

Surname						Other Names					
Centre Number						Candidate Number					
Candidate Signature											

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General Certificate of Secondary Education
November 2003



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

Tuesday 11 November 2003 9.00 am to 11.00 am

<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 – 21	
22 – 23	
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.

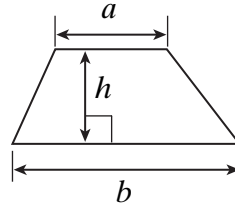
Advice

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

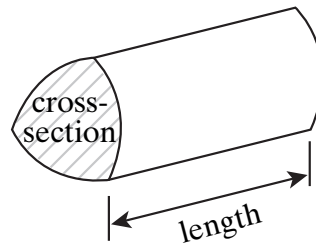
Formulae Sheet: Intermediate Tier

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** Work out the difference between the two square numbers in this list of numbers.

6 11 15 21 27 36 48 64

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Answer (2 marks)

- 2** Fill in the **two** missing numbers in this sequence.

31, 29, 25, 19, , 1,

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(2 marks)

- 3** Videos are stored on shelves.

Each video is 25 mm wide.

Each shelf is 90 cm long.

How many videos can be stored on 5 shelves?

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Answer (3 marks)

Turn over ►

- 4 A rectangle has an area of 40 cm^2 and a perimeter of 26 cm.
Find the length and width of the rectangle.
You may use the grid to help you.

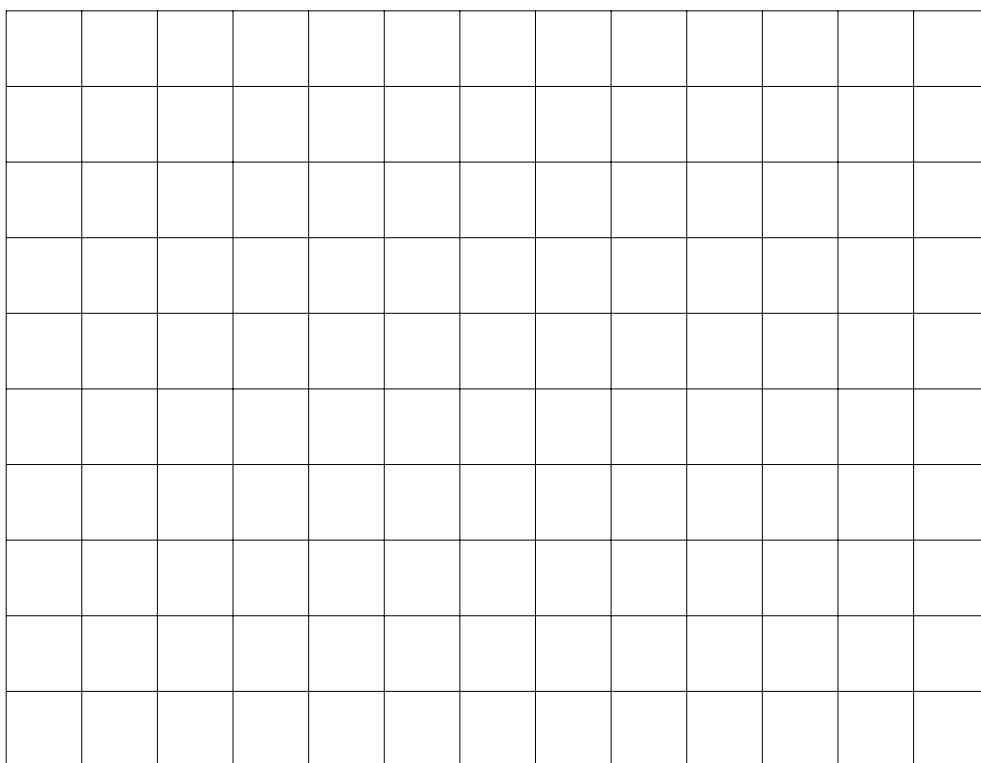
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Answer

