OCR

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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

* B 3 9 1 0 1 *

* 3 0 5 4 2 2 2 2 4 *

Candidate forename		Candidate surname	

Centre number						Candidate number				

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

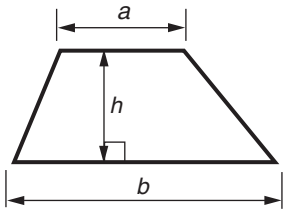
- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- Your quality of written communication is assessed in questions marked with an asterisk (*****).
- The total number of marks for this paper is **60**.
- This document consists of **16** pages. Any blank pages are indicated.

WARNING

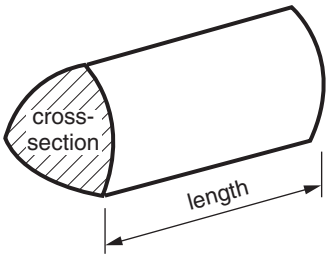
No calculator can be used for this paper

Formulae Sheet: Foundation Tier

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



Volume of prism = (area of cross-section) × length



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Answer **all** the questions.

1 Work out.

(a) 747 – 253

(a) _____ **[1]**

(b) 162 ÷ 6

(b) _____ **[1]**

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

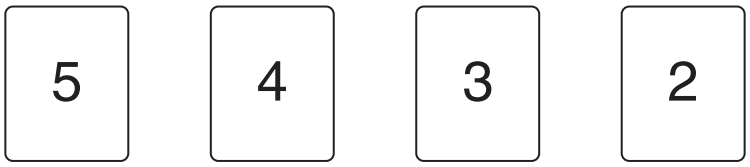
Mrs Cox says that she has been teaching for 4 years. This is only half the time that Mrs Archer has been teaching.
Mrs Archer and Mr Bing have been teaching for a total of 15 years between them.

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

Mrs Archer _____ years

Mr Bing _____ years **[2]**

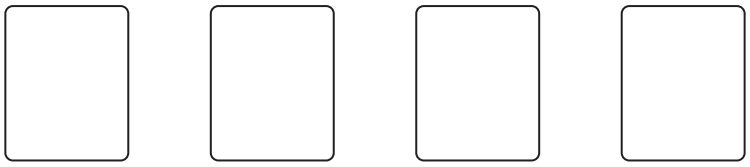
3 Lily has four number cards on her desk.



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

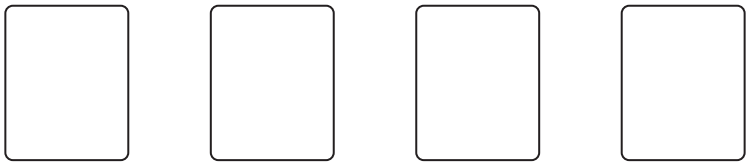
(a) Show how she can arrange the cards to make

(i) the smallest possible number,



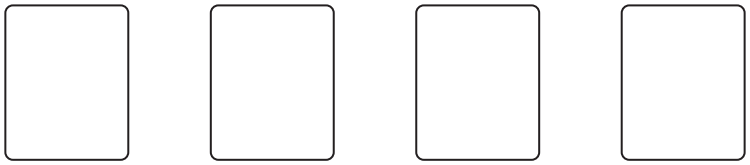
[1]

(ii) the largest odd number,



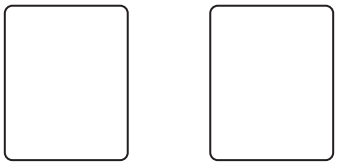
[1]

(iii) the largest multiple of 5.



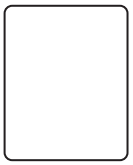
[1]

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



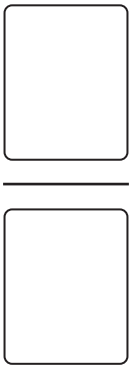
[1]

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



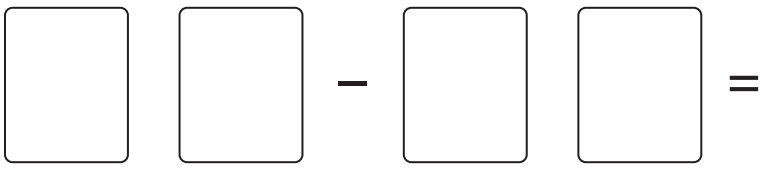
[1]

(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.



_____ **[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.

26.21875×5280 **[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.

