

Surname						Other Names					
Centre Number						Candidate Number					
Candidate Signature											

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General Certificate of Secondary Education
June 2003



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

Wednesday 4 June 2003 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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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

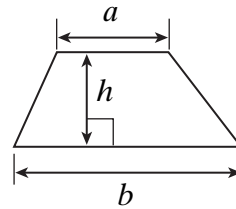
- In all calculations, show clearly how you work out your answer.

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 – 23	
TOTAL	
Examiner's Initials	

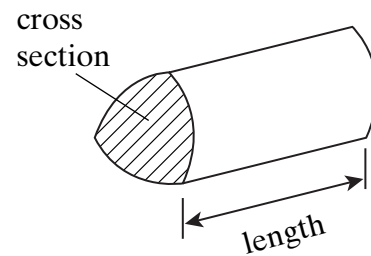
Formulae Sheet: Intermediate Tier

You may need to use the following formulae:

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



Volume of prism = area of cross section \times length



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

- 1** A youth club hires a disco for £70.
Tickets for the disco cost 80p each.
They sell 140 tickets.

**Friday night
DISCO
Tickets 80p**

How much profit does the youth club make?

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Answer £ (3 marks)

- 2** Magazines are stored in piles of 100.
Each magazine is 0.4cm thick.
Calculate the height of one pile of magazines.

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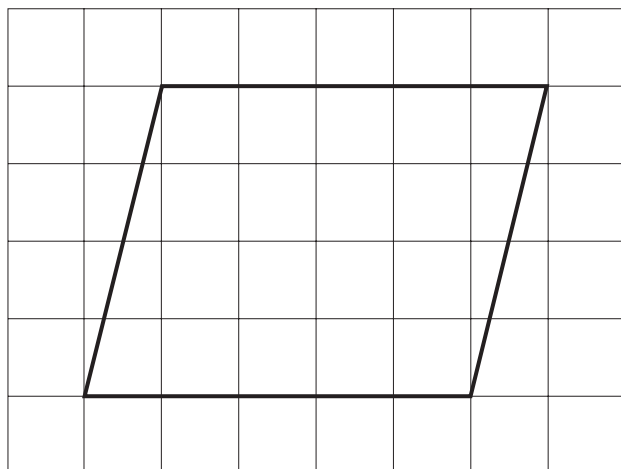
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Answercm (2 marks)

Turn over ►

- 3 A parallelogram is drawn on a centimetre square grid.



Calculate the area of the parallelogram.

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Answercm² (2 marks)

- 4 The stem and leaf diagram shows the ages, in years, of 15 members of a badminton club.

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

Key: 2 7
means an age of 27 years

- (a) What is the median age of the members?

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Answeryears (1 mark)

- (b) What is the range of the ages?

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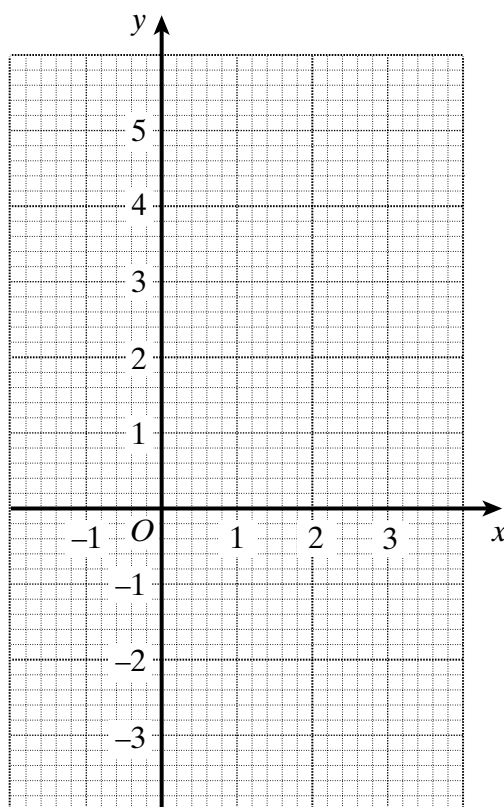
Answeryears (1 mark)

- 5 (a) Complete this table of values for $y = 2x - 1$

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

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(1 mark)

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



(2 marks)

- (c) Find the coordinates of the point where the line $y = 2x - 1$ crosses the line $y = -2$.

