

Surname	Centre Number	Candidate Number
Other Names		0



**GCSE**

4351/02



S15-4351-02

**MATHEMATICS (UNITISED SCHEME)**

**UNIT 1: Mathematics in Everyday Life**

**HIGHER TIER**

A.M. THURSDAY, 21 May 2015

1 hour 15 minutes

**ADDITIONAL MATERIALS**

A calculator will be required for this paper.

A ruler, a protractor and a pair of compasses may be required.

**INSTRUCTIONS TO CANDIDATES**

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

Write your name, centre number and candidate number in the spaces at the top of this page.

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

If you run out of space, use the continuation page at the back of the booklet, taking care to number the question(s) correctly.

Take  $\pi$  as 3.14 or use the  $\pi$  button on your calculator.

**INFORMATION FOR CANDIDATES**

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question 1.

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	7	
2.	3	
3.	4	
4.	4	
5.	4	
6.	4	
7.	3	
8.	3	
9.	5	
10.	5	
11.	3	
12.	4	
13.	7	
14.	6	
15.	3	
<b>Total</b>	<b>65</b>	

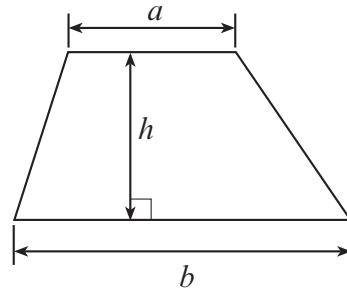
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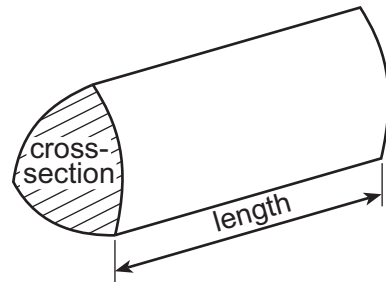
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### Formula List

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

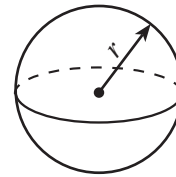


**Volume of prism** = area of cross-section  $\times$  length



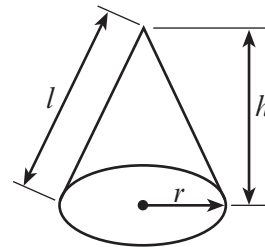
**Volume of sphere** =  $\frac{4}{3}\pi r^3$

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



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

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

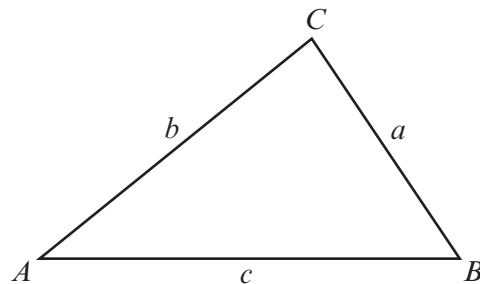


In any triangle  $ABC$

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

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

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



### The Quadratic Equation

The solutions of  $ax^2 + bx + c = 0$

where  $a \neq 0$  are given by

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



1. *You will be assessed on the quality of your written communication in this question.*

A shop offers a discount of 15% off all marked prices on the items it sells.  
It also allows its customers to pay for the items bought in 12 equal monthly instalments.  
Andrew buys a fridge-freezer which has a marked price of £720.

Calculate the amount he has to pay each month.  
Show all your working.

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2. Nerys wants to test the following hypothesis.

*'Dog owners are fitter than the average person.'*

She plans to:

- hand out a short questionnaire between 9 a.m. and 10 a.m., as people arrive at a local dog show,
- ask the following questions in the questionnaire,

(i) How fit are you?

(ii) How often do you walk your dog?  
 1–5 times     6–10 times     10 or more times

- collect the completed questionnaires between 4 p.m. and 5 p.m., as people are leaving the dog show.

Write down **three** unfavourable comments about this plan.

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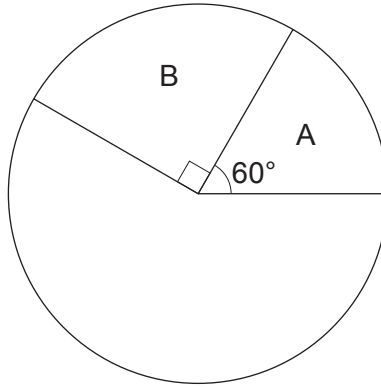
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3. A number of people were asked to choose which of four brands of ice cream they liked the most. The brands were labelled A, B, C and D respectively.

Dimitar has begun to show the results using a pie chart.



He knows that:

- 10 people chose brand A,
- 30 people chose brand C.

Calculate how many people chose brand D.

