Friday 7 November 2014 – Morning
GCSE MATHEMATICS A
A503/01 Unit C (Foundation Tier)

INSTRUCTIONS TO CANDIDATES

• Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
• Use black ink. HB pencil may be used for graphs and diagrams only.
• Answer all the questions.
• Read each question carefully. Make sure you know what you have to do before starting your answer.
• Your answers should be supported with appropriate working. Marks may be given for a correct method even if the answer is incorrect.
• Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
• Do not write in the bar codes.

INFORMATION FOR CANDIDATES

• The number of marks is given in brackets [ ] at the end of each question or part question.
• Your quality of written communication is assessed in questions marked with an asterisk (*).
• Use the π button on your calculator or take π to be 3.142 unless the question says otherwise.
• The total number of marks for this paper is 100.
• This document consists of 20 pages. Any blank pages are indicated.

Candidates answer on the Question Paper.

OCR supplied materials:
None

Other materials required:
• Scientific or graphical calculator
• Geometrical instruments
• Tracing paper (optional)

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Formulae Sheet: Foundation Tier

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

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

PLEASE DO NOT WRITE ON THIS PAGE
1 (a) Calculate.

(i) £5.60 ÷ 7

(a)(i) £ .......................................................... [1]

(ii) $2.5^3$

(ii) ............................................................ [1]

(iii) $\sqrt{4.41} + 7$

(iii) ............................................................ [1]

(b) Round 2.95 correct to 1 decimal place.

(b) ............................................................ [1]

2 A bag contains only 8 red balloons and 2 blue balloons. Witold chooses a balloon at random from the bag.

Use arrows to mark the probability of each of these events on the probability line below.

• Witold chooses a red balloon.
  Label the arrow A.

• Witold chooses a green balloon.
  Label the arrow B.
3 (a) (i) Convert 1.35 kg to grams.

(a)(i) ...................................................... g [1]

(ii) Convert 40 cm to metres.

(ii) ........................................................ m [1]

(b) A bottle contains 0.2 litres of medicine.

How many 5 ml spoons can be filled from the bottle?

(b) ........................................................ [2]
Choose from the cards above to complete the following problems. Each card may be used once, more than once or not at all.

(a) \[ \square + \square = -1 \] [1]

(b) \[ \square \times \square = -45 \] [1]

(c) \[ -8 - \square = -3 \] [1]

(d) In this part you cannot use any of the cards more than once.

\[ \frac{15}{\square} + \square = \square \] [2]
5  Shape A and shape B have been drawn on the one-centimetre grid.

(a) (i) Find the area of shape A.  
Give the units of your answer.  

(a)(i) ........................................................... [2]

(ii) Measure the perimeter of shape A.  

(ii) ...................................................... cm [1]

(b) Shape B is an enlargement of shape A.  
What is the scale factor of this enlargement?  

(b) ........................................................... [1]

(c) Tick the statements that are true.  

<table>
<thead>
<tr>
<th>Statement</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The perimeter of shape A is the same as the perimeter of shape B.</td>
<td></td>
</tr>
<tr>
<td>Each angle of shape A is twice the size of each angle in shape B.</td>
<td></td>
</tr>
<tr>
<td>The area of shape A is twice the area of shape B.</td>
<td></td>
</tr>
<tr>
<td>The area of shape B is four times the area of shape A.</td>
<td></td>
</tr>
<tr>
<td>The perimeter of shape B is twice the perimeter of shape A.</td>
<td></td>
</tr>
</tbody>
</table>

[2]
Mark competes in a cycling race. The graph shows his speed in kilometres per hour during the race.

(a) What was the fastest speed that Mark achieved during the race?

(a) .................................................. km/h [1]

(b) For how long did Mark cycle at this fastest speed?

(b) ..................................................minutes [1]

(c) What could have happened at 11:10?

.............................................................................................................................................. [1]
7 (a) Use an appropriate metric unit to complete each sentence.

The height of a lamp post is 5.2 ......................................... .
The weight of an apple is 120 ......................................... .
The distance from Leeds to Liverpool is 104  ......................................... .
A petrol tank holds 50 ......................................... .