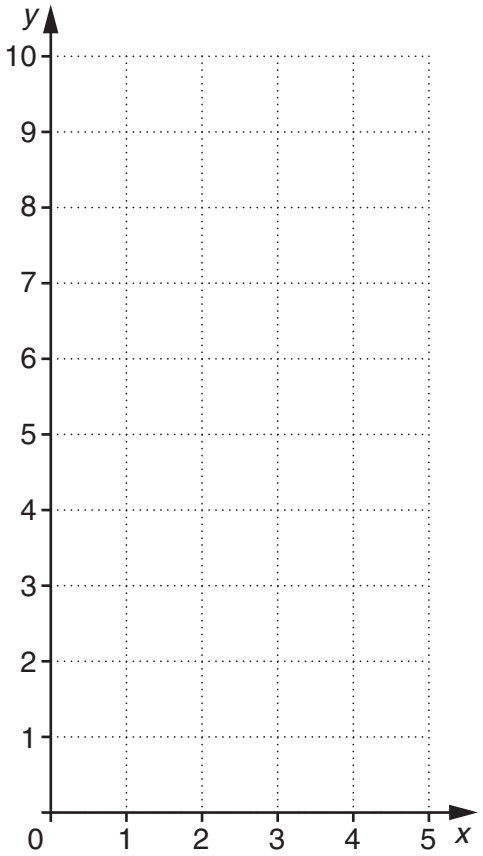
How many marbles of each colour could be in the bag now?

_____ 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 $y=2x+1$.



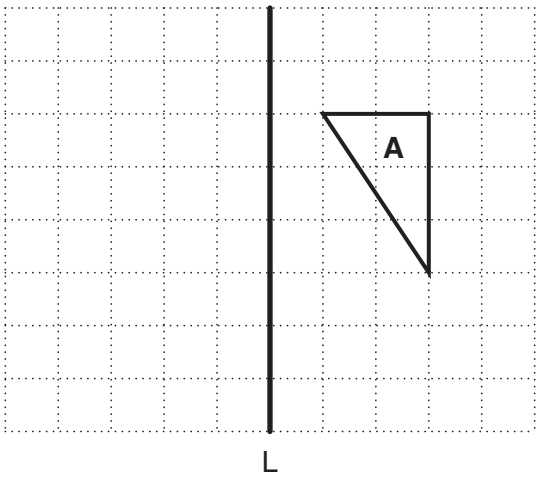
[2]

(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 $y = 2x + 1$.

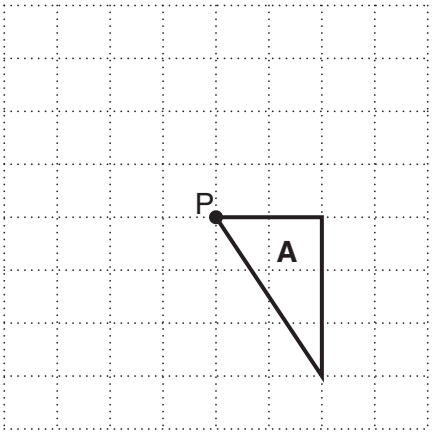
[3]

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



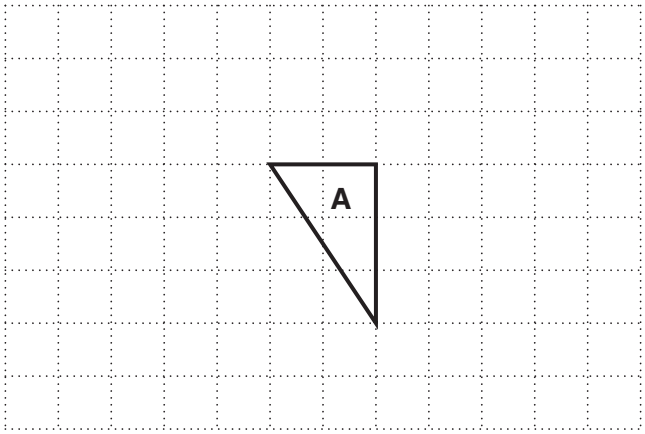
[2]

(b) Rotate triangle **A** 90° anticlockwise about point P.