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Answer (..... ,) (2 marks)

Turn over ►

6 In a raffle 200 tickets are sold.

There is only one prize.

Mr Key buys 10 tickets.

Mrs Key buys 6 tickets.

Their children, Robert and Rachel, buy 2 tickets each.

(a) What is the probability that one of the children wins the prize?

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Answer (2 marks)

(b) What is the probability that **none** of the family wins the prize?

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Answer (3 marks)

7 (a) Work out $12 \times 18 - 10 \times 18$

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Answer (2 marks)

(b) Find an approximate value of $\frac{41 \times 197}{78}$

You **must** show all your working.

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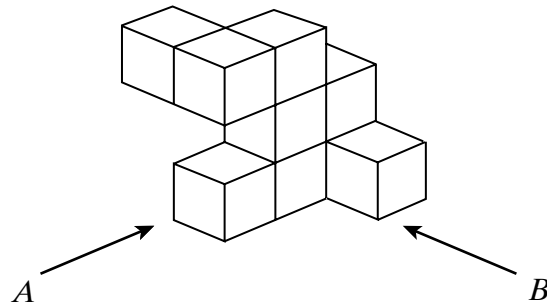
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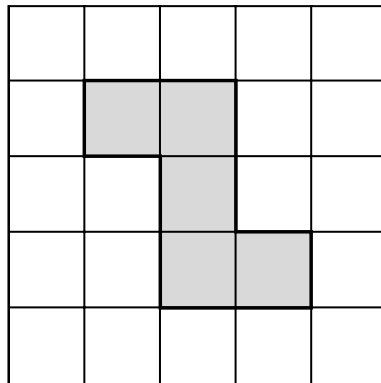
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Answer (2 marks)

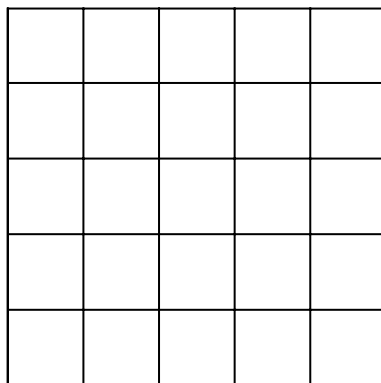
- 8 The diagram represents a solid made from 9 small cubes.



The view of the solid from direction *A* is shown below.



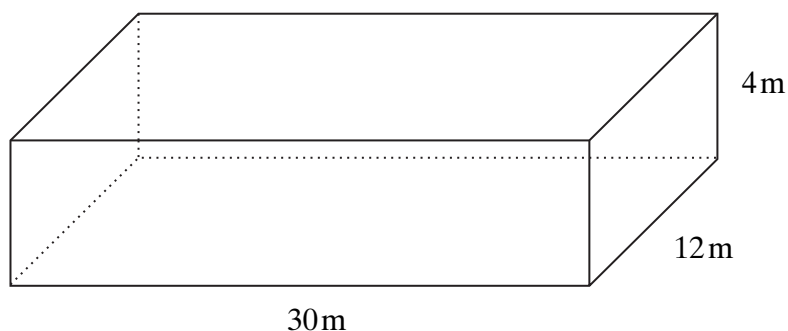
On the grid below, draw the view of the solid from direction *B*.



(2 marks)

Turn over ►

- 9 A school hall is in the shape of a cuboid.



Not to scale

- (a) The school hall is 30m long, 12m wide and 4m high.

- (i) Calculate the volume of the hall.

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Answerm³ (2 marks)

- (ii) Calculate the total area of the **four walls** of the hall.

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Answerm² (3 marks)

- (b) The school buys **ten** 5 litre tins of paint to paint the hall.
The area to be painted is 279m^2 .
Each tin covers 30m^2 .
Calculate the percentage of paint used.

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Answer% (3 marks)

- 10** (a) Find the value of $3x + 4y$ when $x = 6$ and $y = -3$

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Answer (2 marks)

- (b) Sam buys x packets of sweets.
Each packet of sweets costs 22 pence.
Sam pays with a £5 note.
Write down an expression for the change, in pence, Sam should receive.

