

In which test did Ann do better?
You **must** show your working.

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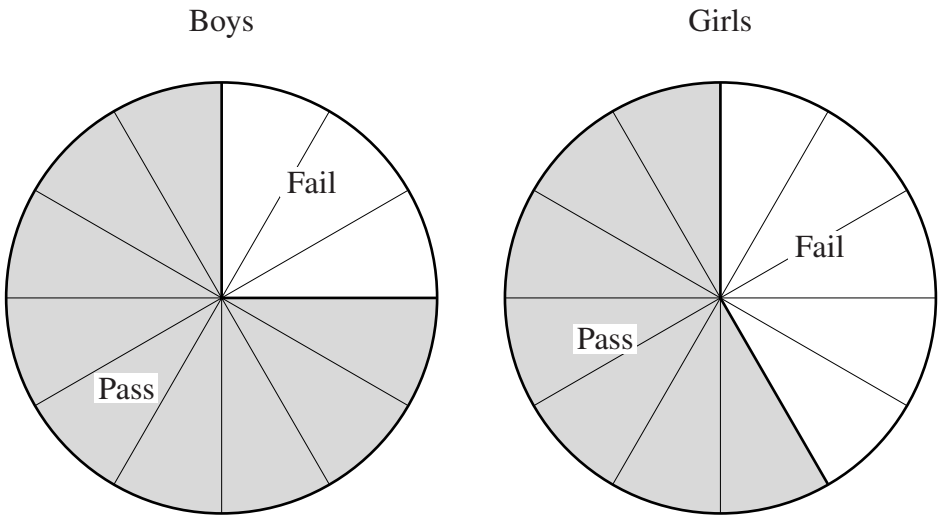
Answer ..... *(3 marks)*

7 The pie charts show the results of a cycling test.



(a) The number of boys who fail the test is 15.

How many boys pass the test?

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Answer ..... *(2 marks)*

(b) The number of girls who take the test is the same as the number of boys who take the test.
This two-way table shows that 15 boys fail the test.

	Boys	**Girls**
Pass		
Fail	15	

Complete the two-way table.

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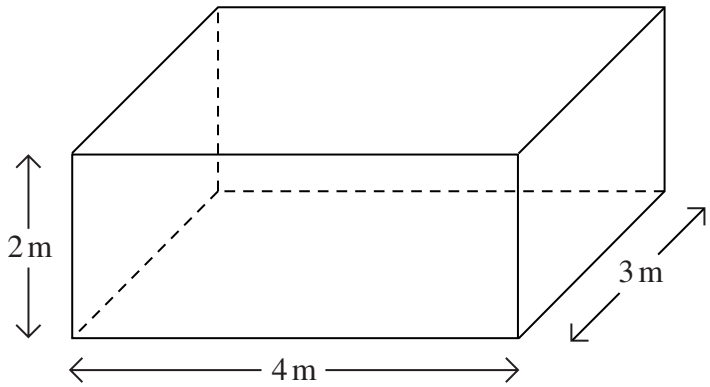
(2 marks)

Turn over ►

10

8 The diagram shows a container in the shape of a cuboid.



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(a) Work out the volume of the container.
State the units of your answer.

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Answer ..... *(3 marks)*

(b) Ben wants to paint the four outside walls and the top of the container.
One tin of paint covers $6\,m^2$.

How many tins of paint does Ben need?
You **must** show your working.

