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General Certificate of Secondary Education  
2010

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Candidate Number

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## Mathematics

Module N6 Paper 2  
**(Calculator)**  
Higher Tier  
[GMN62]



GMN62



MONDAY 7 JUNE  
**3.00 p.m. – 4.15 p.m.**

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	

### TIME

1 hour 15 minutes.

### INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.  
 Write your answers in the spaces provided in this question paper.  
 Complete in blue or black ink. Pencil may be used in diagrams only.  
**Do not write with a gel pen.**  
 Do not use correction fluid to correct errors in your answers.  
 Answer **all eighteen** questions.  
 Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.

### INFORMATION FOR CANDIDATES

The total mark for this paper is 56.  
 Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.  
 You should have a calculator, ruler, compasses, set-square and protractor.  
 The Formula Sheet is on page 2.

<b>Total Marks</b>	
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5573

Examiner Number

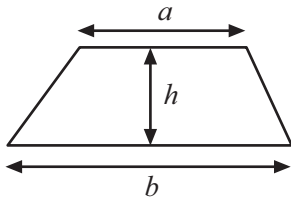
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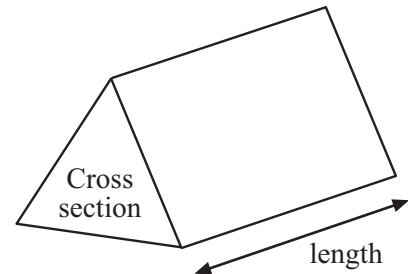
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# Formula Sheet

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



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

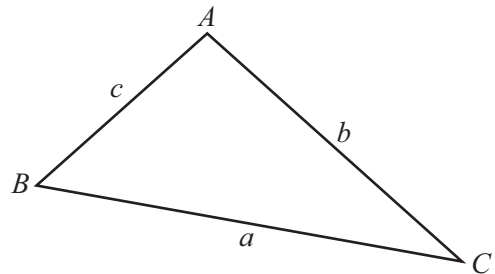


**In any triangle  $ABC$**

**Area of triangle**  $= \frac{1}{2} ab \sin C$

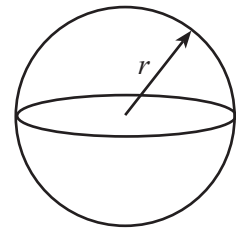
**Sine rule:**  $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

**Cosine rule:**  $a^2 = b^2 + c^2 - 2bc \cos A$



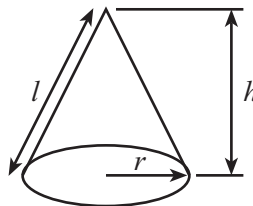
**Volume of sphere**  $= \frac{4}{3}\pi r^3$

**Surface area of sphere**  $= 4\pi r^2$



**Volume of cone**  $= \frac{1}{3}\pi r^2 h$

**Curved surface area of cone**  $= \pi r l$



**Quadratic equation:**

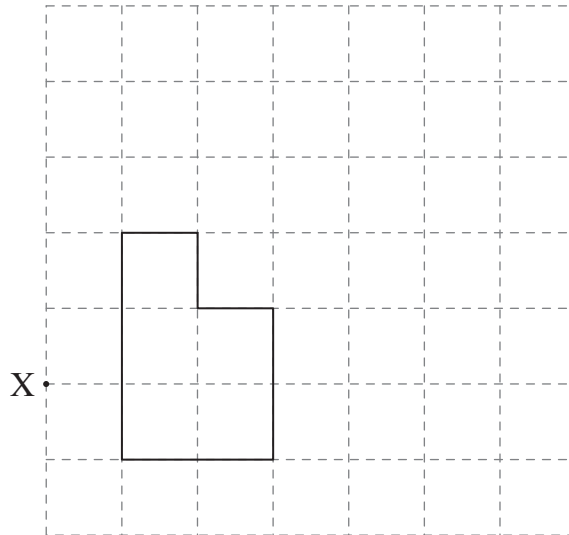
The solutions of  $ax^2 + bx + c = 0$ , where  $a \neq 0$ , are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$



**Question 1**

- (a) Enlarge the shape in the diagram below by a scale factor of 2 with centre X. [3]



- (b) A car travels a distance of 210 km at an average speed of 60 km/h. Calculate the time taken in hours and minutes.