(b) A ladder has 12 steps spaced 20 cm apart.
Each step has a thickness of 1 cm.
The first and last steps are positioned 15 cm from the ends of the ladder.

[Diagram of a ladder with steps indicated, 20 cm spacing, 1 cm thickness, and 15 cm offset from ends, labeled Not to scale.]

Calculate the total length of the ladder.
Give your answer in centimetres.

(b) ...................................................... cm [4]
8 (a) Simplify.

(i) \( 5x + x \)

(ii) \( a \times a \)

(iii) \( \frac{12p}{6} \)

(iv) \( 7x + 3y - 2x \)

(a)(i) ........................................................... [1]

(ii) ........................................................... [1]

(iii) ........................................................... [1]

(iv) ........................................................... [1]

(b) Work out the value of \( 2x^3 \) when \( x = 3 \).

(b) ........................................................... [1]
Emma has a pack of 20 ice lollies in her freezer. There are:

- 5 orange ice lollies
- 3 strawberry ice lollies
- 10 blackcurrant ice lollies
- 2 lime ice lollies.

(a) Emma chooses an ice lolly at random from the pack.

Choose from the words below to complete each sentence.

<table>
<thead>
<tr>
<th>likely</th>
<th>impossible</th>
<th>certain</th>
<th>evens</th>
<th>unlikely</th>
</tr>
</thead>
</table>

It is ....................................... that she chooses a blackcurrant ice lolly.

It is ....................................... that she chooses a lime ice lolly.

It is ....................................... that she does not choose an orange ice lolly.

It is ....................................... that she chooses a cola ice lolly. [4]

(b) One week later there are just 10 ice lollies left. Emma now chooses one of these at random.

- It is evens that she chooses an orange ice lolly.
- It is more likely that she chooses a strawberry ice lolly than a blackcurrant ice lolly.

Write down a possible number for each of the flavours of these 10 ice lollies.

(b) Orange ..............................................................

Strawberry ..............................................................

Blackcurrant ..........................................................

Lime ................................................................. [3]
Here is part of a bus timetable.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Burnsden</td>
<td>06:50</td>
<td>08:35</td>
<td>14:20</td>
</tr>
<tr>
<td>Callissay</td>
<td>07:12</td>
<td>08:57</td>
<td>14:42</td>
</tr>
<tr>
<td>North Easden</td>
<td>07:30</td>
<td>09:15</td>
<td>15:00</td>
</tr>
<tr>
<td>South Easden</td>
<td>07:37</td>
<td>09:22</td>
<td>15:07</td>
</tr>
<tr>
<td>Plumbley</td>
<td>07:50</td>
<td>09:35</td>
<td>15:20</td>
</tr>
<tr>
<td>Rivenside Centre</td>
<td>08:05</td>
<td>09:50</td>
<td>15:35</td>
</tr>
</tbody>
</table>

(a) Tim catches the 14:20 bus in Burnsden.

What time should the bus arrive at South Easden?

(a) ........................................................... [1]

(b) Alice gets to the bus stop in North Easden at 8:57 am.
She catches the next bus to Plumbley.

(i) How many minutes does she wait?

(b)(i) .................................................. minutes [1]

(ii) How long should this bus take to get to Plumbley?

(ii) .................................................. minutes [1]

(c) Helen takes 15 minutes to walk to the bus stop at Burnsden from her house.
She catches the 06:50 bus to Rivenside Centre.

How long is her total journey time from home to Rivenside Centre?

(c) ........................................................... [2]
11 A hotel has 360 bedrooms. 
One quarter of these bedrooms are single rooms. 
The remainder are double rooms.

<table>
<thead>
<tr>
<th>Type of room</th>
<th>Cost of room for one night</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single bedroom</td>
<td>£75.00</td>
</tr>
<tr>
<td>Double bedroom</td>
<td>£110.00</td>
</tr>
</tbody>
</table>

Calculate the total amount of money that the hotel receives in one night if all the single and double bedrooms are taken.