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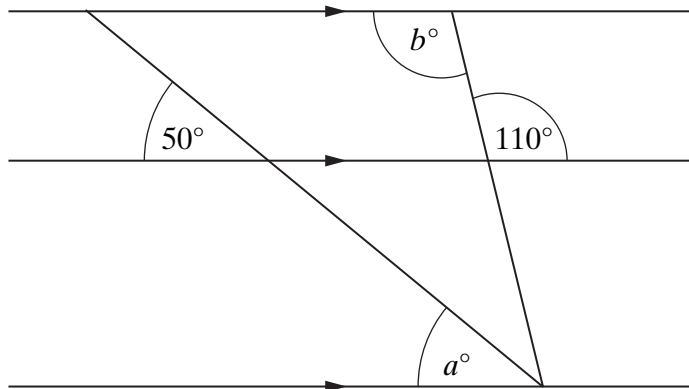
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Answerpence (2 marks)

Turn over ►

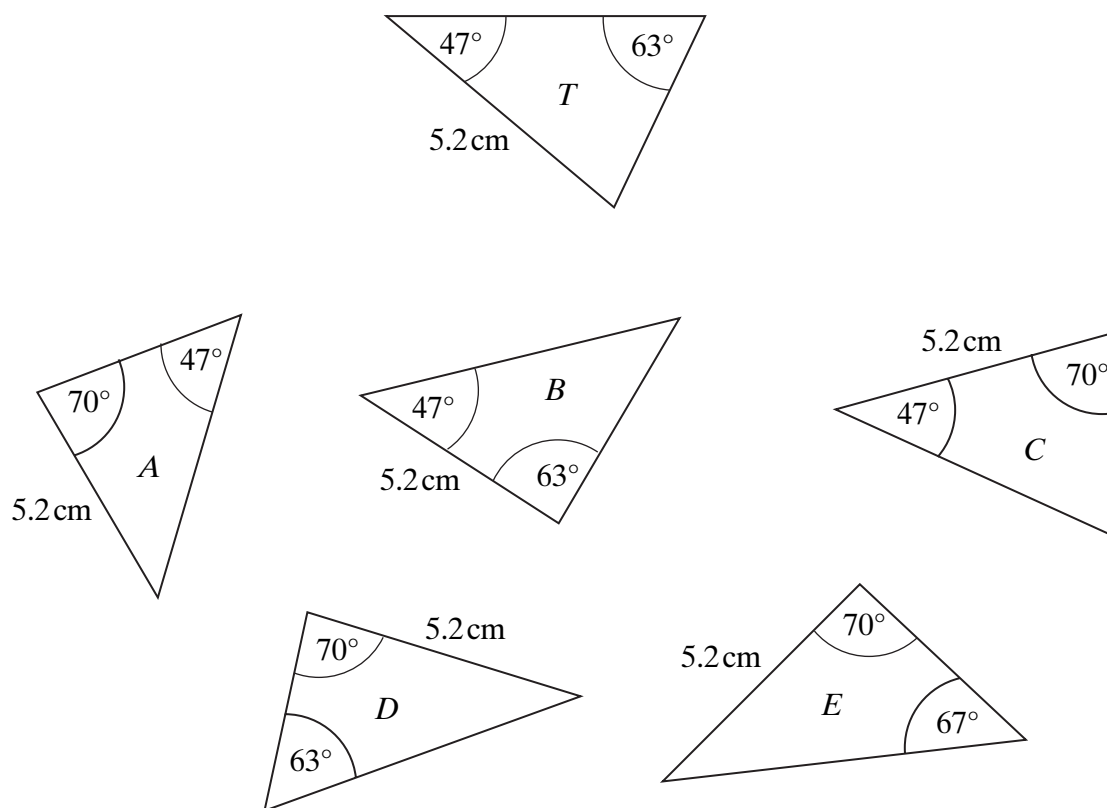
- 11** (a) Write down the values of a and b .



Not drawn accurately

Answer $a = \dots\dots\dots$ degrees, $b = \dots\dots\dots$ degrees (2 marks)

(b) Triangle T and triangles A, B, C, D and E are not drawn accurately.



