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**Tuesday 17 June 2014 – Morning**

**GCSE METHODS IN MATHEMATICS**

**B391/01 Methods in Mathematics 1 (Foundation Tier)**



Candidates answer on the Question Paper.

**OCR supplied materials:**

None

**Other materials required:**

- Geometrical instruments
- Tracing paper (optional)

**Duration: 1 hour**



Candidate forename						Candidate surname					
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Centre number						Candidate number				
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**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.

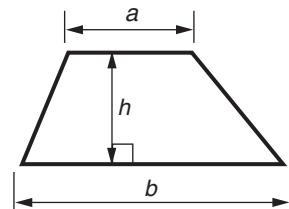
**INFORMATION FOR CANDIDATES**

- 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 (\*).
- The total number of marks for this paper is **60**.
- This document consists of **16** pages. Any blank pages are indicated.

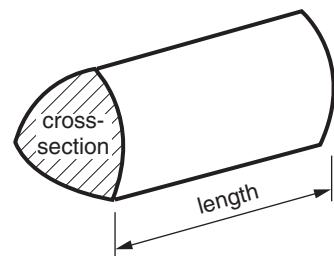


## Formulae Sheet: Foundation Tier

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



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



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Answer **all** the questions.

1 Work out.

(a)  $747 - 253$

(a) \_\_\_\_\_ [1]

(b)  $162 \div 6$

(b) \_\_\_\_\_ [1]

2 Three teachers are discussing how long they have been teaching.

Mrs Cox says that she has been teaching for 4 years. This is only half the time that Mrs Archer has been teaching.

Mrs Archer and Mr Bing have been teaching for a total of 15 years between them.

How long have Mrs Archer and Mr Bing each been teaching?

Mrs Archer \_\_\_\_\_ years

Mr Bing \_\_\_\_\_ years [2]

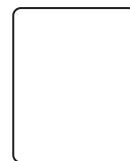
3 Lily has four number cards on her desk.



She has placed them in a line to make the largest possible number.

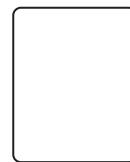
(a) Show how she can arrange the cards to make

(i) the smallest possible number,



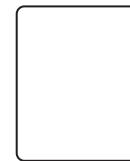
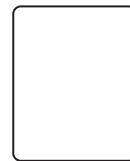
[1]

(ii) the largest odd number,



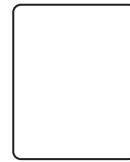
[1]

(iii) the largest multiple of 5.



[1]

(b) Use two of the cards to make a square number.



[1]

(c) Which card shows a factor of both 9 and 12?

[1]

(d) Arrange two of the cards to make a fraction which is equivalent to  $\frac{1}{2}$ .

[1]

(e) Arrange Lily's four cards in the subtraction sum below to find the **smallest** possible positive answer. Fill in your answer.

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\_\_\_\_\_

[3]

4 Paula knows that the distance of a marathon is 26 miles 385 yards. She works out that this is 26.21875 miles.

(a) Write

(i) 26.21875 correct to the nearest whole number,

(a)(i) \_\_\_\_\_ [1]

(ii) 26.21875 correct to 2 decimal places.

(ii) \_\_\_\_\_ [1]

(b) Wilson says that the distance of a marathon is 138 435 feet.

(i) How many feet does the digit 8 represent in this number?

(b)(i) \_\_\_\_\_ feet [1]

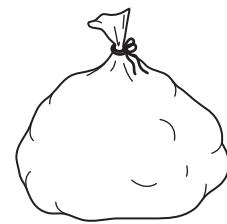
(ii) To convert miles into feet, you multiply by 5280.

Round each of the numbers in this calculation correct to 1 significant figure and show that Wilson is about right.

$26.21875 \times 5280$

[3]

5 Malachi has some marbles in a bag.  
He has 1 red, 2 yellow, 3 blue and 6 green marbles in the bag.



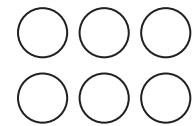
1 red



2 yellow



3 blue



6 green

Malachi picks a marble from the bag at random.