Answer \_\_\_\_\_ hours \_\_\_\_\_ minutes [3]

Examiner Only	
Marks	Remark



**Question 2**

Examiner Only

Marks	Remark

- (a) Write the number  $0.3204204204204 \dots$  as a recurring decimal.

Answer \_\_\_\_\_ [1]

- (b) Write down the two numbers which are the square roots of 0.25

Answer \_\_\_\_\_ and \_\_\_\_\_ [1]

- (c) Which of 'always even', 'always odd', 'could be odd or even' describes the number  $5(2n + 3)$ ? ( $n$  is an integer).  
Explain your answer.

Answer \_\_\_\_\_

because \_\_\_\_\_

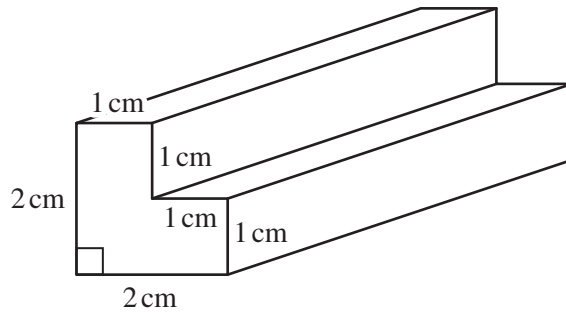
\_\_\_\_\_ [2]



### Question 3

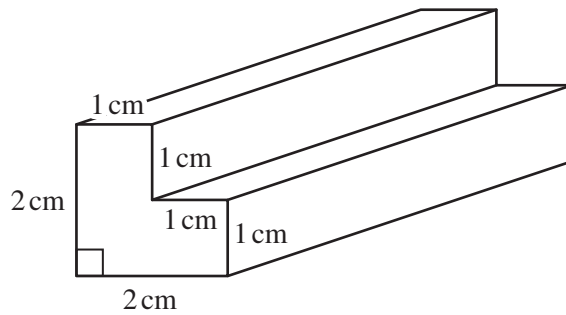
(a) Draw a plane of symmetry on this solid.

[1]



(b) Draw a different plane of symmetry on this solid.

[1]



Examiner Only	
Marks	Remark



**Question 4**

Julie earns £42 000 per year. Her tax free allowance is £5000  
She pays 22% of the remaining salary in tax.  
How much is left after tax has been deducted?

Answer £ \_\_\_\_\_ [3]

**Examiner Only****Marks** **Remark**

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**Question 5**

Handbags in a shop come in five colours. The table shows the probability of buying a particular colour of handbag.

<b>Black</b>	<b>Red</b>	<b>White</b>	<b>Silver</b>	<b>Blue</b>
45%	4%	25%	20%	12%

The shopkeeper's mathematics is not good.

