| Surname |
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| Other Names |

Candidate Number

0

## GCSE

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.

| For Examiner's use only |  |  |
| :---: | :---: | :---: |
| Question | Maximum <br> Mark | Mark <br> Awarded |
| 1. | 7 |  |
| 2. | 3 |  |
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| 11. | 3 |  |
| 12. | 4 |  |
| 13. | 7 |  |
| 14. | 6 |  |
| 15. | 3 |  |
| Total | 65 |  |

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

## 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 $A B C$
Sine rule $\frac{a}{\sin A}=\frac{b}{\sin B}=\frac{c}{\sin C}$
Cosine rule $a^{2}=b^{2}+c^{2}-2 b c \cos A$
Area of triangle $=\frac{1}{2} a b \sin C$


## The Quadratic Equation

The solutions of $a x^{2}+b x+c=0$
where $a \neq 0$ are given by

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

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,

- 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.
1.
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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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4. The dimensions of a playing field $A B C D E F$ are shown on the diagram below.

$A B C F$ is a rectangle and sides $A B$ and $E D$ are parallel.
Calculate the area of the playing field.
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5. Elfed invests $£ 3500$ for 2 years at $1 \cdot 5 \%$ per annum compound interest. Calculate the value of his investment at the end of the 2 years. Give your answer correct to the nearest penny.
6. Sofia had planned to exchange $£ 300$ for euros during a visit to the local town one Saturday. She had checked the exchange rate for that day, and found it to be $£ 1=1.20$ euros.

Unfortunately, she had to cancel her visit to town that day, and it was not until the following Saturday that she was able to exchange her $£ 300$ for euros.
By this date the exchange rate was $£ 1=1.17$ euros.
How many fewer euros did she receive due to this delay?
What percentage loss was caused by this delay?

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Choosing from the graphs A to G, decide which graph matches each of the following newspaper headlines.
'The increase in the number of top grades has been constant.'

Graph $\qquad$
'New opening hours have made little difference to the number of visitors.'

Graph $\qquad$
'Rate of decrease in the number of road accidents is slowing down.'

Graph $\qquad$
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 <br> 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.
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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.
9. Helen makes greetings cards which she sells at a weekly market. Her weekly profit ( P ), in pounds, is given by the formula

$$
P=2.99 S-0.7 M
$$

where $\boldsymbol{S}$ is the number of cards she sells and $\boldsymbol{M}$ 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?
(b) What was the minimum number of cards she needed to sell that week in order to make a profit?
10. Identical wooden sheds are displayed side by side along a straight wall in a builder's yard. The sheds are 270 cm wide, measured correct to the nearest 10 cm . The wall is 36 m long, measured correct to the nearest metre.

Show that it is not always possible to fit 13 of these sheds along the wall.
$\qquad$
11. Aafreen is studying a scale drawing that shows a road $A B$ and a tower $B C$.


## Drawn to scale

Aafreen knows that the actual length of the road $A B$ is 44 yards.
He also knows that the actual height of the tower $B C$ is 24 metres.
Using these facts, and the scale drawing, convert 1 metre into yards.
12. A fruit grower knows that it usually takes 20 workers 8 hours to pick 420 kg of strawberries. She needs to pick 360 kg of strawberries in 5 hours.

What is the minimum number of workers she should employ? You may assume that all workers pick strawberries at the same rate.
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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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14. A part of an engine is made up of a hemisphere attached to a cylinder of radius $r \mathrm{~cm}$, as shown below.


Diagram not drawn to scale

The height of the cylinder is $6 r \mathrm{~cm}$.
The radius of the hemisphere is two times the radius of the cylinder.
The volume of the whole part is $3244.48 \mathrm{~cm}^{3}$.
Calculate the total height of the whole engine part.
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TURN OVER
15. Diego makes the following statement.
'If you drive any distance at a constant speed, it would take the same amount of time to complete the journey as if you travelled half of that distance at twice that speed and the other half at half that speed.'

Show that this is incorrect.

END OF PAPER

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| Question number | Additional page, if required. Write the question number(s) in the left-hand margin. | $\begin{aligned} & \text { Examiner } \\ & \text { only } \end{aligned}$ |
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