OCR
Oxford Cambridge and RSA

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Tuesday 8 November 2016 – 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

B391 01

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. If additional space is required, you should use the lined page(s) at the end of this booklet. The question number(s) must be clearly shown.
- Do **not** write in the bar codes.

INFORMATION FOR CANDIDATES

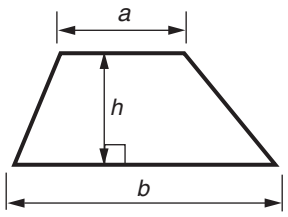
- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- Quality of written communication will be assessed in questions marked with an asterisk (*).
- The total number of marks for this paper is **60**.
- This document consists of **16** pages. Any blank pages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

WARNING
No calculator can be used for this paper

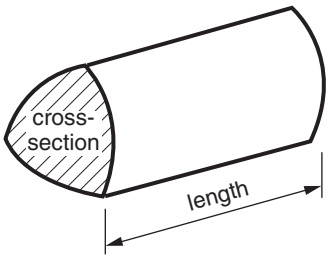
DC (LK/FC) 134897/1

Formulae Sheet: Foundation Tier

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



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



PLEASE DO NOT WRITE ON THIS PAGE

Answer **all** the questions.

1 Fill in the boxes to complete the calculations.

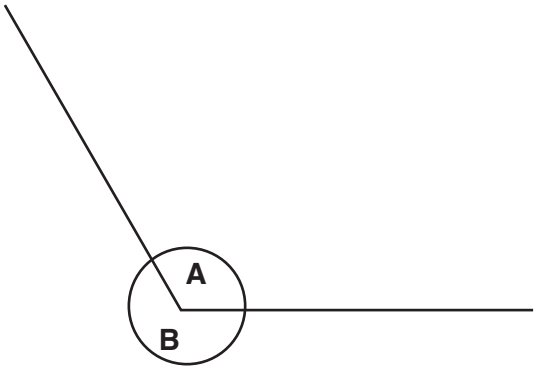
(a) $24 + \square = 51$ **[1]**

(b) $\square \times 9 = 54$ **[1]**

(c) $\square - 36 = 19$ **[1]**

(d) $28 \div \square = 4$ **[1]**

2 Circle the correct choice in each sentence below.



(a) Angle **A** is approximately 60° / 120° / 250°. **[1]**

(b) Angle **B** is reflex / acute / obtuse. **[1]**

3 There are ten marbles in a bag. They are identical apart from their colour.
5 are green, 3 are red and 2 are blue.

One marble is picked out of the bag at random.
Complete the table below.

Colour of marble	Word to describe the probability of this colour being picked	Numerical probability
green		$\frac{1}{2}$
blue	unlikely	
yellow		0

[3]

4 Work out.

(a) $\frac{1}{5} \times 35$

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

(b) 4.3×8

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

5 **(a)** Sharon has had a sale of her old toys. She is counting the money from the sale. She makes a table to show the number of each type of coin and the amount.

Fill in the missing values in the table, including the total amount.

Coin	Number of Coins	Amount (£)
2p	15	0.30
5p		0.40
10p		1.70
20p	12	
£1	9	9.00
£2	4	8.00
	Total	

[4]

(b) Sharon wants to save £100. She has saved £44 altogether.

(i) How much more does she need to reach her £100 target?

(b)(i) £ ..... **[1]**

(ii) What fraction of her target has she **saved**? Give your answer in its simplest form.

(ii) ..... **[2]**

6 All the rows, columns and diagonals in a 'magic square' add up to the same number.

Here is an example of a 3 by 3 magic square where all the integers from 1 to 9 are used once. The total of each row, column and diagonal is 15.

4	9	2
3	5	7
8	1	6

(a) Complete the following 4 by 4 magic square. Every number from 1 to 16 can be used only once.

16	2	3	13
5		10	8
9	7		12
4	14		

[3]

(b) Here is an incomplete 3 by 3 magic square that contains algebraic terms.
The total of each row, column and diagonal is 30.

b	$7a$	$6a$
$9a$	$5a$	a
	$3a$	$4b$

(i) Find the values of a and b.