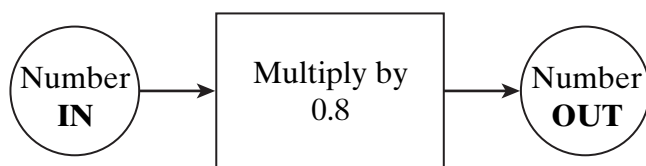
Which two of triangles A, B, C, D and E are congruent to triangle T ?

Answer Triangle and Triangle (2 marks)

TURN OVER FOR THE NEXT QUESTION

Turn over ►

- 12 (a) Here is a one-stage number machine.

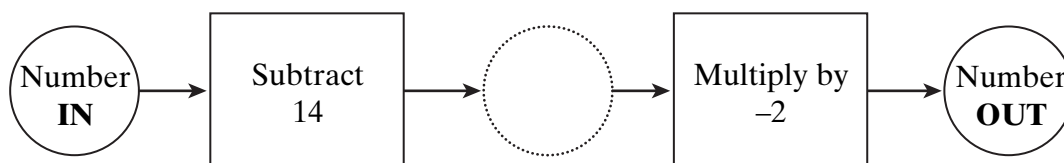


Find the number **IN** when the number **OUT** is 80.

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Answer (2 marks)

- (b) Here is a two-stage number machine.

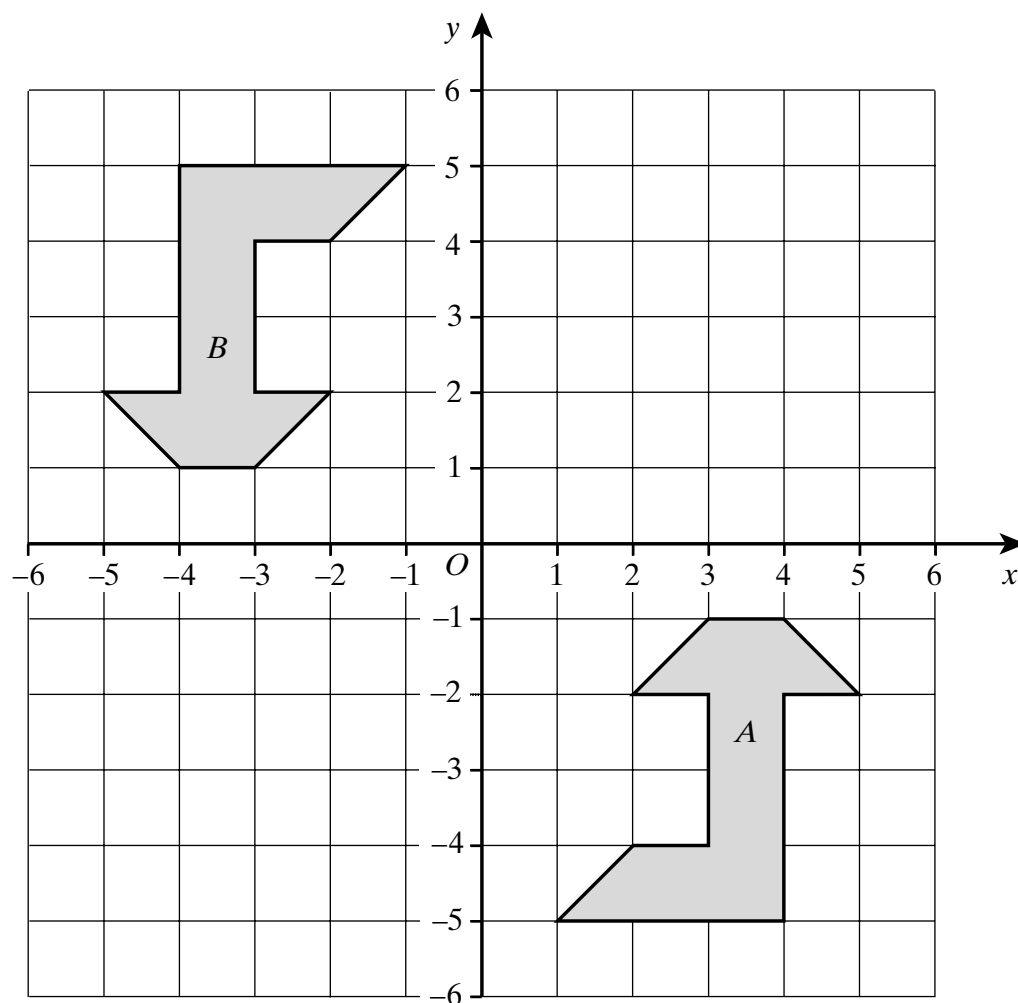


Find the number **OUT** when the number **IN** is 10.

