OCR
Oxford Cambridge and RSA

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Tuesday 10 November 2015 – 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 *

* 4 9 9 3 4 7 9 5 0 0 *

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

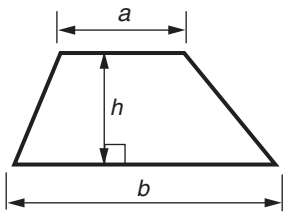
- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- Your quality of written communication is assessed in questions marked with an asterisk (*****).
- The total number of marks for this paper is **60**.
- This document consists of **16** pages. Any blank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

WARNING

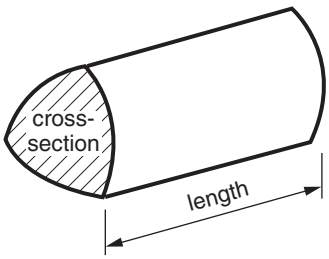
No calculator can be used for this paper

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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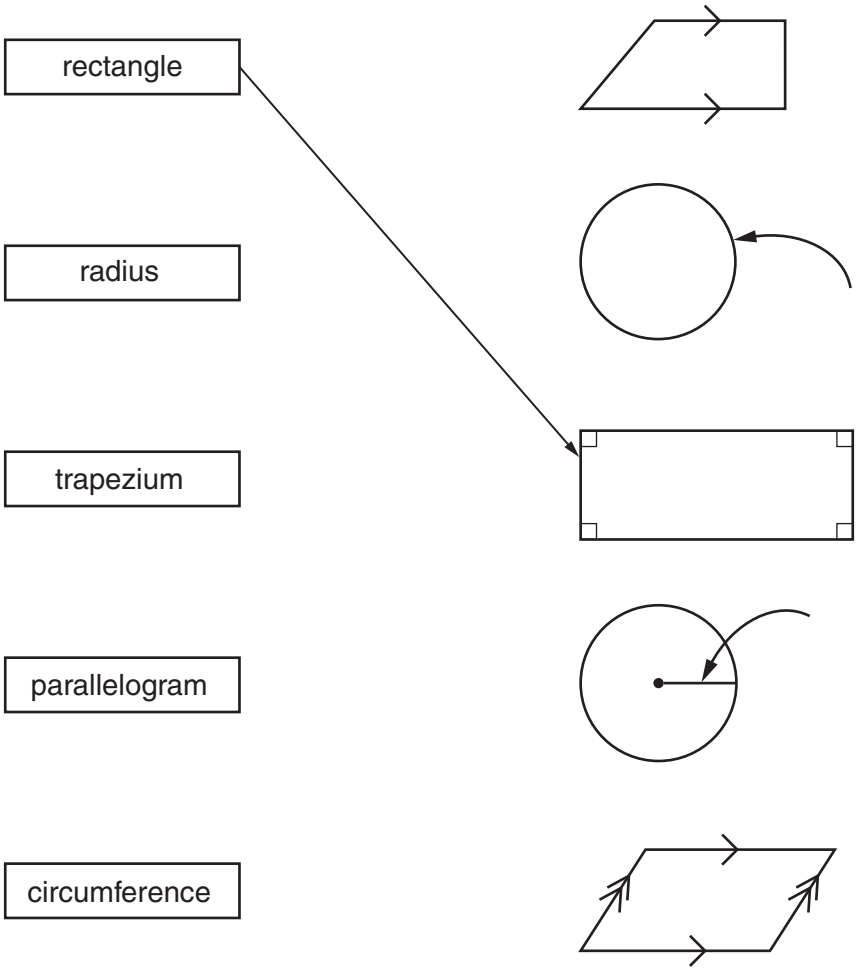
Answer **all** the questions.

1 Match each word to the correct picture.
The first one has been done for you.



[3]

2 **(a)** Calculate.

(i) 18.6 – 4.8

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

(ii) 24 × 8

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

(b) Harrison works out that 504 ÷ 7 = 72.

Use the same numbers to suggest a different calculation that Harrison could do to check that his answer is correct.

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

3 **(a)** Fill in the gaps with numbers to make each simplification correct.

(i) $3a + \ldots\ldots\ldots a - \ldots\ldots\ldots a = 6a$ **[1]**

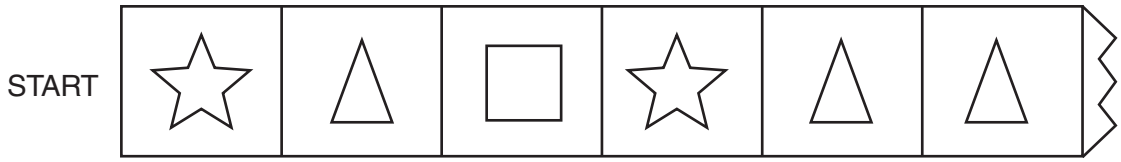
(ii) $\ldots\ldots\ldots a \times \ldots\ldots\ldots b = 18ab$ **[1]**

(b) Put + or – in each gap to make the simplification correct.