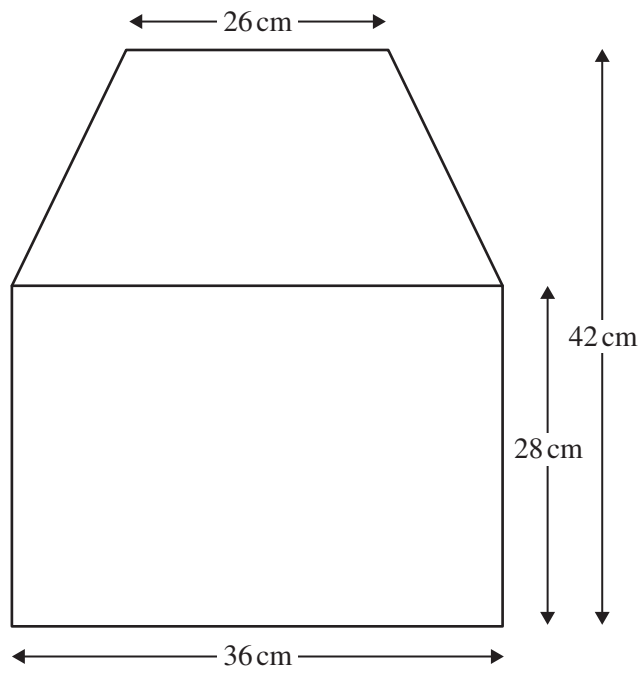
How can you tell there is a mistake in the table?

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[1]

**Examiner Only****Marks** **Remark**

**Question 6**

The diagram above shows the cross-section of a doll's house.  
The diagram shows a rectangle and a trapezium.  
Find the total area of the cross-section.

Answer \_\_\_\_\_  $\text{cm}^2$  [3]

**Examiner Only****Marks** **Remark**



**Question 7**

S and T are two points 80 metres apart on a straight road.  
 Shade clearly the region in which each point is less than 50 metres from S and  
 is further from S than it is from T.  
 (The scale on the diagram is 1 cm = 10 m).



[3]