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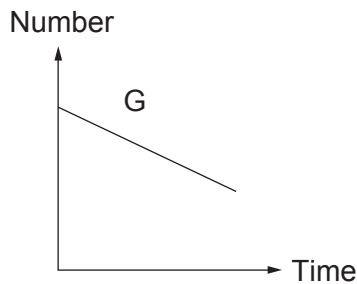
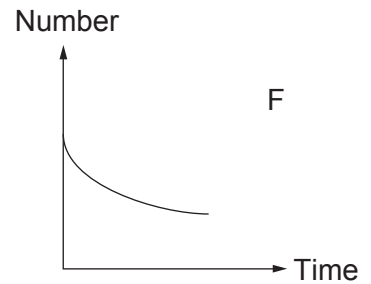
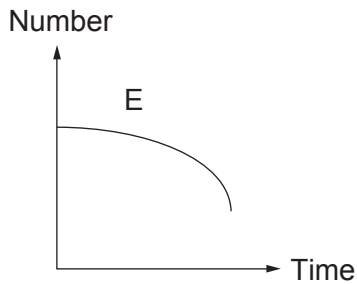
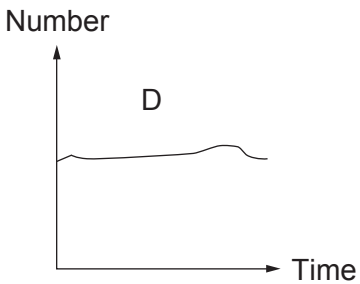
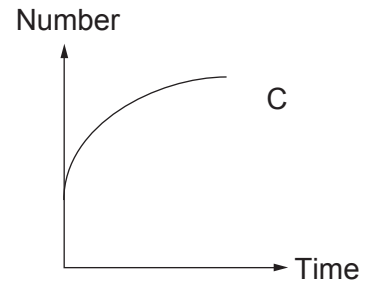
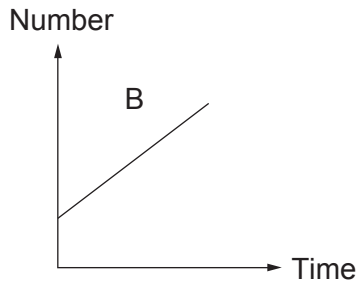
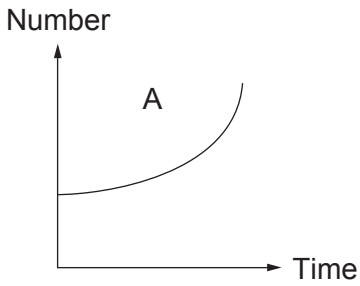








7.



Choosing from the graphs A to G, decide which graph matches each of the following newspaper headlines. [3]

'The increase in the number of top grades has been constant.'

Graph .....

'New opening hours have made little difference to the number of visitors.'

Graph .....

'Rate of decrease in the number of road accidents is slowing down.'

Graph .....



8. A survey was carried out on the age profile of people who attended a food fair. A summary of the results is shown below.

Age	Under 18	18 to 25	26 to 40	41 to 60	61 and over
Number of people	120	162	205	341	148

- (a) Using the table, explain fully how it is possible that there could have been more people under the age of 20 than over the age of 50 attending the food fair. [2]

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- (b) From the numbers shown in the table, write down the smallest possible range in the ages of those attending the food fair. [1]

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9. Helen makes greetings cards which she sells at a weekly market.  
Her weekly profit (**P**), in pounds, is given by the formula

$$P = 2.99S - 0.7M$$

where **S** is the number of cards she sells and **M** is the number of cards she made.

- (a) One week she sold 60 cards but made a loss of £30.60.  
How many cards had she made?

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- (b) What was the minimum number of cards she needed to sell that week in order to make a profit?

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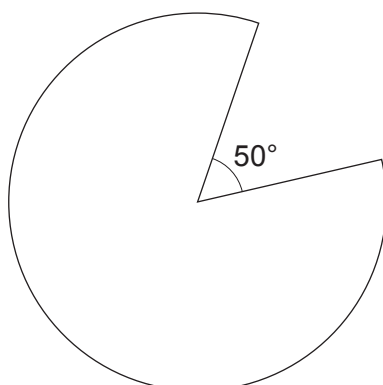








13. A sector is removed from a circle of radius 12 cm, as shown below.



*Diagram not drawn to scale*

- (a) Calculate the area of the **remaining** shape.

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- (b) What is the perimeter of the **sector that has been removed**?

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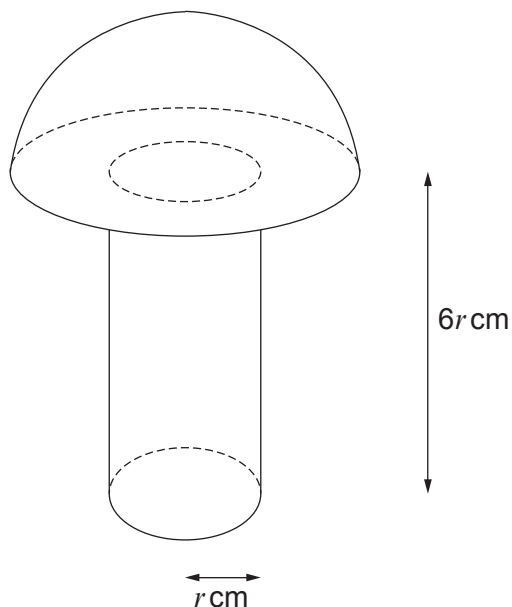
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14. A part of an engine is made up of a hemisphere attached to a cylinder of radius  $r$  cm, as shown below.



*Diagram not drawn to scale*

The height of the cylinder is  $6r$  cm.

The radius of the hemisphere is two times the radius of the cylinder.

The volume of the whole part is  $3244.48 \text{ cm}^3$ .

Calculate the total height of the whole engine part.

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