$2a \ldots\ldots\ldots 6b \ldots\ldots\ldots 4b \ldots\ldots\ldots 5a = 7a + 2b$ **[2]**

4 In a board game, you roll an ordinary 6-sided dice to see how many spaces to move your counter.

Here are the first 6 spaces on the board. Your counter is on 'START'.



You roll the dice for your first go.

(a) Which symbol do you have an evens chance of landing on? Tick the correct choice.

....

[1]

(b) What is the probability that you land on

(i) a star,

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

(ii) a circle?

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

5 Solve.

(a) $4x = 20$

(a) $x =$ ..... **[1]**

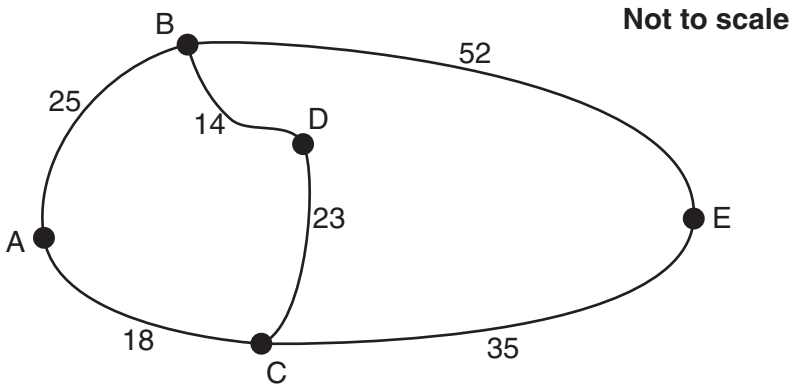
(b) $x - 7 = 15$

(b) $x =$ ..... **[1]**

(c) $3x + 6 = 18$

(c) $x =$ ..... **[2]**

6* The diagram below shows the roads which connect towns A, B, C, D and E.
The distances between towns are also given, in km.



A delivery driver wants to go from town A to town E. He needs to deliver a parcel in town D on the way.

Which is the shortest route the driver could take?

.....

.....

.....

.....

.....

.....

.....

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.....

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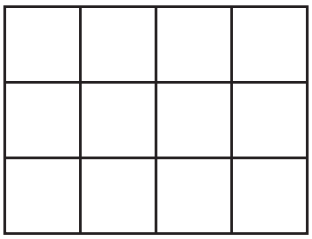
.....

The shortest route is A → .....

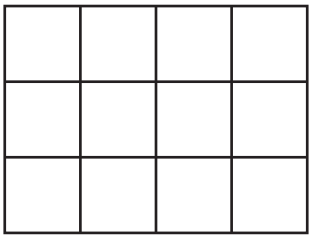
The distance is .....km **[4]**

7 **(a)** **(i)** Shade $\frac{1}{4}$ of this rectangle.



[1]

(ii) Shade $\frac{1}{3}$ of this rectangle.



[1]

(iii) What is $\frac{1}{4} + \frac{1}{3}$? Give your answer as a fraction.

(a)(iii) ..... **[2]**

(b) What is $\frac{1}{5} \times 30$?

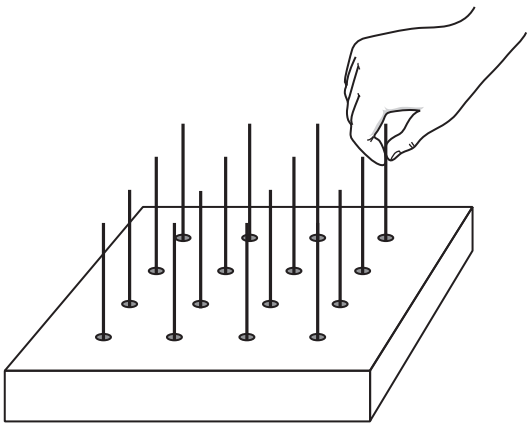
(b) ..... **[1]**

(c) Work out $\frac{6}{7} \times \frac{1}{9}$. Give your answer in its simplest form.

(c) ..... **[2]**

8 In a game of 'Stick Pick' you pick a stick from a box. The bottom of the stick is hidden.
On the bottom some sticks have red paint, some have black paint and some have no paint.

(a) There are 16 sticks in this box.



In this box

- the probability of picking a stick with red paint on the bottom is $\frac{1}{8}$, and
- there is a greater chance of picking a stick with no paint on than a stick with paint on.

How many of each type of stick could there be?