Length cm

Width cm

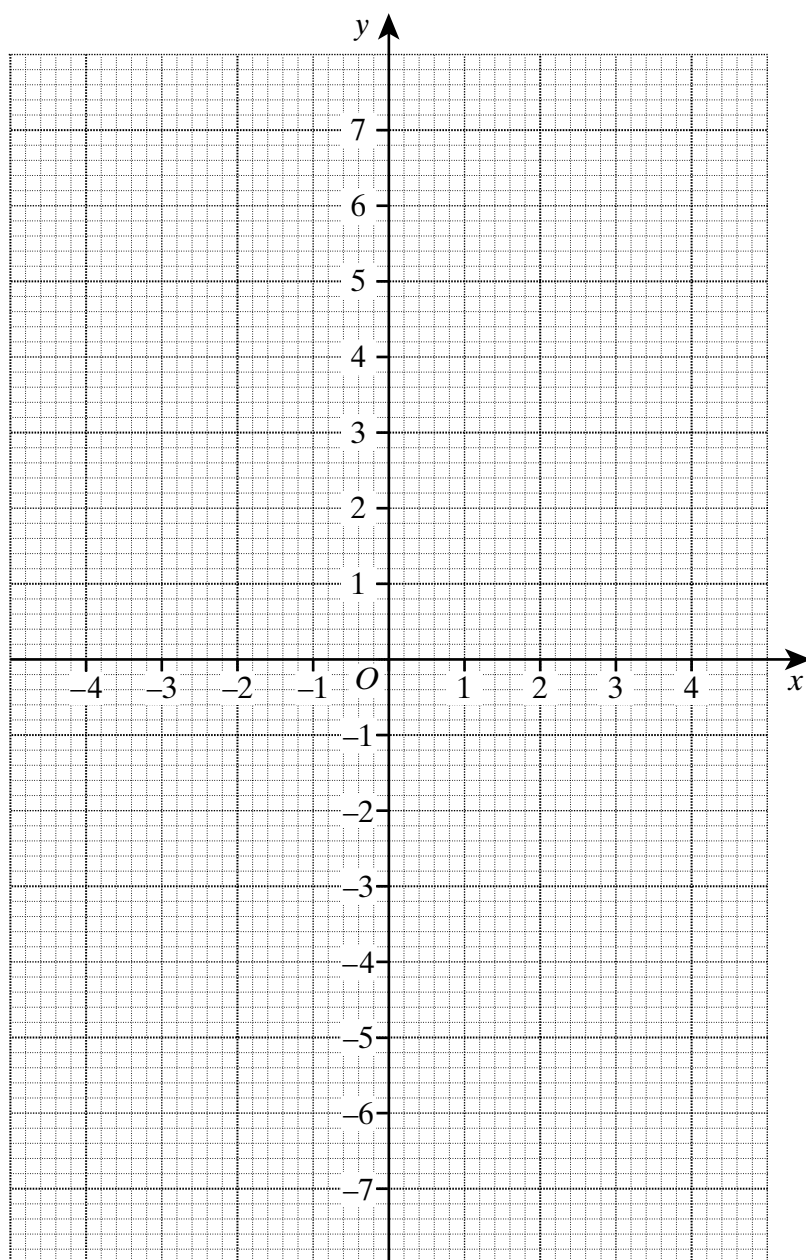
(2 marks)

- 5 (a) On the grid below draw and label the lines $y = -4$ and $y = 2x + 1$

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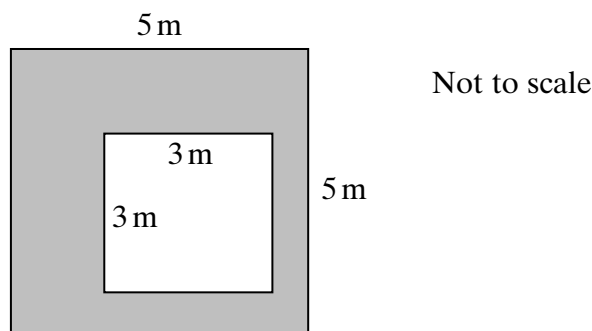
(4 marks)

- (b) Write down the coordinates of the point where the lines $y = -4$ and $y = 2x + 1$ cross.