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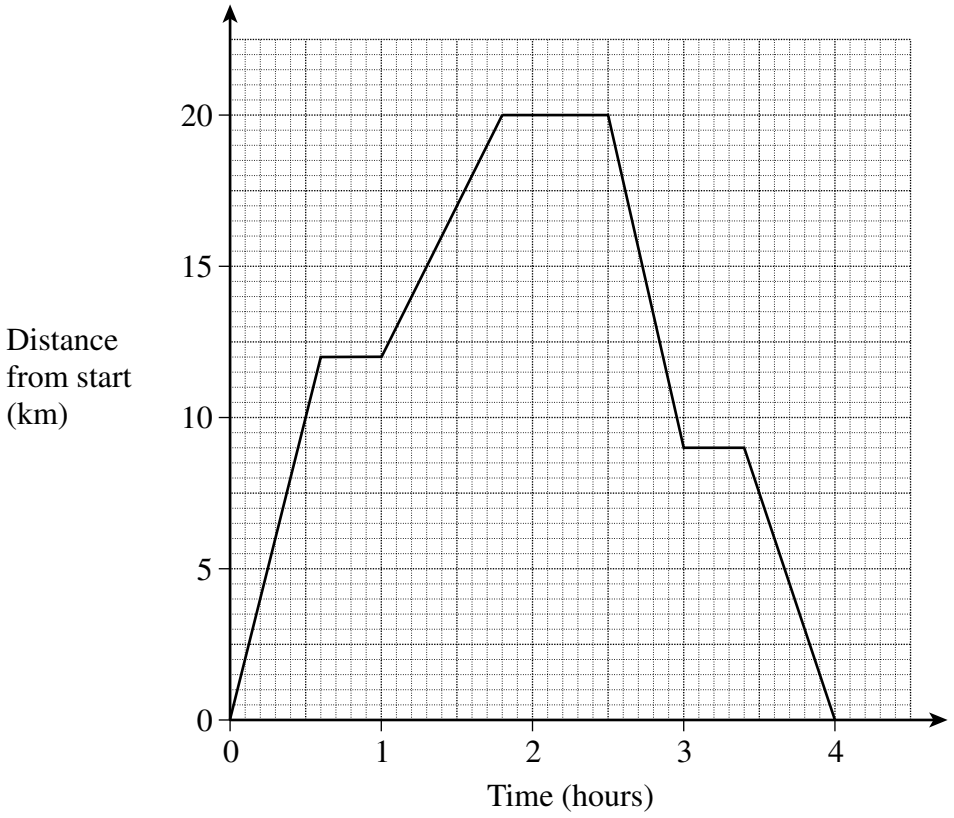
Answer ..... *(4 marks)*

9 The graph shows Adil's bicycle journey.



(a) How many times does Adil stop on his journey?

Answer ..... *(1 mark)*

(b) How many times is Adil exactly 10 km from the start of his journey?

Answer ..... *(1 mark)*

(c) What is the total distance that Adil travels on his journey?

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Answer ..... km *(1 mark)*

(d) Calculate Adil's average speed during the first 30 minutes of his journey.
Give your answer in kilometres per hour.

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Answer ..... km/h *(2 marks)*

Turn over ►

12

10 Two car hire firms use different ways of charging for the hire of a car.

(a) Cheap Days uses this formula.

$$H = 50d + 120$$

H is the hire charge in pounds.
d is the number of days the car is hired.

Work out H when $d = 2$

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Answer £ ..... *(2 marks)*

(b) Cheap Miles uses this formula.

$$H = \frac{m + 750}{5}$$

H is the hire charge in pounds.
m is the number of miles the car travels.

Work out m when $H = 200$

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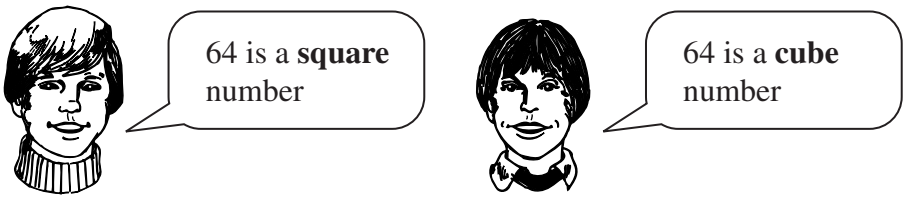
Answer ..... miles *(2 marks)*

11 Tom says Sam says



Tom and Sam are both right.
Explain why.