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Answer (2 marks)

13 The diagram shows two identical shapes, *A* and *B*.



Describe fully the **single** transformation which takes shape *A* to shape *B*.

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(3 marks)

Turn over ►

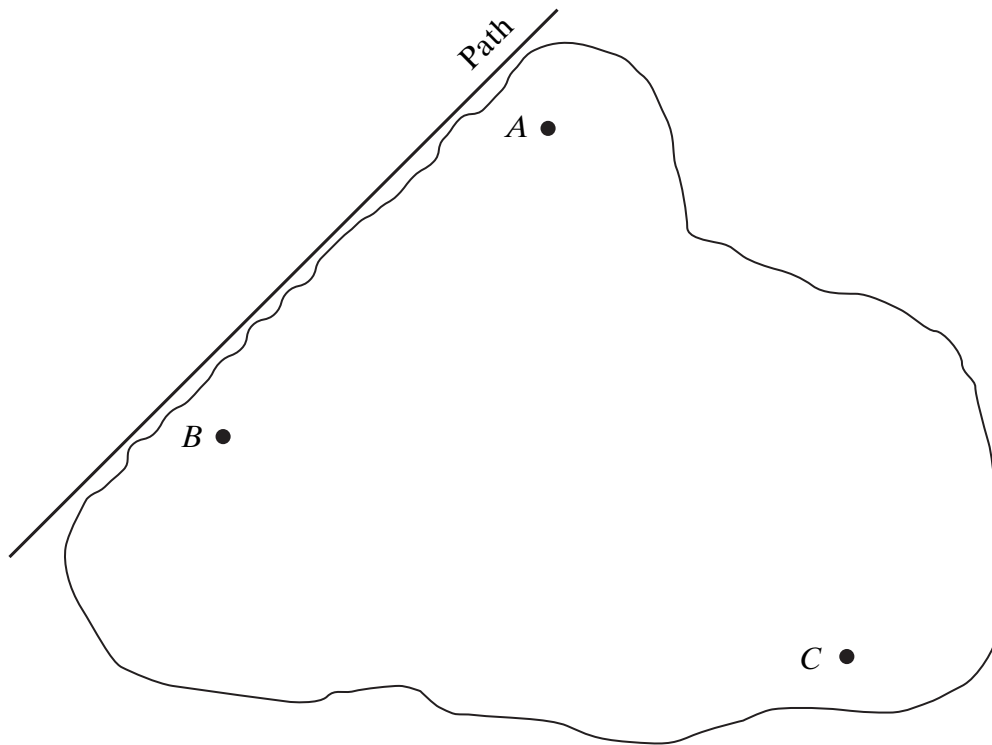
- 14** The map below shows three boats, *A*, *B* and *C*, on a lake.
Along one edge of the lake there is a straight path.

Treasure lies at the bottom of the lake.

The treasure is:

between 150m and 250m from *B*,
nearer to *A* than *C*,
more than 100m from the path.

Scale: 1 cm represents 50m



Using a ruler and compasses only, shade the region in which the treasure lies.
You **must** show clearly all your construction arcs.

(5 marks)

15 (a) The n th term of a sequence is $4n + 1$

(i) Write down the first three terms of the sequence.

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Answer , , (2 marks)

(ii) Is 122 a term in this sequence?
Explain your answer.

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(1 mark)

(b) Tom builds fencing from pieces of wood as shown below.

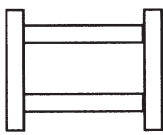


Diagram 1
4 pieces of wood

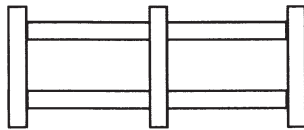


Diagram 2
7 pieces of wood

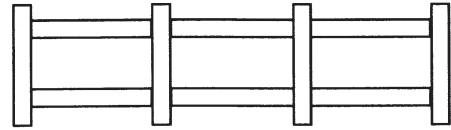


Diagram 3
10 pieces of wood

How many pieces of wood will be in Diagram n ?