Answer (..... ,) (1 mark)

Turn over ►

6 What percentage of this shape is shaded?



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Answer% (4 marks)

7 (a) The stem and leaf diagram shows the amounts that 15 pupils spend on healthy food.

Key: | 3 | 5 means 35 pence

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

(i) What is the range of the amounts spent?

.....

Answer pence (1 mark)

(ii) What is the median of the amounts spent?

.....

Answer pence (1 mark)

(iii) What is the mode of the amounts spent?

.....

Answer pence (1 mark)

- (b) Seema wants to find out who eats healthy food.
She decides to investigate this hypothesis:

Girls are more likely to eat healthy food than boys.

- (i) Design a two-way table that Seema might use to help her do this.

(2 marks)

- (ii) Seema records information from a sample of 30 boys and 20 girls.
She finds that 13 boys and 12 girls eat healthy food.
Based on this sample, is the hypothesis correct?
Explain your answer.

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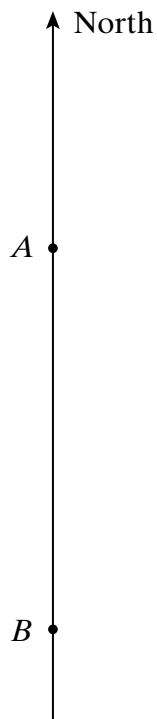
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(2 marks)

Turn over ►

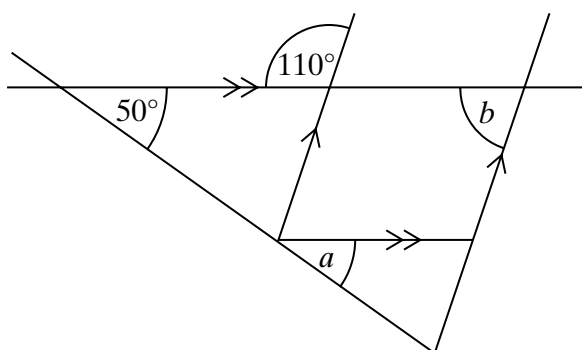
- 8 A is due North of B .
The bearing of C from A is 115° .
The bearing of C from B is 075° .



Mark the position of C on the diagram.

(3 marks)

- 9 Write down the values of a and b .



Not drawn accurately

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

- 10 (a) Work out 600×0.3

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Answer (1 mark)

- (b) Work out $600 \div 0.3$

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Answer (1 mark)

- (c) You are told that $432 \times 21 = 9072$
Write down the value of $9072 \div 2.1$

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Answer (1 mark)

- (d) Find an approximate value of $\frac{2987}{21 \times 49}$

You **must** show all your working.

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Answer (2 marks)

Turn over ►

- 11 (a) Find the value of a^3 when $a = 4$

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Answer (1 mark)

- (b) Find the value of $5x + 3y$ when $x = -2$ and $y = 4$

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Answer (2 marks)

- (c) There are p seats in a standard class coach and q seats in a first class coach.
A train has 5 standard class coaches and 2 first class coaches.
Write down an expression in terms of p and q for the number of seats in the train.

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Answer (2 marks)

- 12 P is an odd number.
 Q is an even number.

- (a) Explain why $P + Q - 1$ is **always** an even number.

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(2 marks)

- (b) Alex says that $P + Q - 1$ **cannot** be a prime number.
Explain why Alex is wrong.