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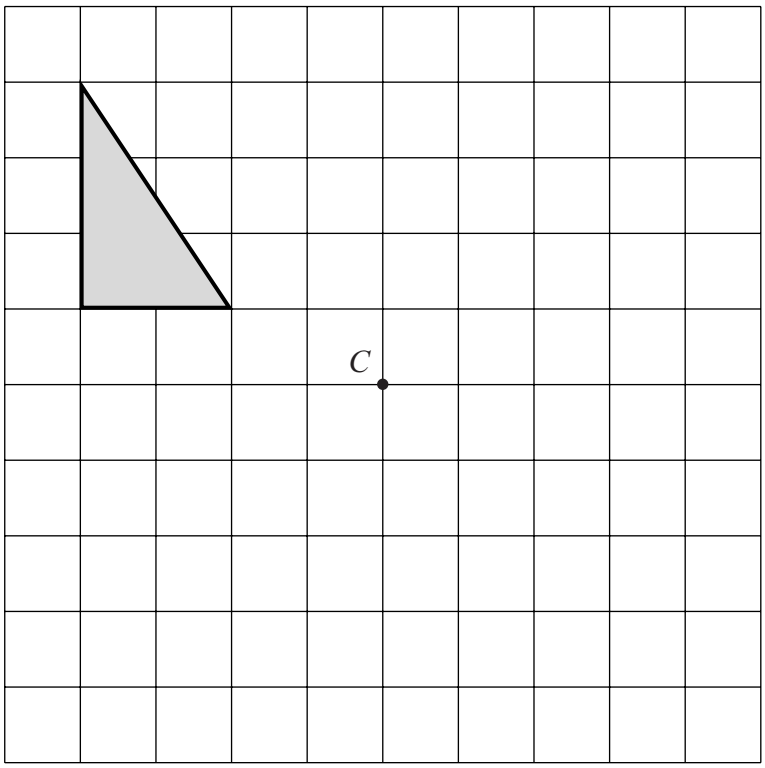
(2 marks)

12 Rotate the triangle 90° clockwise about the point *C*.



(2 marks)

Turn over ►

8

13 A necklace is made from red beads and black beads.
45% of the beads are red.

(a) What percentage of the beads are black?

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Answer ..... % *(1 mark)*

(b) What is the ratio of red beads to black beads?
Give your answer in its simplest form.

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Answer ..... *(2 marks)*

(c) There are 18 red beads on the necklace.
How many black beads are on the necklace?

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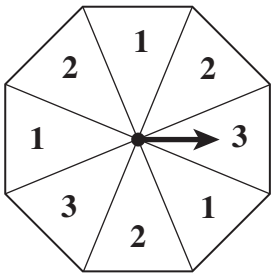
Answer ..... *(2 marks)*

14 The diagram shows a fair octagonal spinner.



(a) What is the probability that the spinner lands on 2?

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Answer ..... *(2 marks)*

(b) Dave spins the spinner 20 times.
The results are shown in this table.

Spin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Result	1	3	1	2	3	2	1	2	1	2	3	3	2	1	2	2	1	2	3	1

(i) What is the relative frequency of the spinner landing on 1?

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Answer ..... *(2 marks)*

(ii) Steve also spins the spinner 20 times.

Explain why Steve may not get the same results as Dave.

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(1 mark)

(c) How many times would you expect a result of 3 if you spin the spinner 1000 times?

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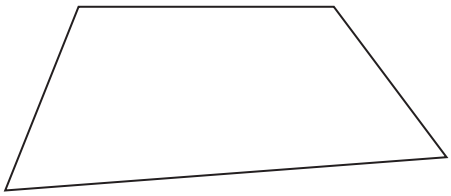
Answer ..... *(2 marks)*

Turn over ►

12

15 (a) Explain why the sum of the angles in any quadrilateral is 360°.



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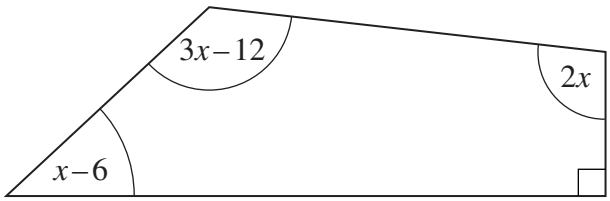
(2 marks)

(b) A quadrilateral has one right angle.
The other angles are $2x$, $3x - 12$ and $x - 6$



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(i) Write down an equation in terms of x.

