



Rewarding Learning

General Certificate of Secondary Education  
2010

Centre Number	
7	1

Candidate Number

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## Mathematics

Module N6 Paper 1  
**(Non-calculator)**  
Higher Tier

[GMN61]

MONDAY 7 JUNE

**1.30 pm – 2.45 pm**



GMN61

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

### 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 sixteen** questions.  
Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.  
You **must not** use a calculator for this paper.

### 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 ruler, compasses, set-square and protractor.  
The Formula Sheet is on page 2.

<b>Total Marks</b>	
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Examiner Number 

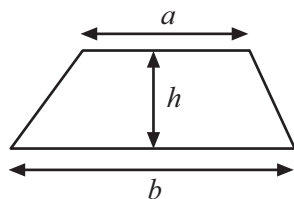
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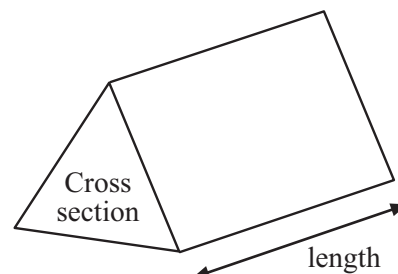
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# Formula Sheet

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



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

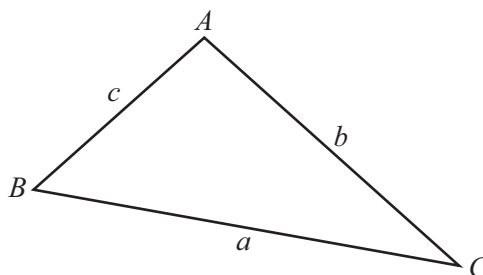


**In any triangle ABC**

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

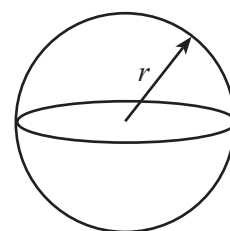
**Sine rule:**  $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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



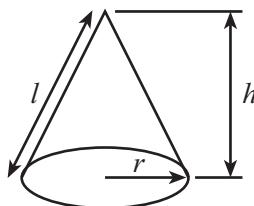
**Volume of sphere** =  $\frac{4}{3}\pi r^3$

**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:**

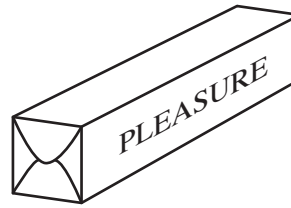
The solutions of  $ax^2 + bx + c = 0$ , where  $a \neq 0$ , are given by

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



**Question 1**

There are four colours of sweet in a packet of "Pleasure".  
The probability of picking a sweet of each colour  
is given in the table.



<b>Colour</b>	Green	Blue	Red	Orange
<b>Probability</b>	0.35	0.2		0.2

What is the probability of selecting a red sweet?

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

Examiner Only

Marks Remark



**Question 2**

$$R = \frac{S(2 + T)}{6}$$

Calculate the value of  $R$  when  $S = 15$  and  $T = -10$

Answer  $R =$  \_\_\_\_\_ [3]

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

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**Question 3**

- (a) Estimate the value of  $\frac{8.3 \times 19.6}{6.1 - 3.7}$   
**Show your working.**

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

- (b) Given that  $\frac{3024}{36} = 84$ , write down the answer to:

(i)  $360 \times 84$

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

(ii)  $3024 \div 840$

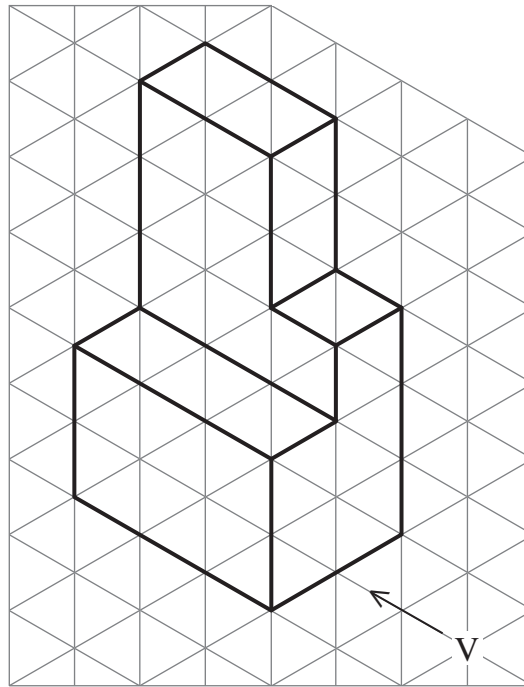
Answer \_\_\_\_\_ [1]