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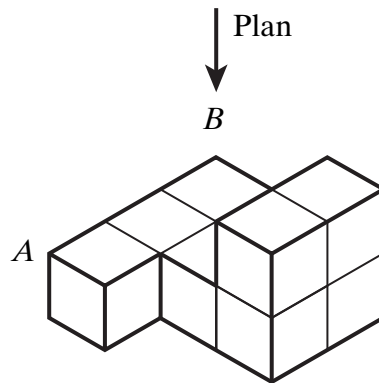
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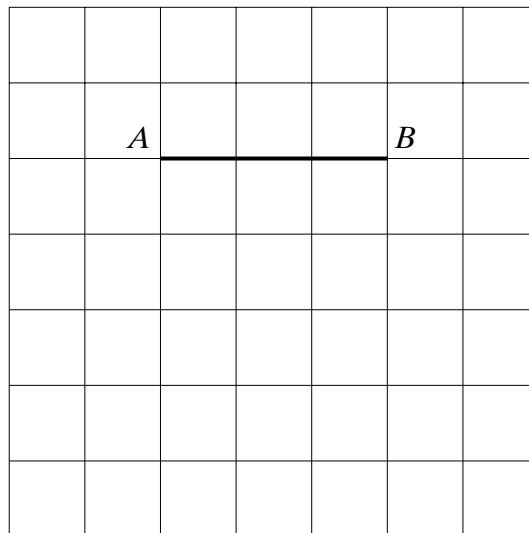
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(1 mark)

- 13** The diagram shows a solid shape made from 8 cubes.



Complete the plan view of the shape on the grid below.