Answer ..... *(1 mark)*

(ii) Solve your equation and find the size of the largest angle in the quadrilateral.

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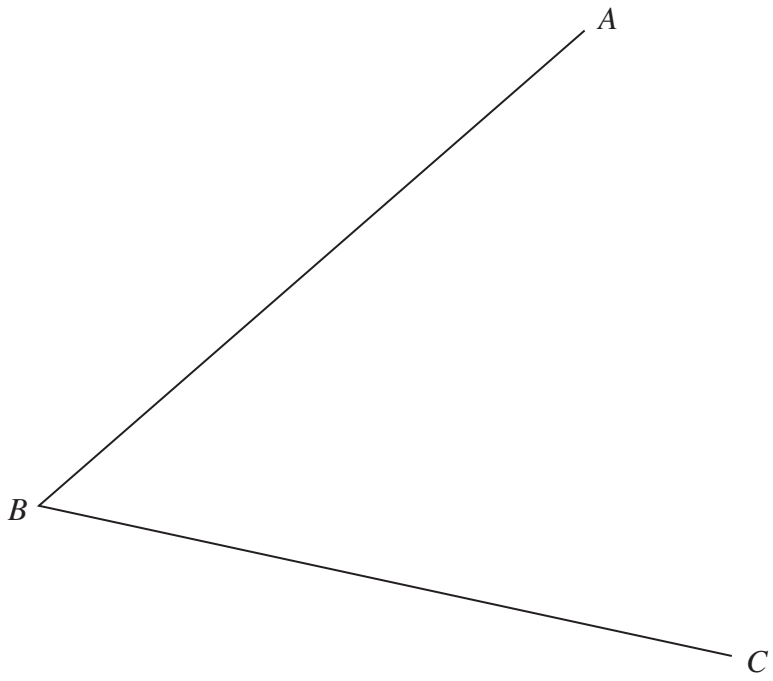
Answer $x =$ ..... degrees

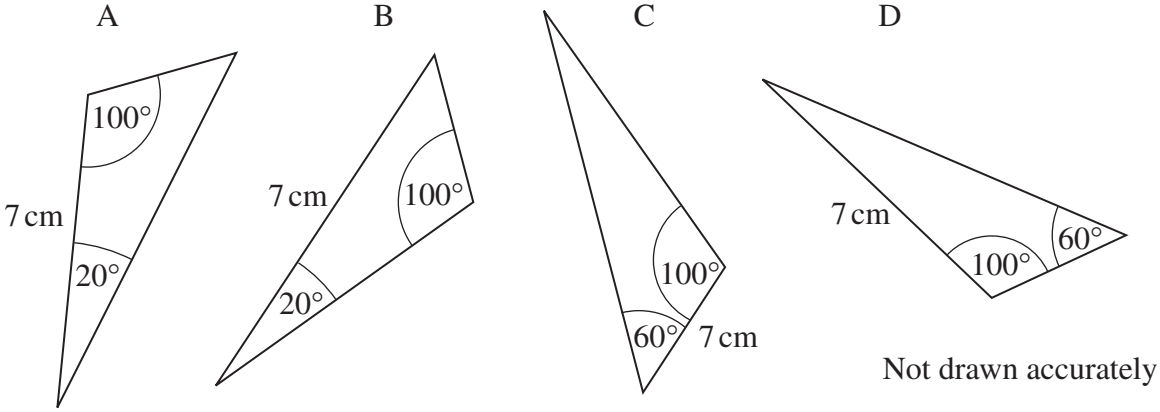
Largest angle = ... degrees *(3 marks)*

16 Using a ruler and compasses construct the bisector of angle *ABC*.



(2 marks)

17 (a) Which two of these triangles are congruent?



Answer ..... and ..... *(1 mark)*

(b) Give a reason for your answer.