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Answer (2 marks)

Turn over ►

- 16** p is an odd number.
Explain why $p^2 + 1$ is always an even number.

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(2 marks)

- 17** (a) Work out the value of $5^7 \div 5^4$

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Answer (2 marks)

- (b) a and b are prime numbers.

$$ab^3 = 54$$

Find the values of a and b .

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Answer $a =$, $b =$ (2 marks)

- (c) Find the Highest Common Factor (HCF) of 54 and 135.

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Answer (2 marks)

18 Chandni wants to survey pupils in her school about their reading habits.

- (a) Write a question that would help Chandni to investigate how often pupils in her school read for pleasure.
Include a response section.

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(2 marks)

- (b) There are 1000 pupils in Chandni's school.

Chandni samples 50 pupils at random and asks them to complete her survey.
She finds that 16 of the pupils in the sample read comics.
Estimate the number of pupils in the school who read comics.

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Answer (2 marks)

Turn over ►

- 19** James invests £700 for 2 years at 10% per year compound interest.
How much interest does he earn?

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Answer £ (2 marks)

- 20** A builder has 7200 kg of sand.

- (a) Write 7200 kg in grams.
Give your answer in standard form.

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Answerg (2 marks)

- (b) One grain of this sand weighs 0.0006 g.
Write the weight of one grain of sand in standard form.

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Answerg (1 mark)

- (c) How many grains of sand are there in 7200 kg of sand?
Give your answer in standard form.

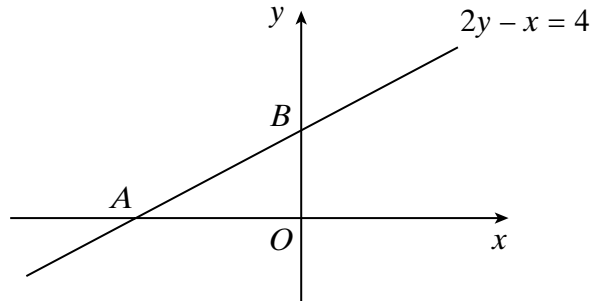
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Answer (2 marks)

- 21** A sketch of the line $2y - x = 4$ is shown.
The line crosses the axes at A and B .



- (a) Calculate the coordinates of A and B .

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Answer A (.....,), B (.....,) (2 marks)

- (b) Calculate the gradient of the line AB .

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Answer (2 marks)

Turn over ►

- 22 (a) Factorise $7x + 14$

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Answer (1 mark)

- (b) Expand and simplify $4(m + 3) + 3(2m - 5)$

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Answer (2 marks)

- (c) Solve the simultaneous equations:

$$2x + 3y = 9$$

$$3x + 2y = 1$$

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

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Answer $x =$, $y =$ (4 marks)

- (d) Factorise $x^2 + 6x - 16$

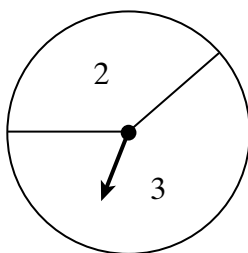
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Answer (2 marks)

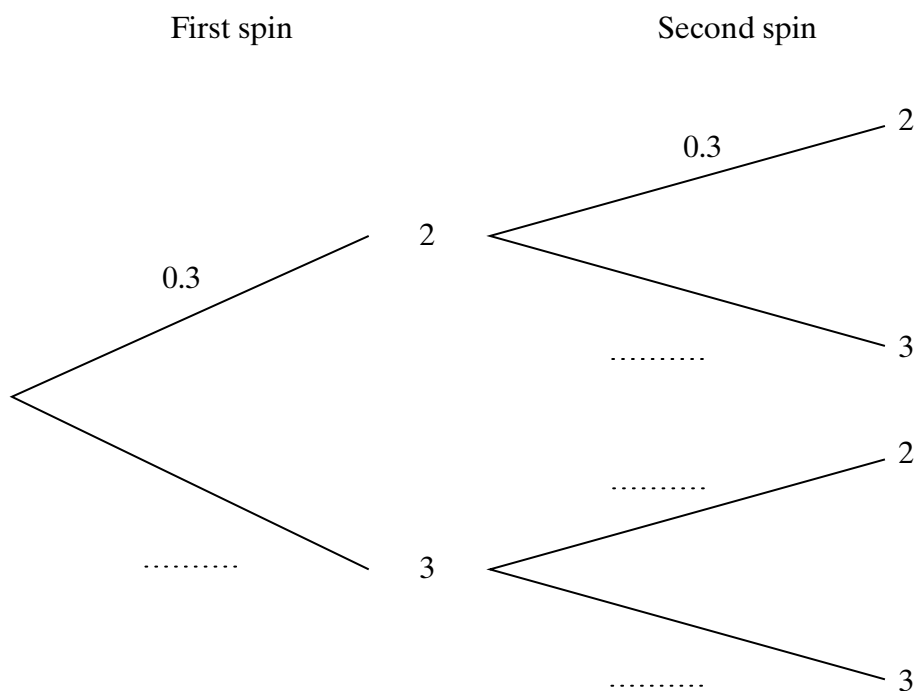
23 The diagram shows a spinner.