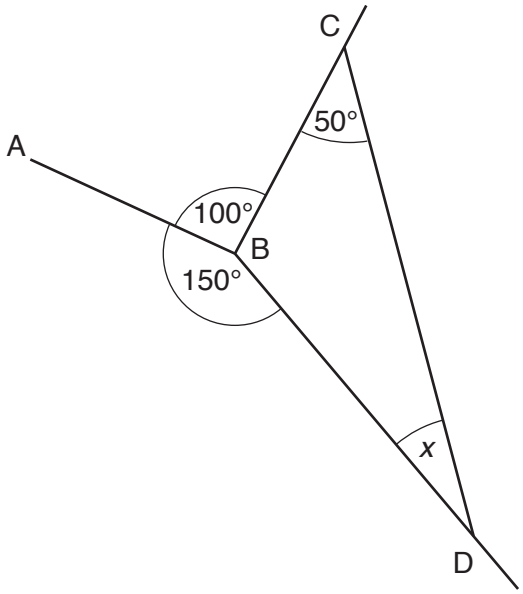
(b)(i) $a =$ .....

$b =$ ..... **[3]**

(ii) What algebraic term could be placed in the bottom left hand corner square to complete the magic square?

(ii) ..... **[2]**

7 **(a)*** Look at the diagram below.



Not to scale

Work out the size of angle *x*, giving reasons for each step of your working.

.....

.....

.....

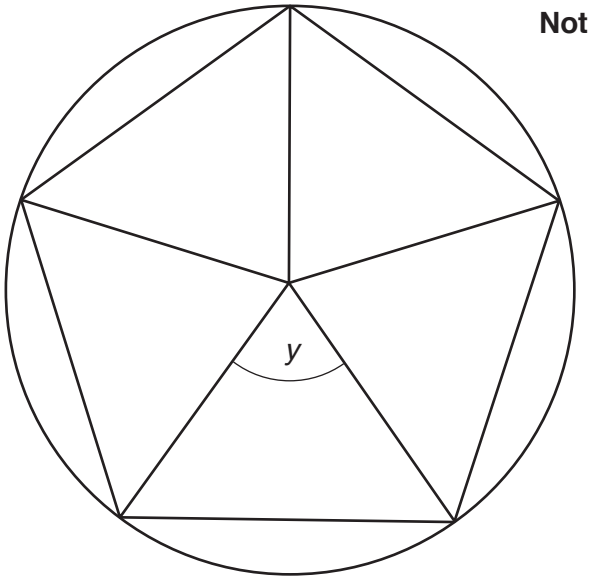
.....

.....

.....

Angle *x* is ..... ° **[4]**

(b) The diagram represents a regular pentagon within a circle.
It has been constructed from 5 congruent isosceles triangles that meet at the centre of the circle.



Not to scale

Calculate angle *y*.

(b) ..... ° **[2]**

8 **(a)** Work out.