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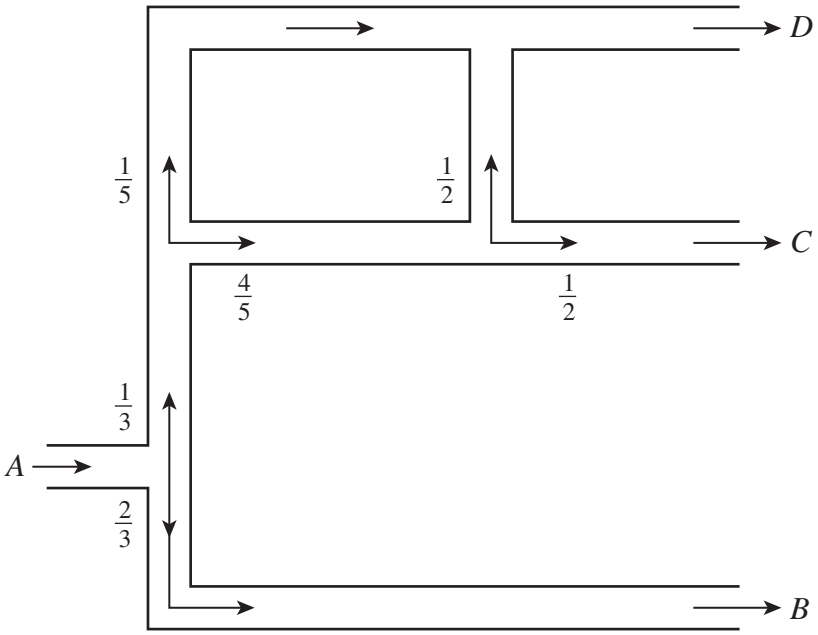
(1 mark)

18 The diagram shows a network of one-way streets.
Vehicles travel in the direction of the arrows.
The fractions on the diagram show how the traffic divides at each junction.
300 vehicles enter the network at *A*.
All 300 vehicles leave the network at either *B* or *C* or *D*.



(a) Show that 200 vehicles leave the network at *B*.

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(2 marks)

(b) How many vehicles leave the network at *D*?

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Answer ..... *(3 marks)*

19 (a) Simplify $x^3 \times x^5$

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Answer ..... *(1 mark)*

(b) Simplify $y^{12} \div y^4$

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Answer ..... *(1 mark)*

20 In the expressions in the table x, y and z represent lengths.

	Expression	**Length**	**Area**	**Volume**	**None**
A	xy		✔		
B	$xy(x + z)$				
C	$xy + z$				
D	y^2				

(a) Complete the table to show whether each expression could represent a length, an area, a volume or none of these.

(2 marks)

(b) Explain your answer for expression C.

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(1 mark)

21 Solve the simultaneous equations

$$5x + 6y = 28$$
$$x + 3y = 2$$

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

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

22 The table gives the diameter, in metres, of planets in the solar system.
The diameters are given to an accuracy of 3 significant figures.

Planet	**Diameter (metres)**
Mercury	4.88×10^6
Venus	1.21×10^7
Earth	1.28×10^7
Mars	6.79×10^6
Jupiter	1.43×10^8
Saturn	1.21×10^8
Uranus	5.11×10^7
Neptune	4.95×10^7
Pluto	2.39×10^6

(a) Which planet has the largest diameter?

Answer ..... *(1 mark)*

(b) Which planet has the smallest diameter?

Answer ..... *(1 mark)*

(c) Which planet has a diameter approximately 10 times that of Venus?

Answer ..... *(1 mark)*

(d) Write 4.88×10^6 as an ordinary number.

Answer ..... *(1 mark)*

(e) What is the diameter of Pluto in kilometres?
Give your answer in standard form.

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Answer ..... km *(2 marks)*

Turn over ►

9

23 A straight line has gradient 3 and passes through the point (–1, –2).

Draw the straight line on the grid below.