(a) Which colour marble is least likely to be picked?

(a) \_\_\_\_\_ [1]

(b) Which colour marble has an evens chance of being picked?

(b) \_\_\_\_\_ [1]

(c) What is the probability that a yellow marble is picked?

(c) \_\_\_\_\_ [1]

(d) Malachi replaces the marble and gives the bag of marbles to Ruth.  
Ruth removes **two** marbles from the bag. After this:

- the probability of picking a green marble from the bag stays the same
- two colours have an equal probability of being picked.

How many marbles of each colour could be in the bag now?

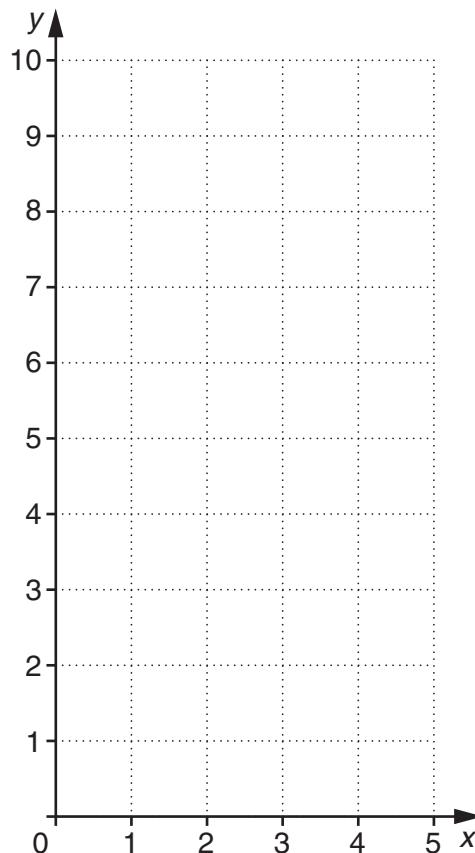
\_\_\_\_\_ red, \_\_\_\_\_ yellow, \_\_\_\_\_ blue, \_\_\_\_\_ green.

[3]

6 Here is a table of values for  $y = 2x + 1$  for  $x$  from 0 to 4.

$x$	0	1	2	3	4
$y$	1	3	5	7	9

(a) Plot the points on the grid and draw the line  $y = 2x + 1$ .

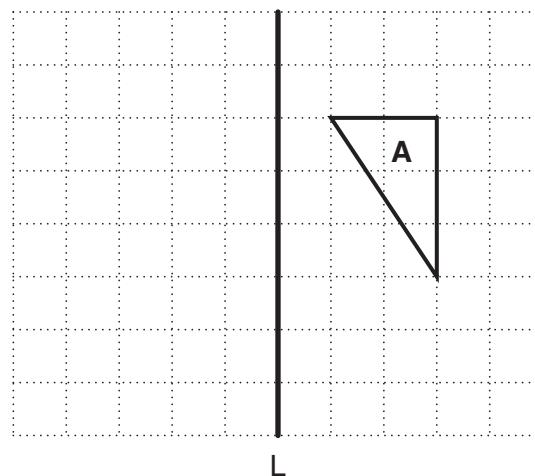


[2]

(b) (i) Draw the straight line which passes through  $(0, 3)$  and is **parallel** to the line  $y = 2x + 1$ .  
 (ii) Draw the straight line which passes through  $(2, 5)$  and is **perpendicular** to the line  $y = 2x + 1$ .

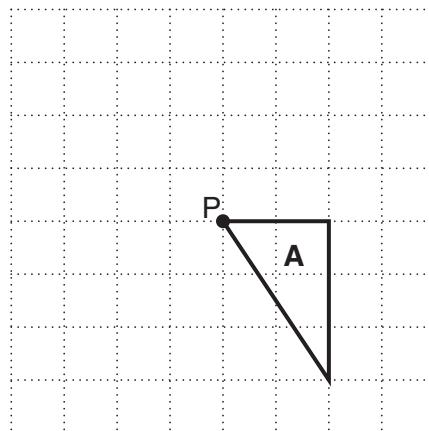
[3]

7 (a) Reflect triangle A in the line L.