(a) Number of sticks with red paint .....

black paint .....

no paint ..... **[3]**

(b) Another game of 'Stick Pick' has a different number of sticks.
As before, on the bottom some sticks have red paint, some have black paint and some have no paint. Also as before

- the probability of picking a stick with red paint on the bottom is $\frac{1}{8}$, and
- there is a greater chance of picking a stick with no paint on than a stick with paint on.

There are 15 sticks with no paint on them.

How many sticks are there in total?

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

9 For each part of this question, circle the 2 cards which are equivalent.

(a)

$\frac{2}{6}$	$\frac{1}{5}$	$\frac{5}{10}$	$\frac{2}{10}$

[2]

(b)

50×10	0.5×1000	500×100	5×1000

[2]

(c)

$2ab$	$2a+b$	$a+a+b$	a^2+b

[1]

(d)

$\frac{1}{4}$	0.4	4	0.25

[1]

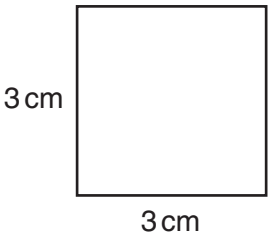
(e)

$240 \div 0.3$	$2400 \div 30$	$2.4 \div 0.3$	$24 \div 3$

[2]

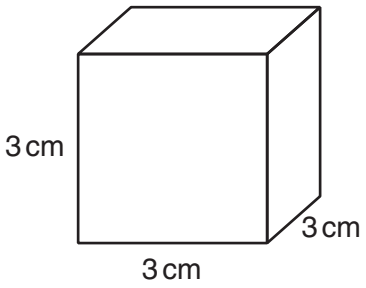
10 **(a)** What is the area of this square?

Not to scale



(a) ..... cm^2 **[1]**

(b) This cube has edges of length 3 cm.



(i) Work out the surface area of this cube.

(b)(i) ..... cm^2 **[2]**

(ii) Work out the volume of this cube.

(ii) ..... cm^3 **[1]**

11 Expressed as the product of its prime factors

$$600 = 2^3 \times 3 \times 5^2.$$

(a) Express 420 as the product of its prime factors.

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

(b) Find, leaving your answers expressed as the **product of prime factors**,

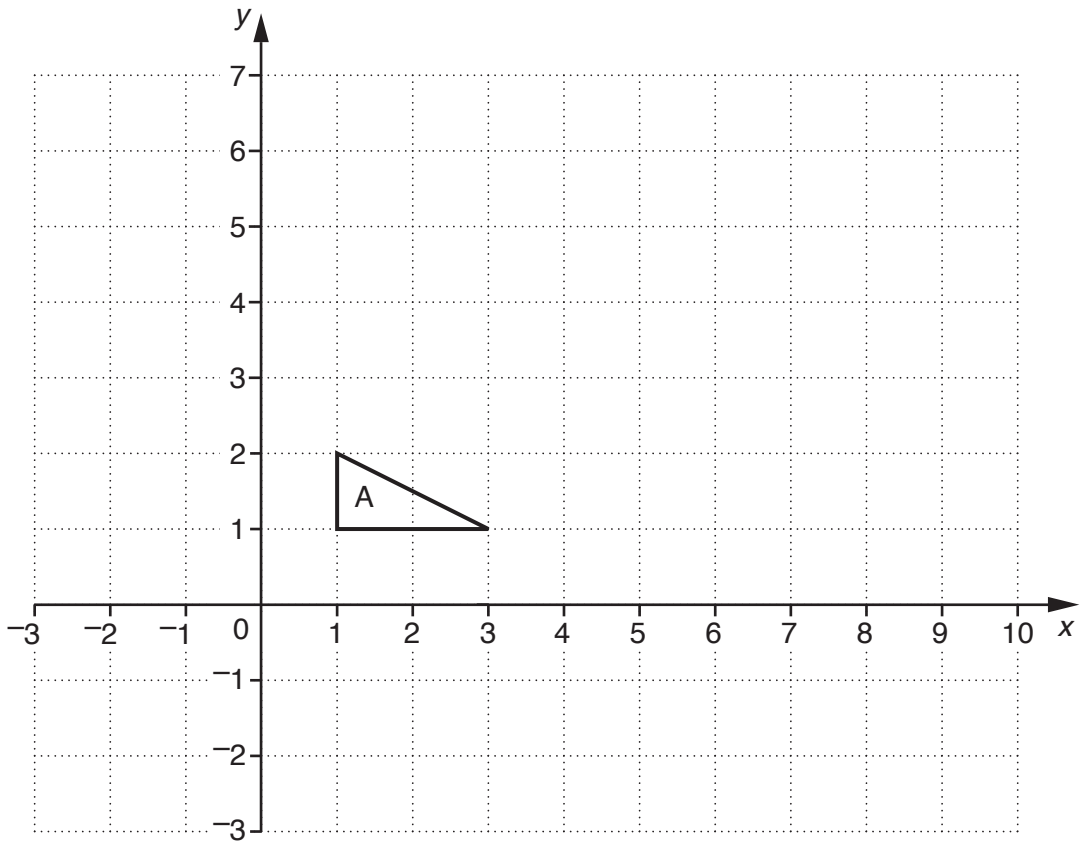
(i) the highest common factor (HCF) of 600 and 420,

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

(ii) the lowest common multiple (LCM) of 600 and 420.

