

Surname	Centre Number	Candidate Number
Other Names		0



**GCSE**

4351/02

**MATHEMATICS (UNITISED SCHEME)**  
**UNIT 1: Mathematics in Everyday Life**  
**HIGHER TIER**

A.M. FRIDAY, 11 January 2013

$1\frac{1}{4}$  hours

**ADDITIONAL MATERIALS**

A calculator will be required for this paper.

**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 6.

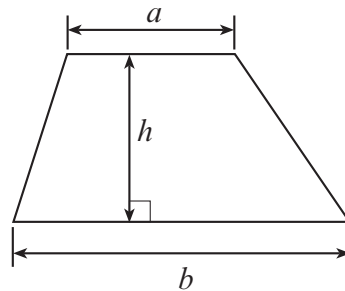
For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	2	
2	6	
3	3	
4	6	
5	5	
6	9	
7	5	
8	4	
9	5	
10	3	
11	5	
12	5	
13	7	
<b>TOTAL MARK</b>		

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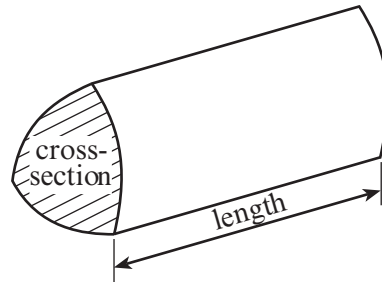


### Formula List

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

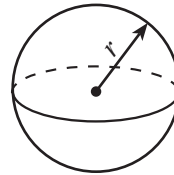


Volume of prism = area of cross-section  $\times$  length



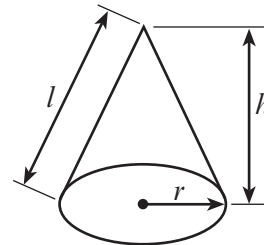
Volume of sphere =  $\frac{4}{3}\pi r^3$

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



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

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

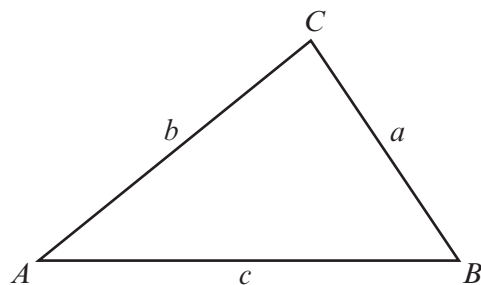


In any triangle  $ABC$

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. A scientist has found that under certain conditions the force ( $F$ ) acting on a moving particle is given by the following formula,

$$F = 100t - t^2$$

where  $t$  is the time measured in seconds from the time the particle started to move.

Calculate the value of the force after 1 minute 40 seconds.

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[2]



2. Pedro has kept a record of the total number of goals he scored in each of the twenty seasons that he played professional football. The table below shows this information.

Goals scored	Number of seasons
4	3
6	8
7	2
11	6
22	1

- (a) Calculate the mean number of goals scored by Pedro per season.

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[3]

- (b) Two football magazines, *Kick* and *Penalty!*, print the scoring records of players.

- (i) Complete each of the following tables that give Pedro's scoring record.

*Kick*

Goals scored	1 - 5	6 - 10	11 - 15	16 - 20	21 - 25	26 - 30
Number of seasons						

*Penalty!*

Goals scored	1 - 10	11 - 20	21 - 30
Number of seasons			

[2]

- (ii) Which magazine's table do you consider to be most useful?  
You **must** give a reason for your choice.

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[1]



3. Denise wants to test the following hypothesis.

*'New cars use less fuel than old cars.'*

She plans to

- send a short questionnaire to every house in her street,
- ask the following two questions,
  - (i) Do you have a car?
  - (ii) How much fuel does it use?

Write down three unfavourable comments about this plan.

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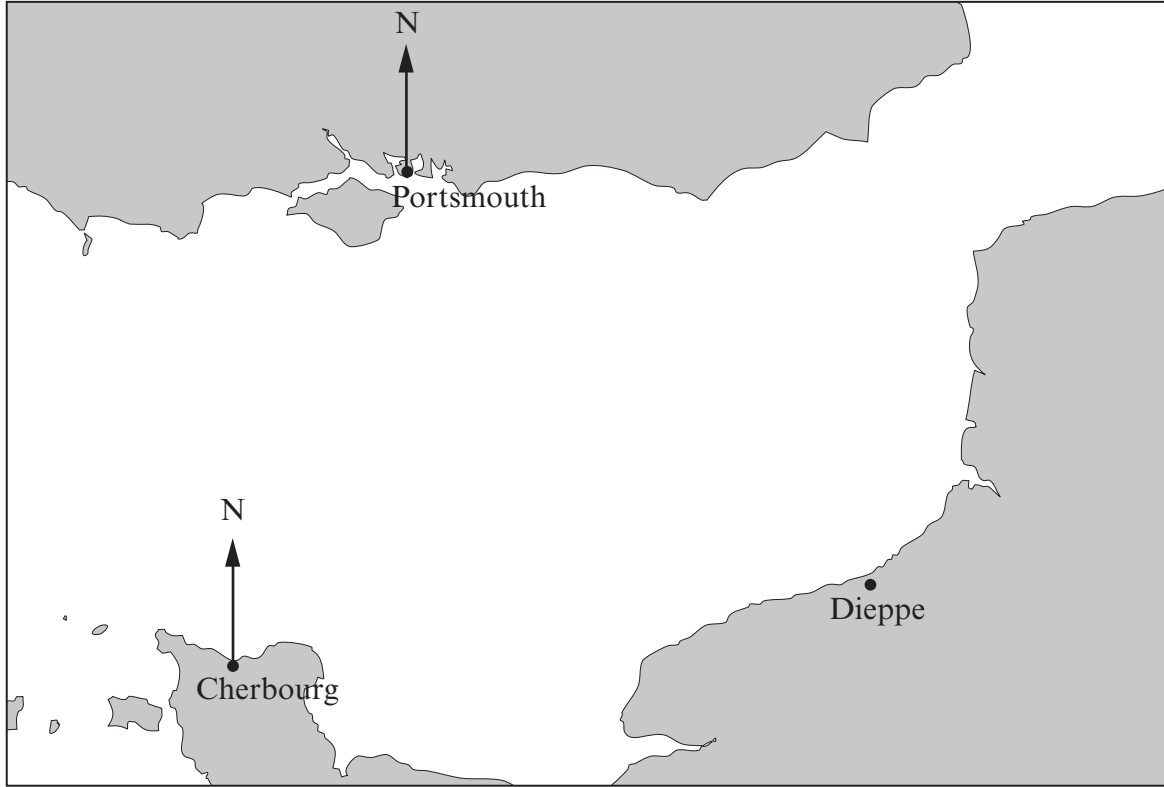
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4. The map shows a scale diagram of part of the English Channel.