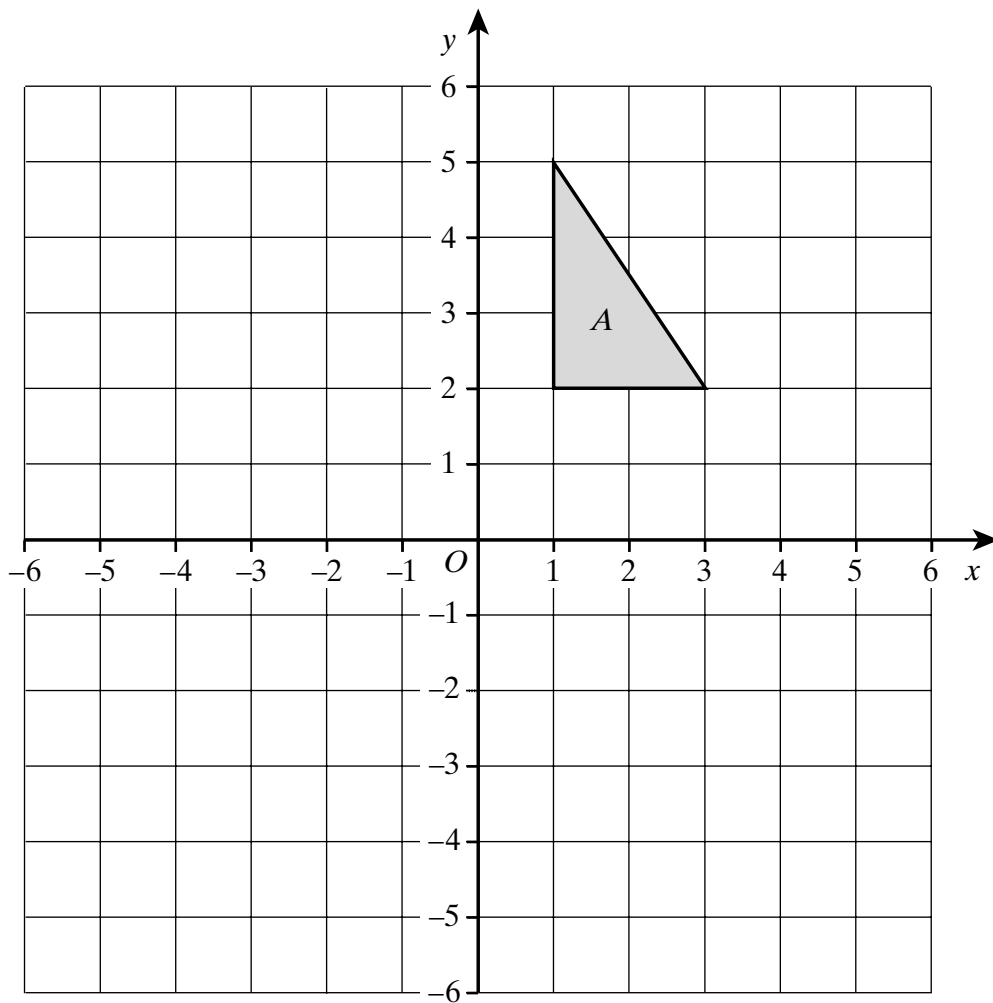


(2 marks)

TURN OVER FOR THE NEXT QUESTION

Turn over ►

- 14 Triangle A has vertices $(1,2)$, $(1,5)$ and $(3,2)$.



Draw the new position of triangle A after a rotation of 90° clockwise about the origin.

(3 marks)

- 15 (a) Matthew has a dice with 3 red faces, 2 blue faces and 1 green face.
He throws the dice 300 times.
The results are shown in the table.

Red	Blue	Green
153	98	49

- (i) What is the relative frequency of throwing a red?

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Answer (1 mark)

- (ii) Is the dice fair?
Explain your answer.

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(2 marks)

- (b) Emmie has a dice with 4 red faces and 2 blue faces.
She throws the dice 10 times and gets 2 reds.
Emmie says the dice is **not** fair.
Explain why Emmie could be wrong.

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(1 mark)

Turn over ►

16 A pattern using pentagons is made of sticks.

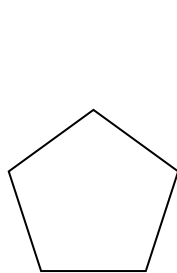


Diagram 1

5 sticks

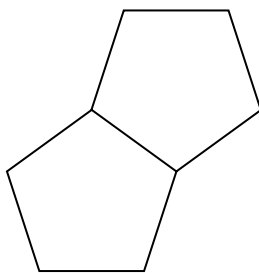


Diagram 2

9 sticks

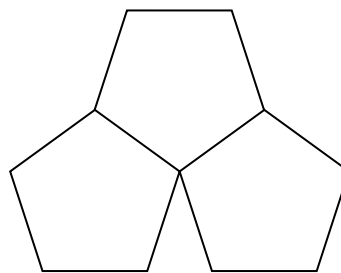


Diagram 3

13 sticks

(a) How many sticks are needed for Diagram 5?

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Answer (2 marks)

(b) Write down an expression for the number of sticks in Diagram n .

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Answer (2 marks)

(c) Which Diagram uses 201 sticks?

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Answer (3 marks)

- 17** (a) You are given that $2x^3 = 250$
Find the value of x .

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Answer $x =$ (1 mark)

- (b) Write 75 as the product of its prime factors.

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Answer (2 marks)

- 18** Mary says the length of a corridor is 35 m to the nearest metre.
Habib says the length of the same corridor is 30 m to the nearest 10 metres.
Mary and Habib are both correct.
Give a possible value for the actual length of the corridor.