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

12



(a) (i) Translate triangle A using the vector $\begin{pmatrix} -3 \\ 2 \end{pmatrix}$.

Label the image B. **[2]**

(ii) Enlarge triangle A with scale factor 3 and centre (0, 0).

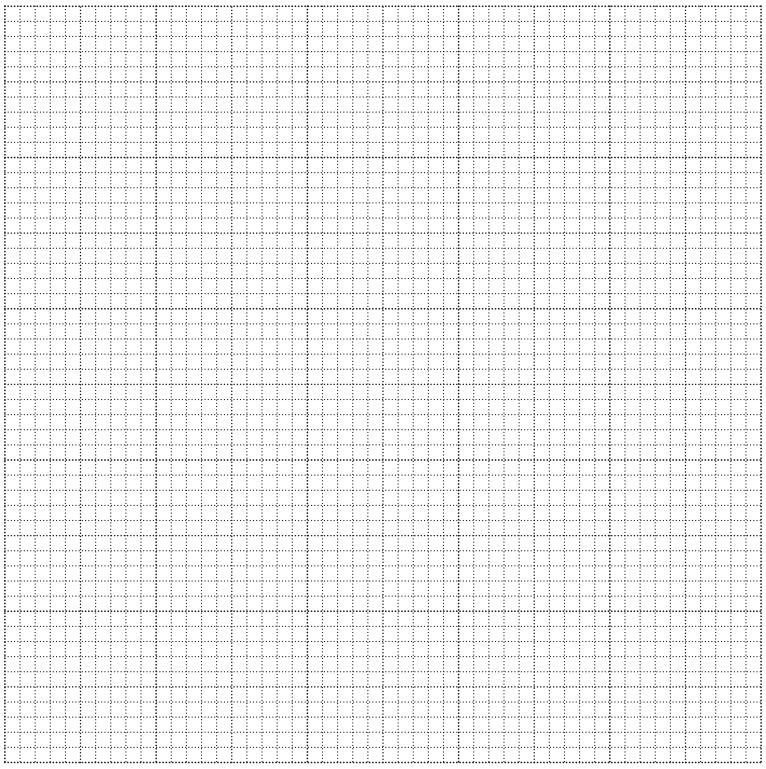
Label the image C. **[2]**

(b) A triangle P is reflected to give triangle Q.
Triangle Q is rotated to give triangle R.
Triangle R is enlarged to give triangle S.
Triangle S is translated to give triangle T.

Complete this table.
Write Y if the triangles are **always** congruent.
Write N if the triangles are **not always** congruent.

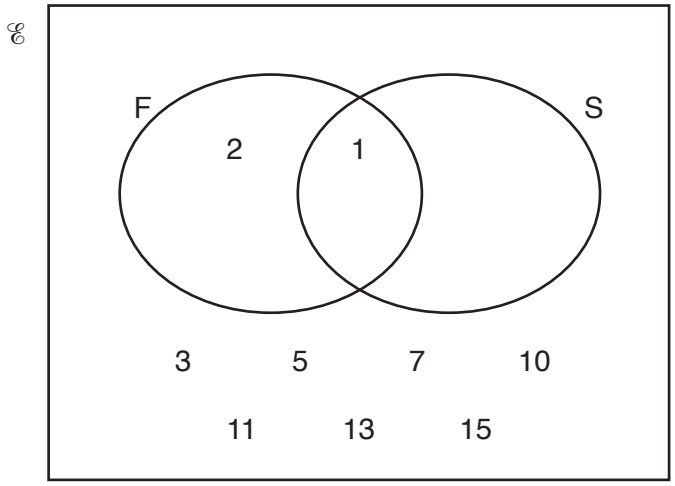
Triangles	Congruent, Y or N?
P and Q	
P and R	
P and S	
R and T	

You may use this grid if required. **[3]**



13 $\mathscr{E}$ = {positive integers less than 17}
F = {factors of 16}
S = {square numbers}

(a) Complete this Venn diagram to show the sets $\mathscr{E}$, F and S.



[3]

(b) List the members of $F \cap S$.

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

END OF QUESTION PAPER

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