£ ........................................................... [5]

12 Write a number in each box to make each statement true.

(a) \( \frac{1}{3} \times \frac{\text{□}}{\text{□}} = \frac{1}{15} \) [1]

(b) \( \frac{3}{4} \div \frac{\text{□}}{8} = \frac{3}{8} \) [1]
13 (a) Solve.

(i) $x - 16 = 23$

(ii) $7x = 24.5$

(iii) $\frac{x}{4} = 12$

(b) Write one number or letter in each box to make these statements true.

(i) $2(\square + 3) = 2x + \square$

(ii) $9x - 15 = \square(3x - \square)$
Matthew is buying baked beans. The shop has three offers.

Pack of 6 for £2.90
Pack of 4 for £1.80
One tin for 65p

The tins are identical.
Which offer represents the best value for money?

(a) ...................................................................... [3]

(b) Give one possible reason why Matthew might not buy the best value offer.
................................................................................................................................................................................. [1]
15 (a)* Alan is making a concrete base for a hot tub. The concrete base is a cuboid of length 3 m, width 3 m and depth 18 cm. The cost of the concrete is £158 for each cubic metre. There is also a delivery charge of £36.

Calculate the total cost of the concrete, including delivery.

(a) £ ........................................................... [5]

(b) The hot tub costs £4500 plus VAT at 20%.

(i) Work out 20% of £4500.

(b)(i) £ ........................................................... [1]

(ii) Work out the cost of the hot tub including VAT.

(ii) £ ........................................................... [1]

(c) It costs £1.35 per day for electricity to heat the water in the hot tub. It also costs £12.50 per month for chemicals to treat the water in the hot tub.

Calculate the total cost of running the hot tub for one year (365 days).

(c) £ ........................................................... [3]
200 students from Years 10 and 11 in a school were asked whether they preferred Maths lessons or Science lessons.

The table below summarises how they responded.

<table>
<thead>
<tr>
<th></th>
<th>Year 10</th>
<th>Year 11</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maths</td>
<td>73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Science</td>
<td></td>
<td>81</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>110</td>
<td></td>
<td>200</td>
</tr>
</tbody>
</table>

(a) Complete the table. [3]

(b) One of the 200 students is chosen at random.

What is the probability that this student is from Year 10?

(b) ............................................................ [2]

(c) One of these 200 students is chosen at random.

What is the probability that this student is from Year 11 and prefers Maths lessons?

(c) ........................................................... [1]
17 (a) Ravi has a 500 g bag of sugar. He uses 150 g of the sugar to make a cake.

What fraction of the bag of sugar does he use? Give your answer as a fraction in its simplest form.

(a) ........................................................... [2]

(b) Elaine is making bread. She uses 3 pounds of flour.

Roughly how many kilograms of flour is this?

(b) ........................................................... kg [2]

18 A fence in Phil’s garden is a rectangle 15 m long and 1.8 m high. He is going to paint both sides of the fence. One tin of paint covers 10 m$^2$.

What is the smallest number of tins of paint that Phil needs to buy?

........................................................... [3]
One solution of the equation \( x^3 - 4x = 25 \) lies between 3 and 4.

Use trial and improvement to find this solution correct to 1 decimal place. Show all your trials and their outcomes.

........................................................... [4]
There are only red counters, white counters and blue counters in a box. The table shows the probability of choosing a red counter or a white counter at random from the box.

<table>
<thead>
<tr>
<th>Colour</th>
<th>Red</th>
<th>White</th>
<th>Blue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probability</td>
<td>0.15</td>
<td>0.7</td>
<td></td>
</tr>
</tbody>
</table>

(a) Complete the table to show the probability of choosing a blue counter. 

(b) Work out the probability that a counter, chosen at random from the box, is either red or white.

(b) ........................................................... [2]

(c) Write two different facts about the number of counters of each colour that are in the box.

1. .................................................................................................................................................
   ..................................................................................................................................................

2. .................................................................................................................................................
   ..................................................................................................................................................

[2]

END OF QUESTION PAPER