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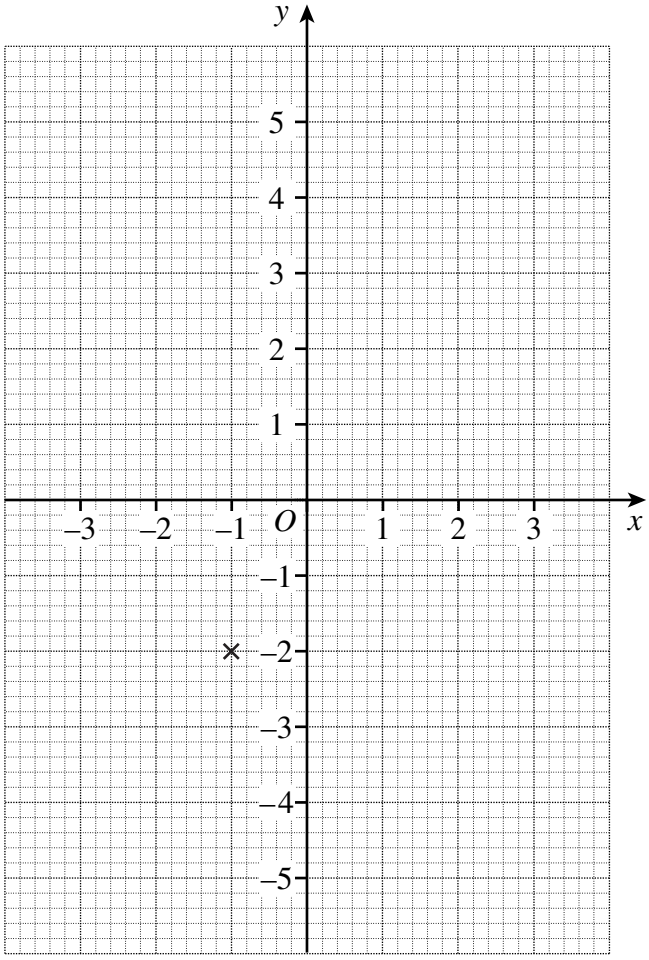
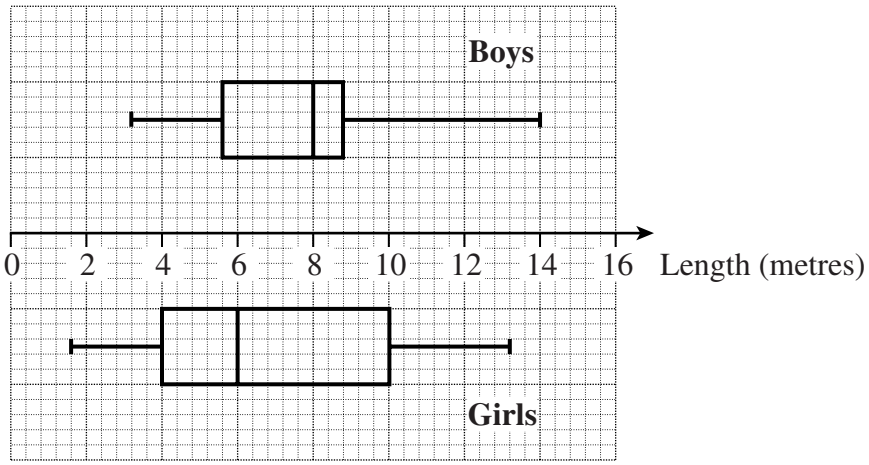


(2 marks)

24 The box plots show the lengths jumped by 50 boys and the lengths jumped by 50 girls in the triple jump.



(a) What is the median length jumped by the girls?

Answer ..... metres *(1 mark)*

(b) Give **two** differences between the lengths jumped by the boys and the lengths jumped by the girls.

1st difference .....

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2nd difference .....

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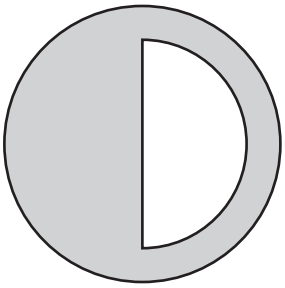
(2 marks)

Turn over ►

5

25 A semi-circle is cut from a circle.
The circle has a diameter of 30 cm.
The semi-circle has a diameter of 20 cm.



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Calculate the shaded area.
Give your answer in terms of π.

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Answer ..... cm^2 *(3 marks)*

END OF QUESTIONS

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