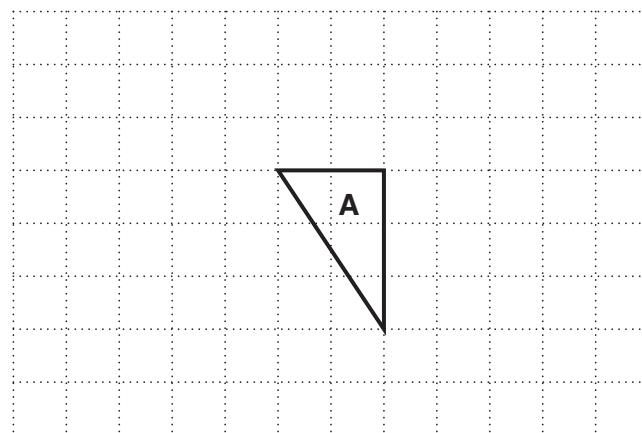
[2]

(b) Rotate triangle A  $90^\circ$  anticlockwise about point P.



[2]

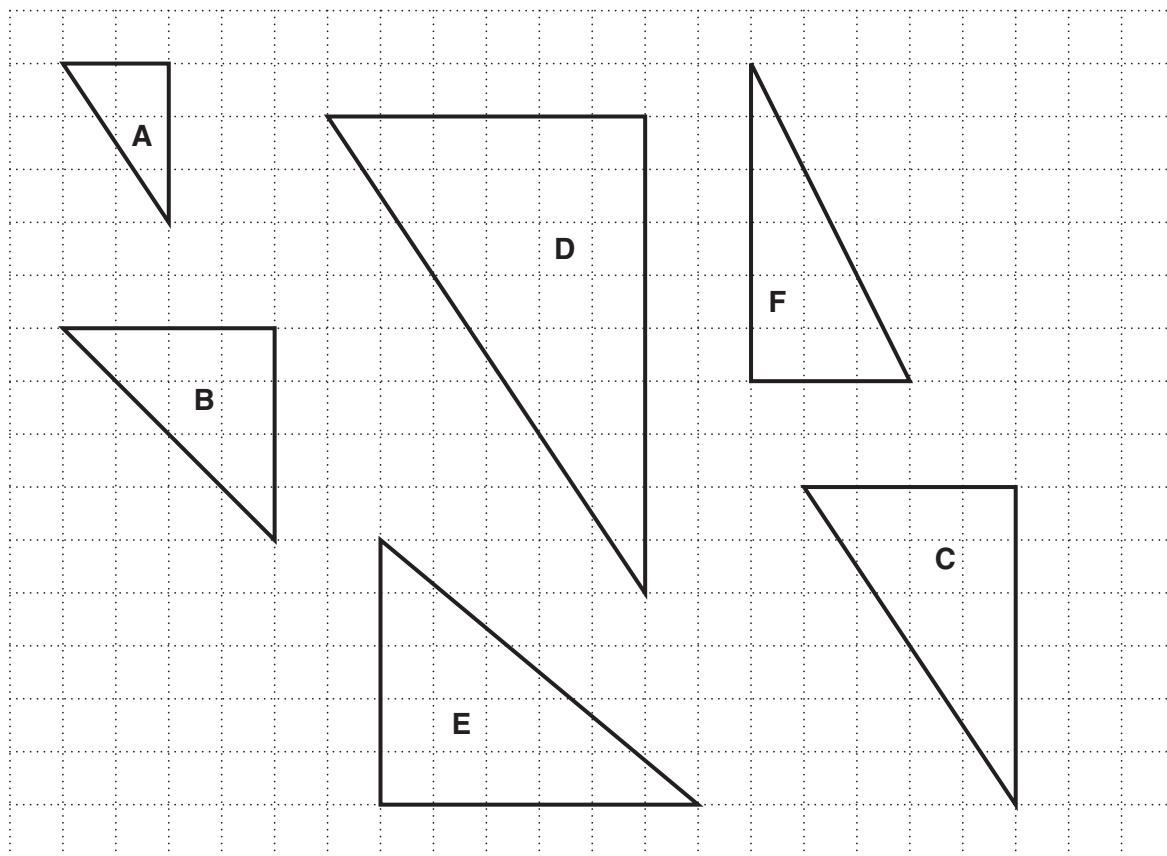
(c) Translate triangle A using the vector  $\begin{pmatrix} 3 \\ -1 \end{pmatrix}$ .