Examiner Only	
Marks	Remark

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**[Turn over**

09

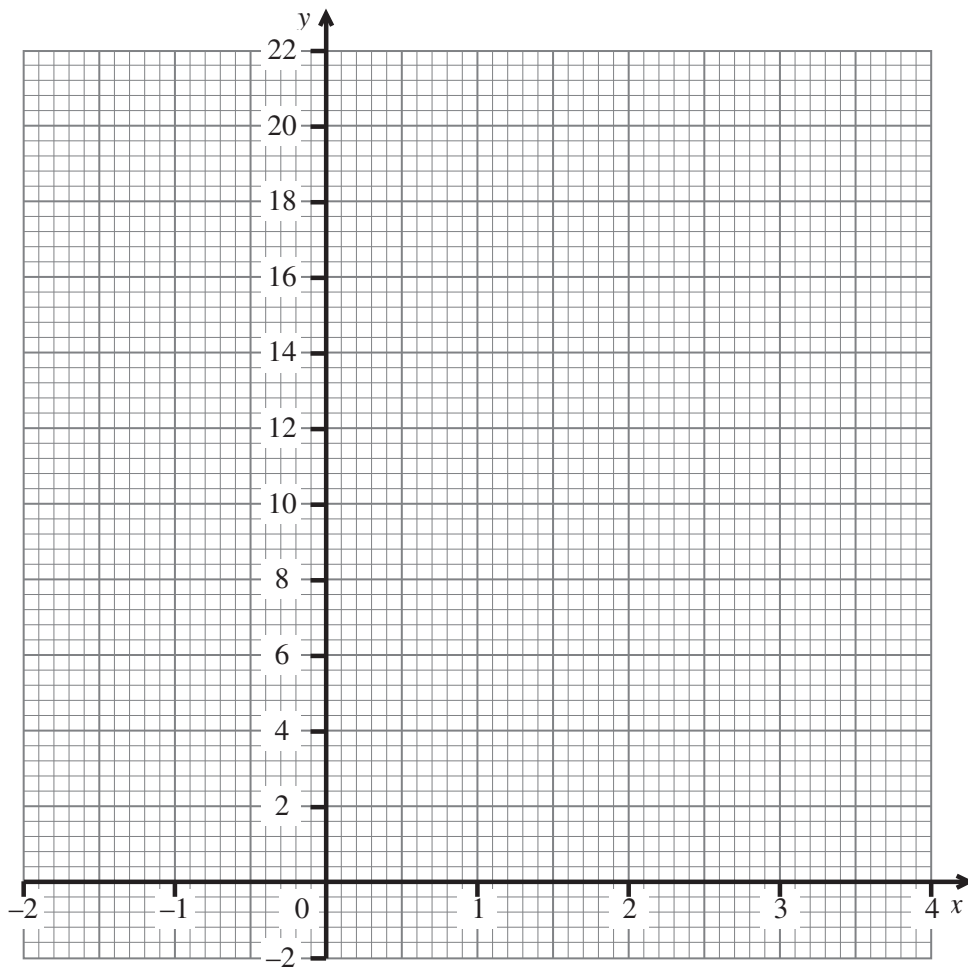
## Question 8

(a) Complete the table for  $y = 2x^2 - 5x + 3$

$x$	-2	-1	0	1	2	3	4
$y$		10	3	0	1		15

[2]

(b) Draw the graph of  $y = 2x^2 - 5x + 3$  for  $x = -2$  to  $x = 4$  on the axes below.



[2]

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Examiner Only	
Marks	Remark

**Question 9**

Maurice travels 99 km.

His journey is split between train and taxi in the ratio 11 : 4

How far does he travel by taxi?

Answer \_\_\_\_\_ km [2]

**Examiner Only****Marks****Remark**

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**[Turn over**

**Question 10**Solve  $7x \leq 3x + 5$ 

Answer \_\_\_\_\_ [2]

Examiner Only

Marks	Remark

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**Question 11**

A solid prism of wood has a cross-sectional area of  $60 \text{ cm}^2$   
The length of the prism is  $43 \text{ cm}$  and the mass of the prism is  $1400 \text{ g}$ .  
Calculate the density of the wood, **giving your answer to a suitable degree of accuracy**.

Answer \_\_\_\_\_  $\text{g/cm}^3$  [3]

**Examiner Only****Marks** **Remark**

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**[Turn over**

**Question 12**

- (a) In an experiment to calculate the probability of throwing a head with a coin, four friends throw it a different number of times and record the number of heads.

- (i) Complete the table.

Name	Number of throws	Number of heads	Relative frequency
John	20	9	
Paul	100	53	
George	500	210	
Ringo	1000		0.502

[2]

- (ii) One of the friends lost count of the number of heads he threw and just made up a number.

Which friend do you think this was?

Explain your answer.

Answer \_\_\_\_\_ because \_\_\_\_\_

\_\_\_\_\_ [1]