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Answer metres (2 marks)

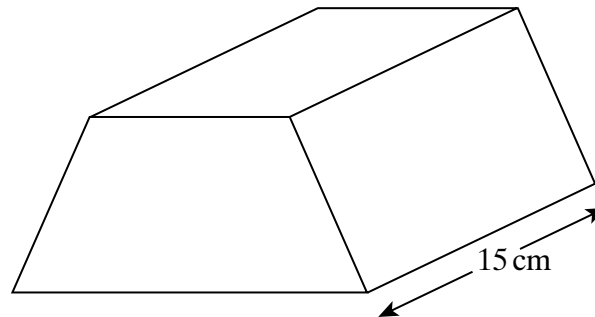
- 19** Expand and simplify $(x - 3)(x + 1)$

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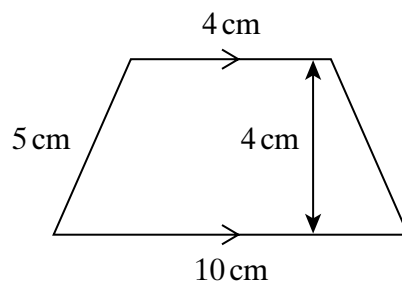
Answer (2 marks)

Turn over ►

- 20** The diagram shows a silver bar.



The cross-section of the silver bar is a trapezium.



- (a) Calculate the area of the cross-section.

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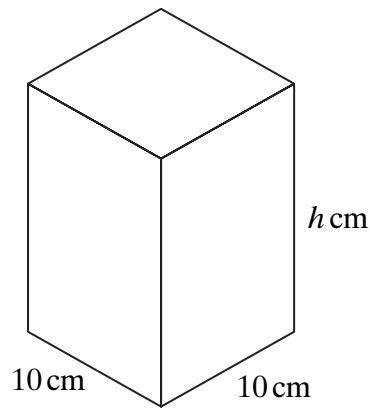
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Answer cm^2 (2 marks)

- (b) The silver bar is 15 cm long.
The bar is melted and the silver is then made into a cuboid.
The base of the cuboid is 10 cm by 10 cm.



Not to scale

What is the height, h , of the cuboid?

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Answer cm (3 marks)

TURN OVER FOR THE NEXT QUESTION

Turn over ►

21 Susan completes a journey in two stages.

In stage 1 of her journey, she drives at an average speed of 80 km/h and takes 1 hour 45 minutes.

- (a) How far does Susan travel in stage 1 of her journey?

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Answer km (2 marks)

- (b) Altogether, Susan drives 190 km and takes a total time of 2 hours 15 minutes.
What is her average speed, in km/h, in **stage 2** of her journey?

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Answer km/h (2 marks)

22 A special savings account earns 10% per year compound interest.

- (a) Jill invests £2 500 in the special account.
How much will she have in her account after 2 years?

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Answer £ (3 marks)

- (b) James also invests in the special account.
After earning interest for one year, he has £1 320 in his account.
How much money did James invest?

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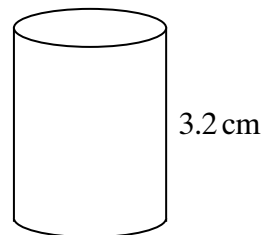
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Answer £ (3 marks)

23 The diagram shows a cylinder.
The volume of the cylinder is $320\pi \text{ cm}^3$.
The height of the cylinder is 3.2 cm.



Not to scale

Calculate the radius of the base of the cylinder.