(i) $^{-}4 + 6$

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

(ii) $^{-}10 - 5$

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

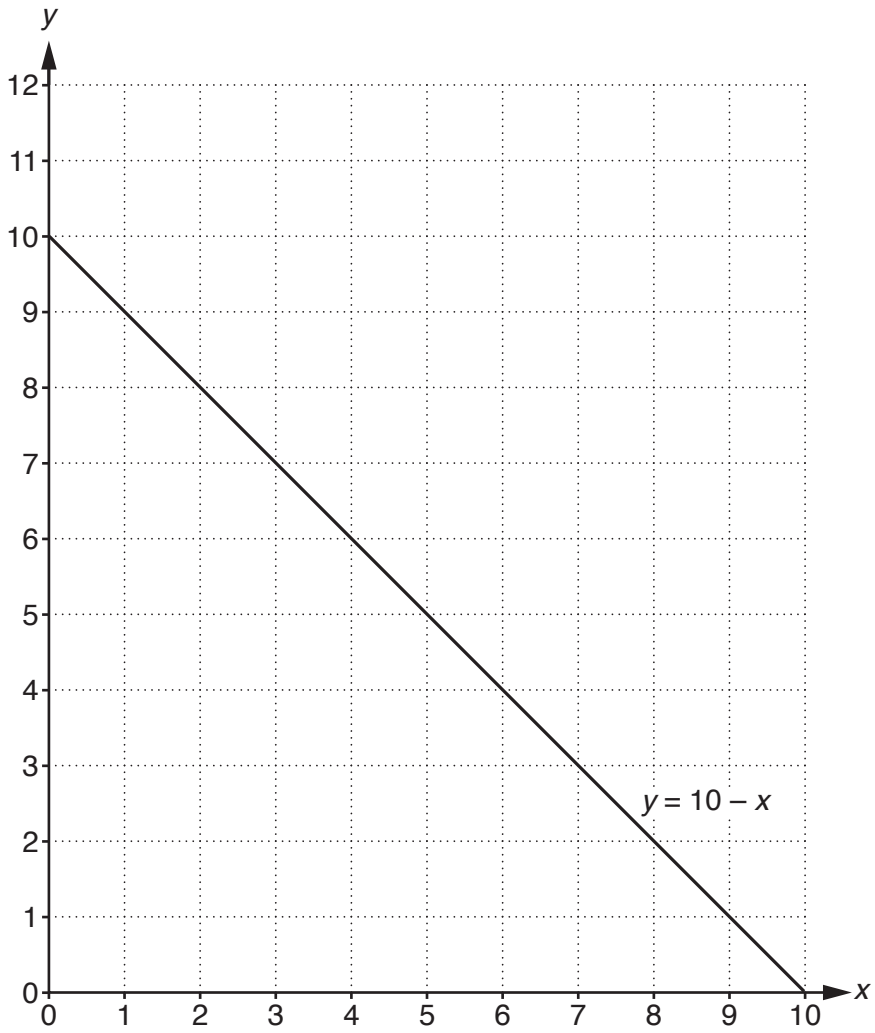
(iii) $6 \times {}^{-}3$

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

(b) Two whole numbers add up to 5 and multiply to make $^{-}14$.
What are the two numbers?

(b) ..... and ..... **[2]**

9 This is the graph of $y = 10 - x$ for values of x between 0 and 10.



(a) Complete the table of values below for $y = \frac{1}{2}x + 1$.

x	0	4	10
y	1		

[2]

(b) Draw the graph of $y = \frac{1}{2}x + 1$ for values of x between 0 and 10 on the grid above. **[2]**

(c) Write down the coordinates of the point where the graphs of $y = 10 - x$ and $y = \frac{1}{2}x + 1$ cross.

(c) (..... , ...) **[1]**

10 **(a)** A coin is biased. The probability of getting a head with this coin is 0.4.

What is the probability of getting a tail?

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

(b) Raj has 3 coins labelled A, B and C. He knows that one is fair and the other two are biased. He does an experiment and records the number of times he gets a head in **50** throws of each coin.

Coin	A	B	C
Number of heads	26	16	33
Relative frequency of getting a head	0.52	0.32	0.66

Raj continues the experiment and records the **total** number of times he gets a head in **200** throws of each coin.

Coin	A	B	C
Number of heads	138	58	110
Relative frequency of getting a head	0.69	0.29	0.55

Raj thinks that coin A is the fair one because the relative frequency of getting a head is so close to 0.5 after the first 50 throws.

Is Raj correct? Explain your reasoning.

.....

.....

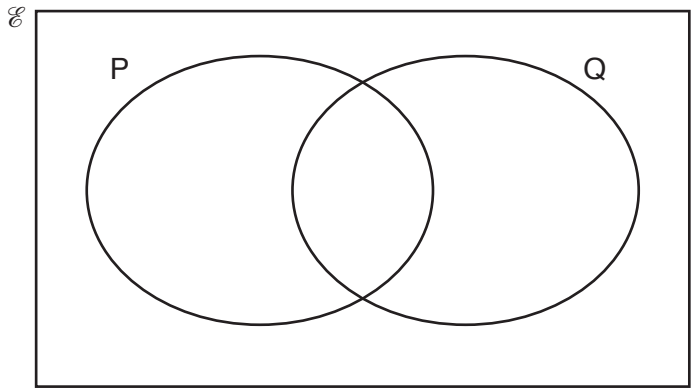
.....

.....

..... **[2]**

11 $\mathscr{E}$ = {letters in the word NUMERICAL}
P = {letters in the word CLEAR}
Q = {letters in the word REMAIN)}

(a) Complete the Venn diagram to show all the elements of the set $\mathscr{E}$.



[3]

(b) List the members of $P \cap Q$.