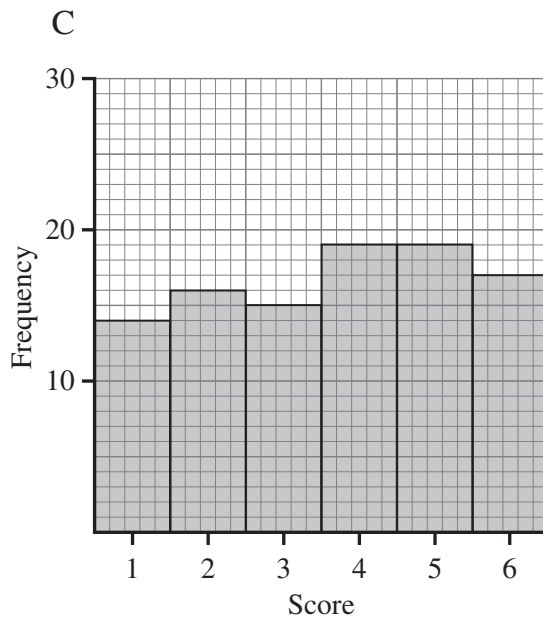
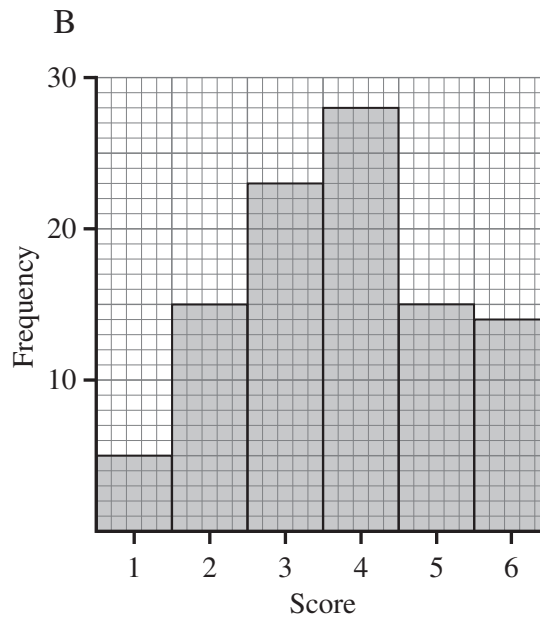
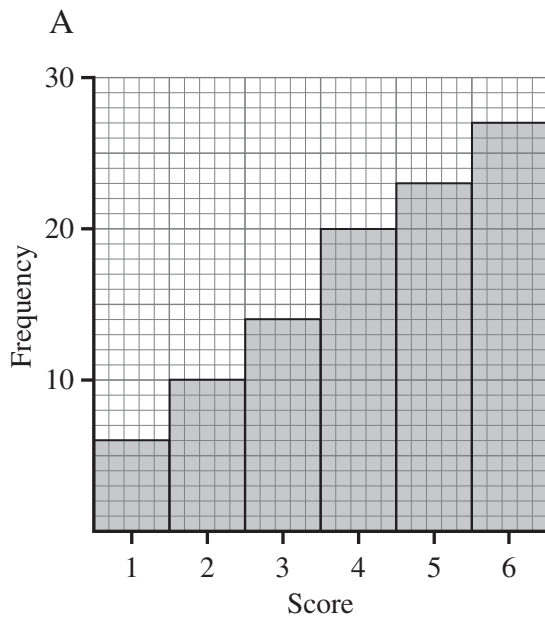
Examiner Only

Marks Remark



## Question 12 continued

- (b) Pete decides to carry out an experiment with a regular dice. He rolls it 100 times and records his results in a frequency diagram. Which of these is it most likely to be?



Answer \_\_\_\_\_ [1]

Examiner Only	
Marks	Remark



**Question 13**

$S$  is proportional to the cube of  $T$  and  $S = 54$  when  $T = 6$

(a) Express  $S$  in terms of  $T$ .

Answer \_\_\_\_\_ [2]

(b) Hence find the value of  $T$  when  $S = 128$

Answer \_\_\_\_\_ [2]

**Examiner Only****Marks** **Remark**



**Question 14**

Calculate the curved surface area of a cylinder with a base radius of 7 cm and a height of 32 cm.

Answer \_\_\_\_\_ cm<sup>2</sup> [2]

**Examiner Only****Marks** **Remark**

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**[Turn over**

**Question 15**

Rearrange  $7(xy - 2) = 5y + 2x$  to make  $x$  the subject.

**Examiner Only**

Marks	Remark

Answer  $x =$  \_\_\_\_\_ [4]

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**Question 16**

Rationalise the denominator of  $\frac{12}{\sqrt{3}}$  and simplify your answer.

Answer \_\_\_\_\_ [2]

**Examiner Only**

Marks	Remark



**Question 17**

Mrs Gump is given a box of chocolates by her husband.

There are 18 chocolates in the box.

There are equal numbers of dark, milk and white chocolates.

She takes two chocolates at random.

What is the probability that there are now more dark chocolates in the box than either milk or white?

Examiner Only

Marks	Remark

Answer \_\_\_\_\_ [3]

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**Question 18**

A solid cylinder of radius  $x$  and height  $3x$  has the same surface area as a sphere of radius  $r$ .

Find an expression for  $r$  in terms of  $x$ .

**Examiner Only****Marks**   **Remark**

Answer  $r =$  \_\_\_\_\_ [4]

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

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