Examiner Only	
Marks	Remark

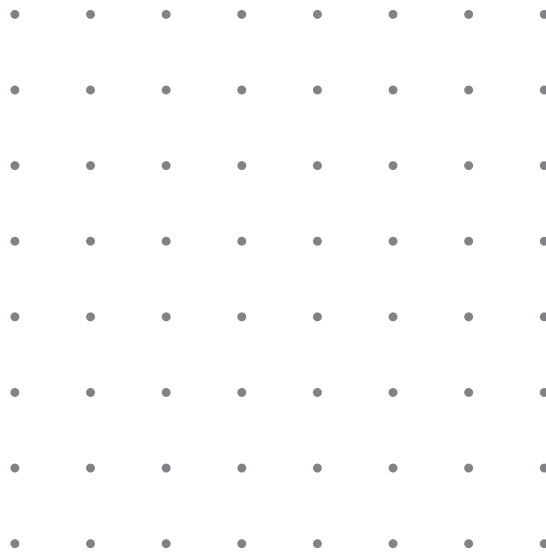


**Question 4**

On the lower grid, draw the front elevation of the solid as viewed from V.



Front elevation



[2]

Examiner Only

Marks Remark



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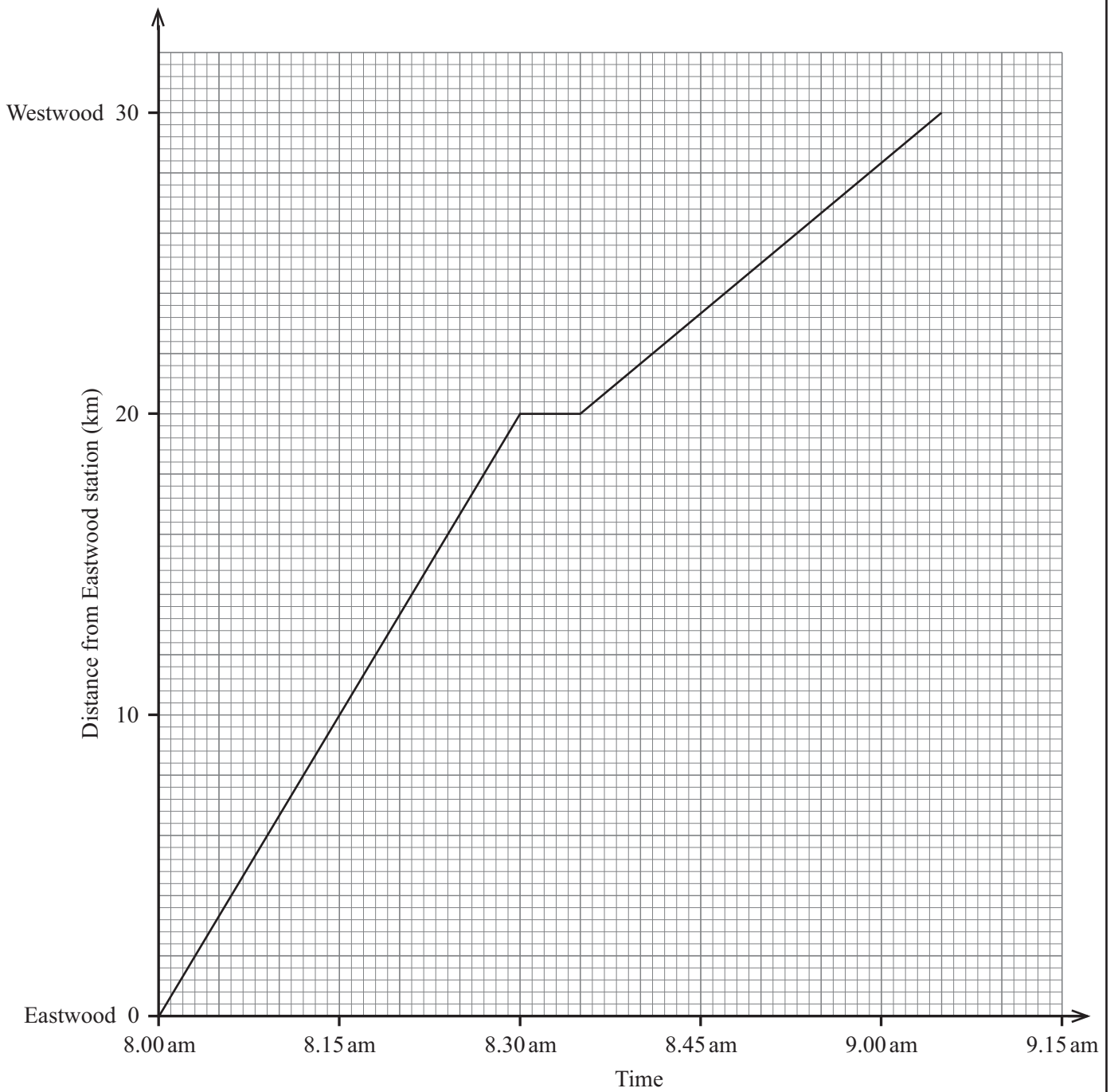
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**[Turn over**



**Question 5**

The graph shows the journey for a bus from Eastwood station to Westwood station.