When the arrow is spun the probability of scoring 2 is 0.3

The arrow is spun twice and the scores are added.

(a) Complete the tree diagram.



(1 mark)

(b) What is the probability that the total score is 4?

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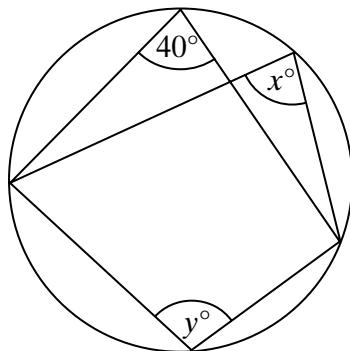
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Answer (2 marks)

Turn over

24 (a)



Not drawn accurately

- (i) Write down the value of
- x
- .

Answer degrees (1 mark)

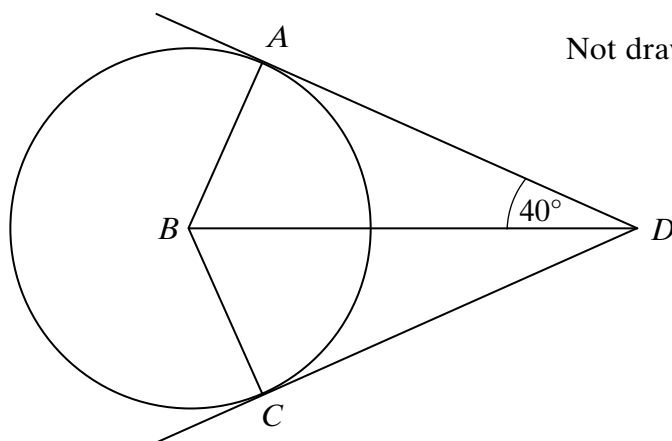
- (ii) Calculate the value of
- y
- .

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Answer degrees (1 mark)

- (b) A and C are points on the circumference of a circle centre B .
 AD and CD are tangents.
 Angle $ADB = 40^\circ$.



Not drawn accurately

Explain why angle ABC is 100° .

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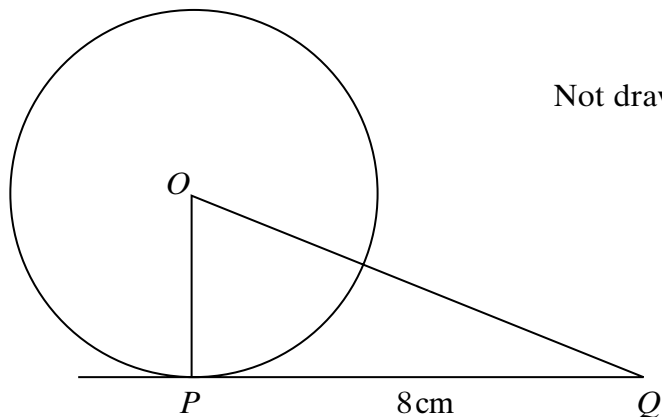
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(2 marks)

- (c) P is a point on the circumference of a circle with centre O .
 PQ is a tangent of length 8 cm.
 The area of triangle OPQ is 24 cm^2 .



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

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Answer cm^2 (3 marks)

END OF QUESTIONS