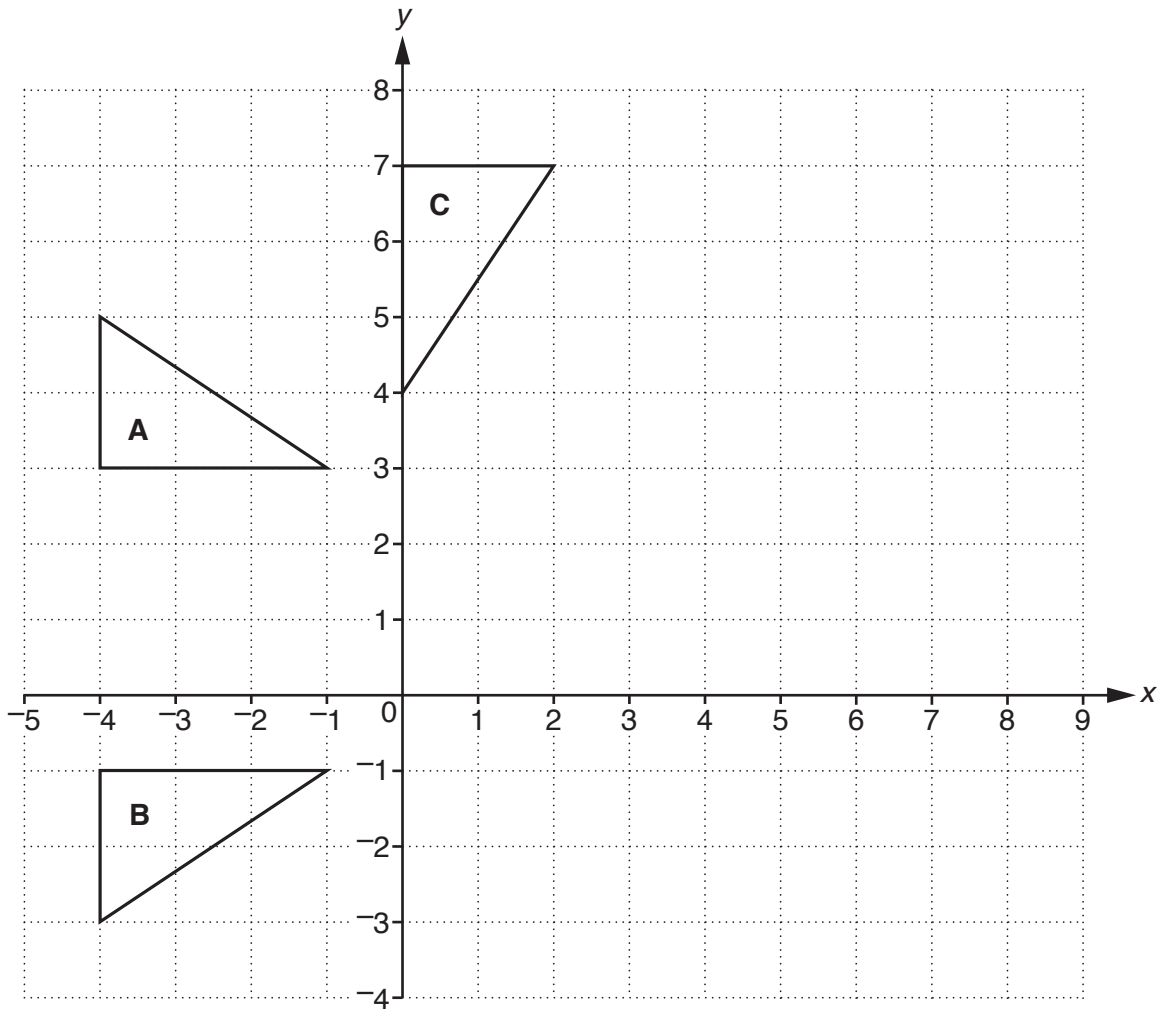
(b) ..... **[1]**

12 The length of a rectangle is 3 cm more than the width.
The perimeter of the rectangle is 28 cm.

Find the length and width of the rectangle.

length ..... cm, width ..... cm **[3]**

13 Triangles A, B and C are drawn on the grid.



(a) Describe fully the **single** transformation that maps

(i) triangle **A** onto triangle **B**,

.....

..... **[2]**

(ii) triangle **A** onto triangle **C**.

.....

..... **[3]**

(b) On the diagram translate triangle **A** using the vector $\begin{pmatrix} 7 \\ 2 \end{pmatrix}$. **[2]**

END OF QUESTION PAPER

ADDITIONAL ANSWER SPACE

If additional space is required, you should use the following lined page(s). The question number(s) must be clearly shown in the margin(s).