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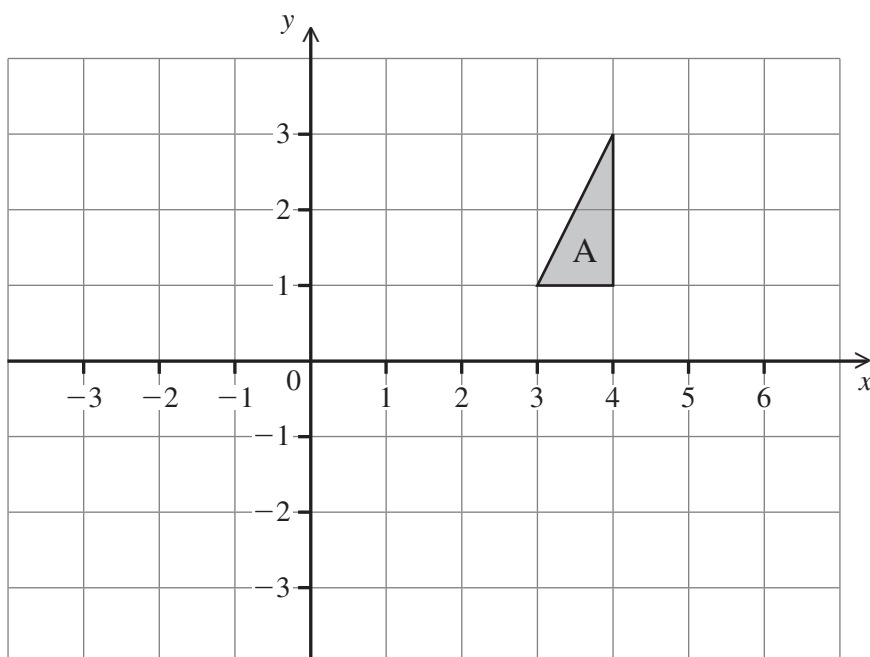
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## Question 6

- (a) Draw the image of the triangle A shown in the diagram below after the translation 6 left and 2 down. Label your triangle, B. [1]
- (b) Reflect triangle A in the line  $x = 2$ . Label your triangle, C. [2]
- (c) Draw the image of triangle A after a rotation of  $90^\circ$  clockwise about the point  $(3, 0)$ . Label your triangle, D. [2]



Examiner Only

Marks Remark



**Question 7**

(a) Rewrite  $12 - x = y + 5$  to make  $x$  the subject.

Answer  $x =$  \_\_\_\_\_ [2]

(b) Simplify

(i)  $p^5 \times p^2$

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

(ii)  $\frac{p^2}{p^8}$

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

(iii)  $\frac{p^4 \times p^6}{p^2}$

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

Examiner Only	
Marks	Remark



**Question 8**

A machine that makes glasses has developed a fault. Peter checks a sample of 100 glasses and finds 18 with scratches.  
The machine produces 4500 glasses each shift.  
How many glasses on each shift would you expect to have scratches?

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

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

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**Question 9**

Decide whether the following statements are true or false.  
In each case, give an example to support your answer.

- (a) Negative numbers have no reciprocals.

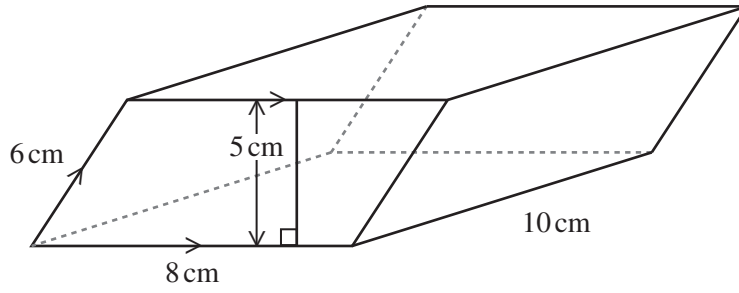
Answer \_\_\_\_\_ because \_\_\_\_\_ [1]

- (b) The product of a number with its own reciprocal is 1

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

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

## Question 10



Calculate the volume of this prism whose cross-section is a parallelogram.