Scale : 1 cm represents 20 km



- (a) A ship is on a bearing of  $058^\circ$  from Cherbourg and on a bearing of  $135^\circ$  from Portsmouth. By drawing suitable lines on the diagram above, find and mark the position of the ship. [3]
- (b) At this position, a motor boat is lowered from the ship into the sea. The motor boat, travelling in a straight line, arrives at Dieppe 4 hours later. Calculate the average speed of the motor boat in kilometres per hour.

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[3]



5. Jack has returned to the UK having been working in Europe.  
 He has 450 euros, which he wants to exchange into pounds.  
 The exchange rate he is offered at the bank for changing euros into pounds is £1 = 1.20 euros.

His sister Gillian is about to go on holiday to France and intends to exchange £400 into euros.  
 The exchange rate she is offered at the bank for changing pounds into euros is £1 = 1.08 euros.

Rather than going to the bank,

- Jack gives Gillian his 450 euros,
- Gillian gives Jack her £400.

Show how both Jack and Gillian save money by doing this.

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- 7. Carol’s telephone answering machine has not been set to the correct time. She returns home on a Saturday after being away since the previous Monday. The following new message is on the answering machine.

“It’s me, Bryn, please call me”,  
followed by,  
“This person called on Wednesday at 6:24 a.m.”

In order to check when the call was actually made, Carol phoned her house number using her mobile phone. She did not answer the house phone but left a message. When the answering machine was now played it gave the following message.

“Hello myself, it is now Saturday and the time is 5:40 p.m.”,  
followed by,  
“This person called on Thursday at 10:30 a.m.”

Showing your strategy, work out what the actual day and time were when Bryn phoned.

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8. The financial press has just published the following headline.

PURKOZI Ltd.  
Annual profit £4,760,000  
Down 13% from last year

What was the profit made by this company last year?  
Give your answer to the nearest ten thousand pounds.

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10. A printer takes 12 hours to complete a job printing 54 000 advertising leaflets using his old print machine.  
How long will he take to print another 72 000 similar leaflets using a new machine that works twice as quickly as his old machine?

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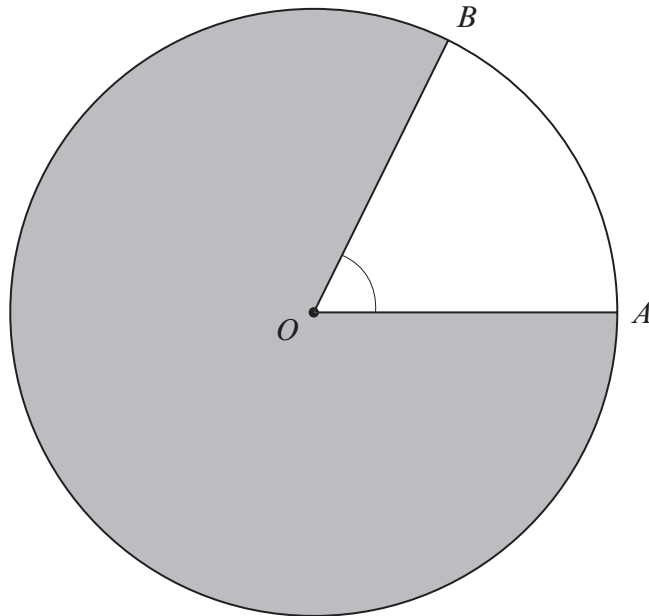
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11.



*Diagram not drawn to scale*

The points  $A$  and  $B$  lie on a circle with centre  $O$ .

The radius of the circle is 15 cm and  $\widehat{AOB} = 80^\circ$ .

(a) Calculate the length of the minor arc  $AB$ .

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(b) Calculate the area of the shaded sector of the circle.

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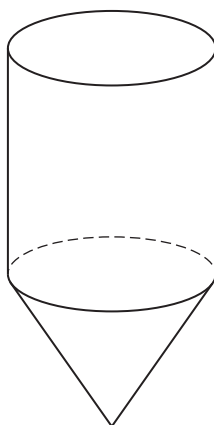
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13. A hollow water container is shown below.



*Diagram not drawn to scale*

The radius of the circle formed at the join between the cone and the cylinder is 12 cm.  
The height of the cylinder is five times the height of the cone.

When full, the container holds 20 litres of water.

Calculate the total height of the container.

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**END OF PAPER**