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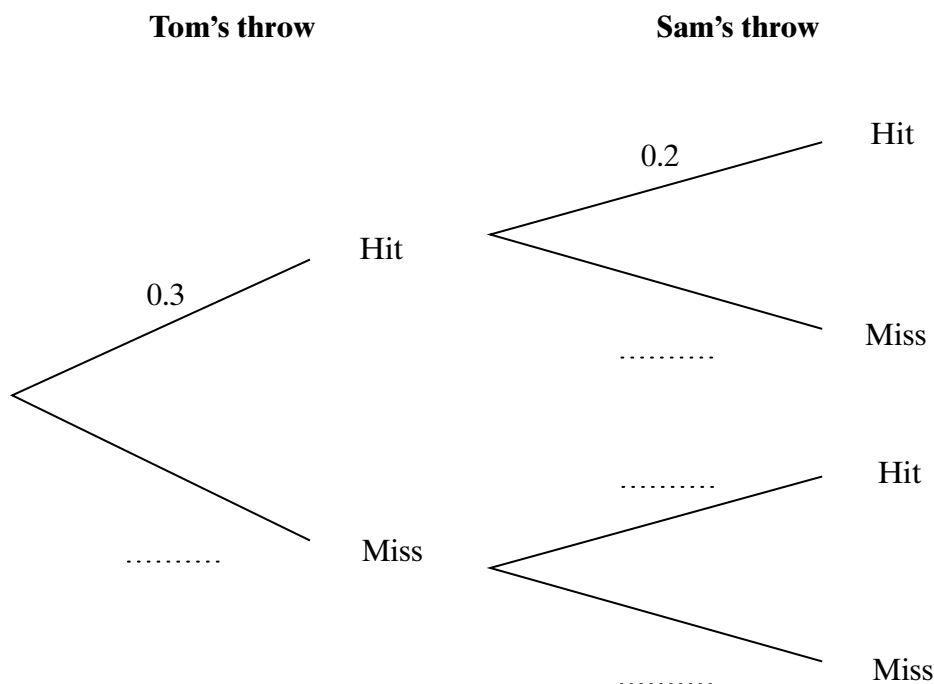
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Answer cm (3 marks)

Turn over ►

- 24** Tom and Sam take turns to throw a dart at a target.
The probability that Tom hits the target is 0.3
The probability that Sam hits the target is 0.2

(a) Complete the tree diagram.



(1 mark)

- (b) What is the probability that Tom and Sam both hit the target?

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Answer (2 marks)

- 25** Calculate 15% of 3×10^7
Give your answer in standard form.

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Answer (2 marks)

26 (a) (i) Factorise $x^2 - 7x - 8$

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Answer (2 marks)

(ii) Hence solve the equation $x^2 - 7x - 8 = 0$

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Answer (1 mark)

(b) Solve the simultaneous equations

$$5x + 3y = 13$$

$$3x + 5y = 3$$

You **must** show your working.

Do **not** use trial and improvement.

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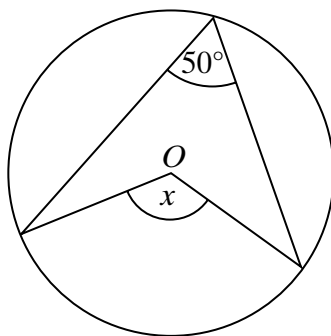
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Answer $x =$, $y =$ (4 marks)

Turn over ►

- 27 (a) The diagram shows a circle with centre O .



Not drawn accurately

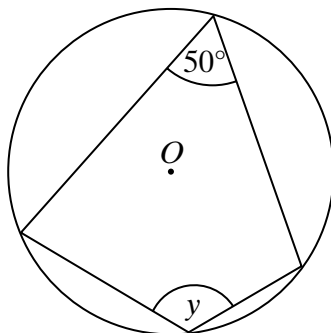
Work out the size of the angle marked x .

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Answer degrees (1 mark)

- (b) The diagram shows a different circle with centre O .



Not drawn accurately

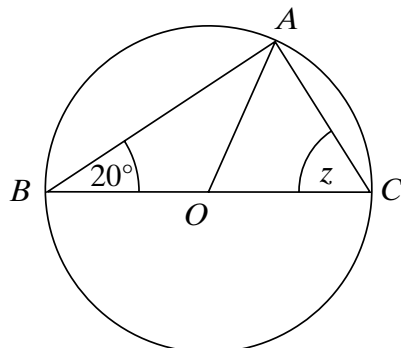
Work out the size of the angle marked y .

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Answer degrees (1 mark)

- (c) A, B and C are points on the circumference of a circle with centre O .
 BOC is a straight line.
 Angle $ABC = 20^\circ$



Not drawn accurately

Work out the size of the angle marked z .
 Explain your answer.

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Answer degrees (2 marks)

END OF QUESTIONS