[2]

10

(d) Here are some more triangles.



(i) Which of the triangles on the grid are enlargements of triangle A?

(d)(i) \_\_\_\_\_ [2]

(ii) What is the scale factor of one of these enlargements?

(ii) \_\_\_\_\_ [1]

(e) Give **two** types of transformation in which a shape and its image are congruent.

(e) \_\_\_\_\_ and \_\_\_\_\_ [2]

8 (a) Work out  $\frac{3}{4} \times \frac{1}{9}$ . Give your answer in its simplest form.

(a) \_\_\_\_\_ [2]

**(b)** Write the following decimals as fractions.

(i) 0.7

(b)(i) \_\_\_\_\_ [1]

(ii) 0.17

(ii) \_\_\_\_\_ [1]

(c) Write  $\frac{2}{5}$  as a decimal.

(c) \_\_\_\_\_ [1]

(d) If a fraction can be written as a terminating decimal, then the denominator of the fraction can only have prime factors of 2 and 5.

Explain why  $\frac{1}{14}$  cannot be written as a terminating decimal.

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[2]

9 (a) Write 60 as the product of its prime factors.

(a) \_\_\_\_\_ [2]

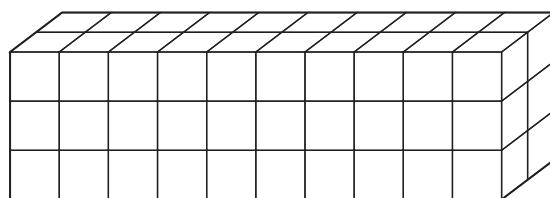
**(b)\*** Jamie has 60 one-centimetre cubes.

He uses them to make cuboids.

Each time he makes a cuboid he uses all 60 cubes.

He makes all the possible cuboids with sides of at least 2cm.

This is the first one he makes.



Investigate which cuboid has the least surface area.

Show all your working. Continue on the opposite page.

Dimensions of cuboid \_\_\_\_\_ cm by \_\_\_\_\_ cm by \_\_\_\_\_ cm

Minimum surface area = \_\_\_\_\_ cm<sup>2</sup> [6]

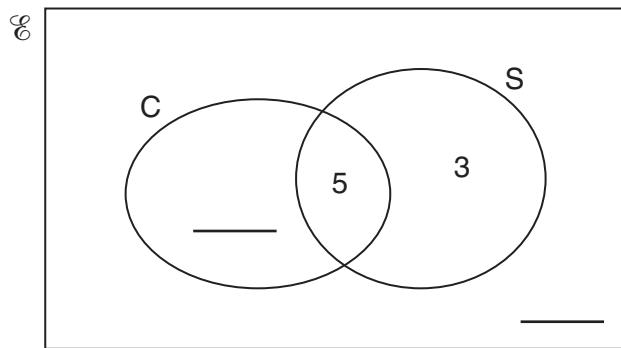
10 Mosna has 25 books in her electronic book reader.

15 are crime books (C).

8 are short story books (S).

5 are short story crime books.

(a) Complete this Venn Diagram showing the number of books of each type in Mosna's reader.



[2]

(b) Mosna chooses one of the books at random.

Find the probability that the book is:

(i) a short story book that is not a crime book,

(b)(i) \_\_\_\_\_ [1]

(ii) neither a crime book nor a short story book.

(ii) \_\_\_\_\_ [1]

**END OF QUESTION PAPER**

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