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

Examiner Only	
Marks	Remark

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**Question 11**

- (a) A memory stick holds 128 000 000 bytes of data.  
A hard disk can store  $2.56 \times 10^{10}$  bytes of data.  
How many of these memory sticks are equivalent to this hard disk?

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

- (b) Given that  $(1.6 \times 10^a) \times (8 \times 10^b) = (c \times 10^4)$   
where all three values are in standard form, find

- (i) the value of  $c$

Answer  $c =$  \_\_\_\_\_ [1]

- (ii) one set of possible values for  $a$  and  $b$ .

Answer  $a =$  \_\_\_\_\_  $b =$  \_\_\_\_\_ [1]

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

**Question 12**

Roger and Rapha play two sets of tennis.

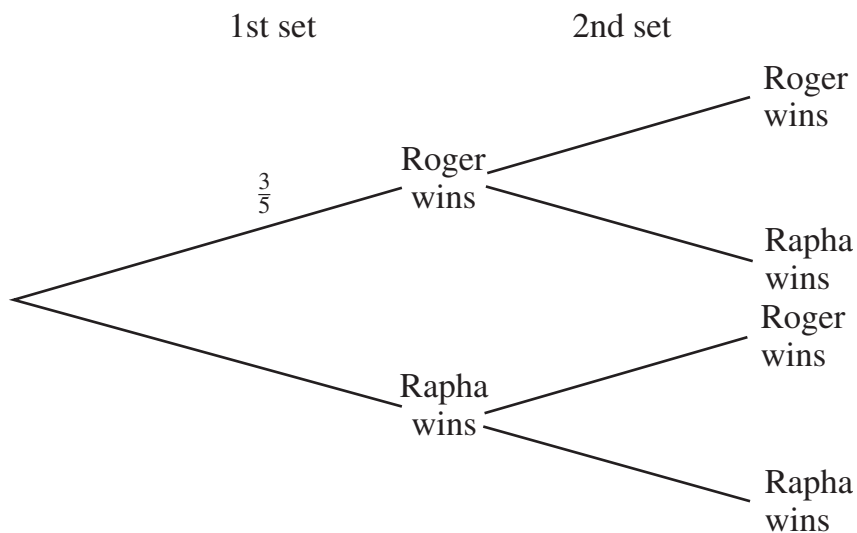
The probability that Roger wins the first set is  $\frac{3}{5}$

If Roger wins the first set, the probability of him winning the second set is  $\frac{2}{3}$

If he loses the first set, the probability of him winning the second set is  $\frac{1}{2}$

A draw is not possible.

- (a) Complete the probability tree diagram.



[2]

- (b) Calculate the probability that Rapha wins both sets.

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

Examiner Only

Marks	Remark





**Question 13**

A sector of a circle makes an angle of  $110^\circ$  at the centre of the circle.  
The radius of the circle is 6 cm.  
Show that the area of the sector is  $11\pi \text{ cm}^2$ .

[2]

Examiner Only	
Marks	Remark

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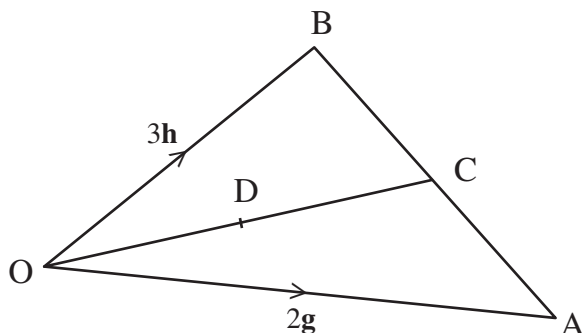
**[Turn over**

**Question 14**

In the triangle OAB shown, the side OA represents the vector  $2\mathbf{g}$  and the side OB represents the vector  $3\mathbf{h}$ .

C is the mid point of the side BA.

D is the mid point of the line OC.



Express the following in terms of  $\mathbf{g}$  and/or  $\mathbf{h}$ .

(a)  $\vec{BA}$

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

(b)  $\vec{OC}$

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

(c)  $\vec{DB}$

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

Examiner Only	
Marks	Remark



**Question 15**

- (a) Express  $0.3\dot{4}\dot{2}$  as a fraction.  
**Show your working.**

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

- (b) Express  $(\sqrt{3} - 4)^2$  in the form  $a + b\sqrt{3}$

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

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

**Question 16**

A man only wears black or white socks. In a drawer he has four socks.  
In the dark, he picks out one sock and then another.  
The probability of both socks being white is  $\frac{1}{2}$   
What is the probability of both socks being black?

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

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

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Examiner Only	
Marks	Remark

