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General Certificate of Secondary Education  
January 2011

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Candidate Number	
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## Mathematics

Module N6 Paper 1  
(Non-calculator)  
Higher Tier

[GMN61]

FRIDAY 14 JANUARY 2011

9.15 am – 10.30 am



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

### 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.

Answer **all fifteen** 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.

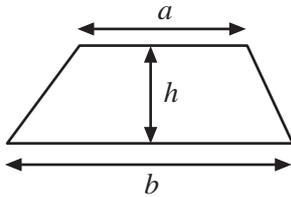
The Formula Sheet is on page 2.



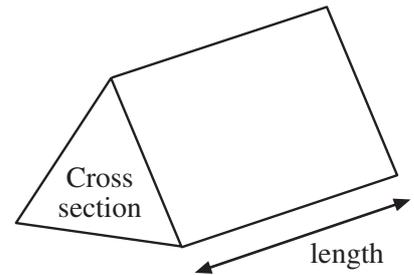
6510

# Formula Sheet

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



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

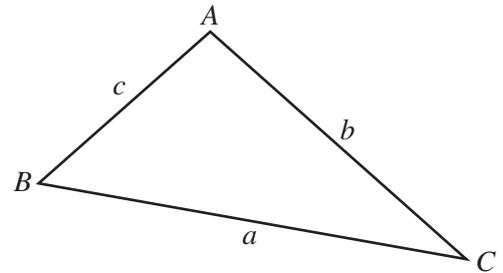


**In any triangle ABC**

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

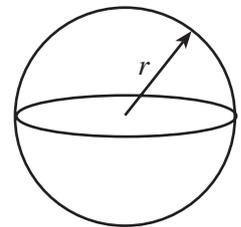
**Sine rule:**  $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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



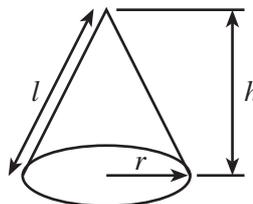
**Volume of sphere** =  $\frac{4}{3}\pi r^3$

**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

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











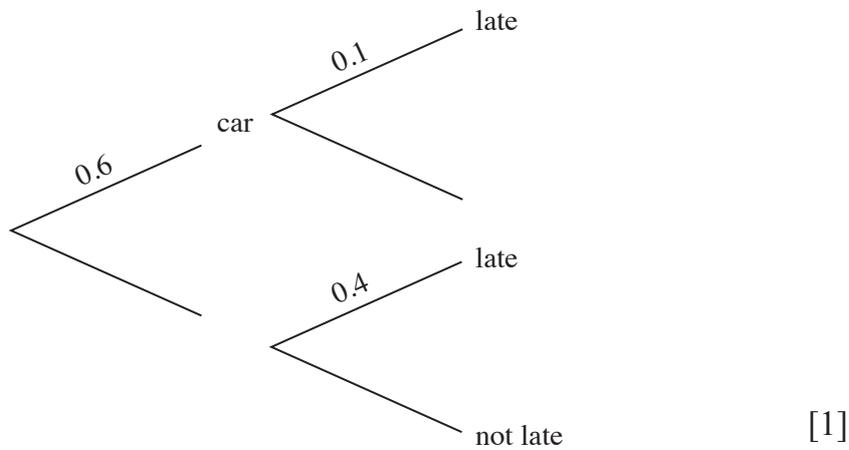




Examiner Only	
Marks	Remark

11 The probability that Peter goes to school by car on any school day is 0.6  
 If he goes by car then the probability that he is late is 0.1  
 If he doesn't go to school by car then the probability that he is late is 0.4

(a) Use this information to complete the tree diagram below.



(b) Calculate the probability that on any school day Peter will be late for school.

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

12 (a) Express  $\frac{1}{7}$  as a recurring decimal.

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

(b) Given that  $p = \sqrt{5}$  and  $q = \sqrt{20}$ ,

(i) find the value of  $p^2$ ,

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

(ii) show that  $(p + q)^2 = 45$ .

[2]

13 Rearrange  $tx + tc = c^2 - cx$  to make  $x$  the subject.

Examiner Only	
Marks	Remark

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

14 A bag contains 6 red, 3 green and 3 yellow beads. Two beads are selected at random from the bag without replacement. Calculate the probability that both beads are red.

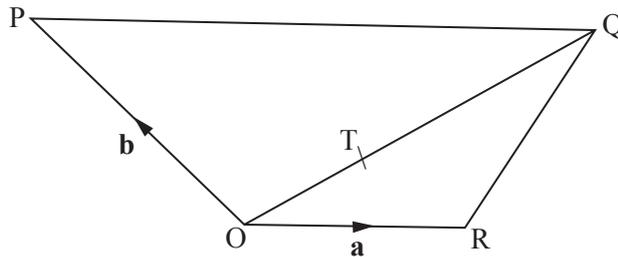
Answer \_\_\_\_\_ [3]

15 The diagram shows a quadrilateral OPQR.

$$\vec{OR} = \mathbf{a} \text{ and } \vec{OP} = \mathbf{b}$$

$$T \text{ is a point on } OQ \text{ such that } \vec{OT} = \frac{1}{3} \vec{OQ}$$

$$\vec{PQ} = 2\vec{OR}$$



What is the ratio  $PT : TR$ ?

**Show all your working.**

Answer  $PT : TR =$  \_\_\_\_\_ [4]

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