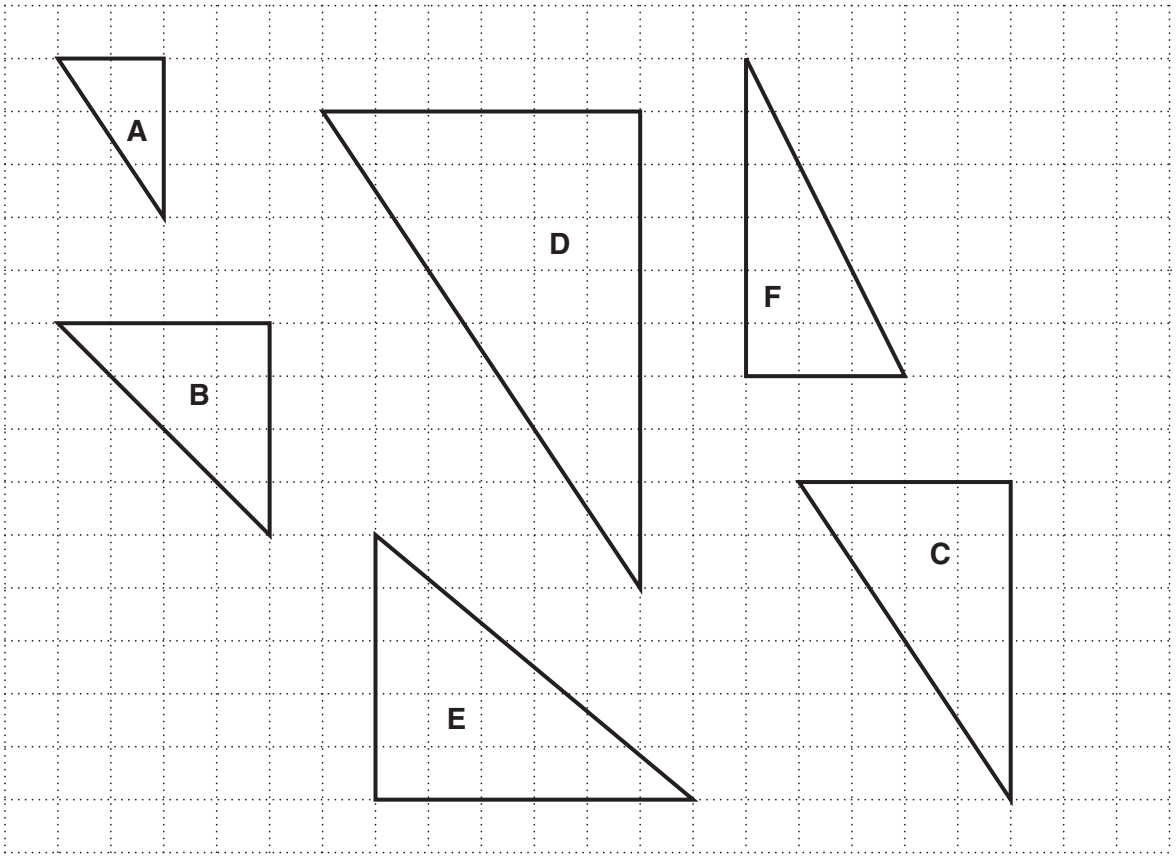
[2]

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



[2]

(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.

_____

_____

_____

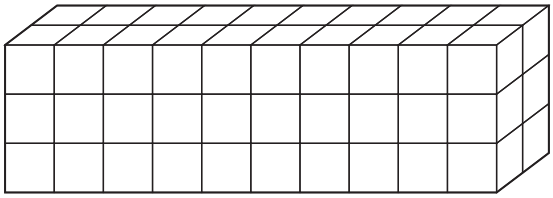
_____ **[2]**

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 2 cm.

This is the first one he makes.



Investigate which cuboid has the least surface area.
Show all your working. Continue on the opposite page.

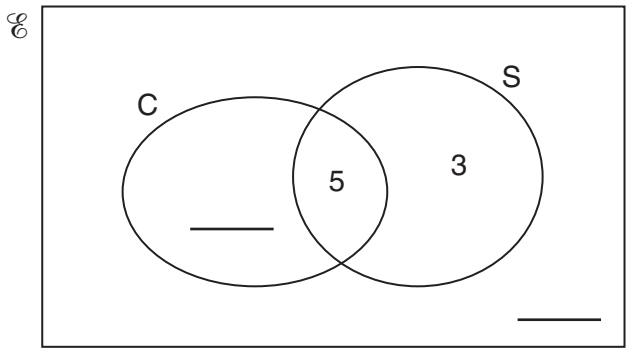
Dimensions of cuboid _____ cm by _____ cm by _____ cm

Minimum surface area = _____ cm^2 **[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]**

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