

**Wednesday 12 November 2014 – Morning**

**GCSE METHODS IN MATHEMATICS**

**B392/01** Methods in Mathematics 2 (Foundation Tier)

Candidates answer on the Question Paper.

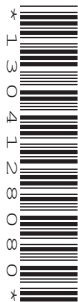
**OCR supplied materials:**

None

**Other materials required:**

- Scientific or graphical calculator
- Geometrical instruments
- Tracing paper (optional)

**Duration:** 1 hour 30 minutes



Candidate forename		Candidate surname	
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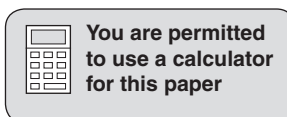
Centre number						Candidate number				
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**INSTRUCTIONS TO CANDIDATES**

- 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.

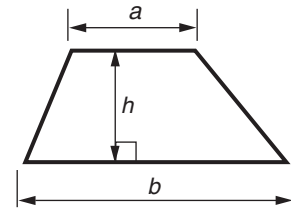
**INFORMATION FOR CANDIDATES**

- 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 **90**.
- This document consists of **16** pages. Any blank pages are indicated.

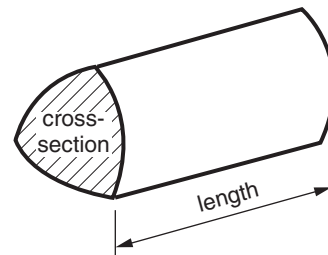


## Formulae Sheet: Foundation Tier

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



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



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Answer **all** the questions.

1 Fill in the missing terms in each of these sequences.

Sequence	Terms
A	50, 44, 38, ....., ....., 20
B	2, 10, 50, ....., ....., 6250
C	4, 9, 16, ....., ....., 49

[6]

2 Calculate.

(a)  $19^3 + 19^2 + 19$

(a) ..... [2]

(b)  $40 - \frac{966}{42}$

(b) ..... [1]

3 Solve.

(a)  $7x = 42$

(a) ..... [1]

(b)  $x - 29 = 46$

(b) ..... [1]

(c)  $\frac{x}{5} = 8$

(c) ..... [1]

4 Maria lives in Bitterne and works in Southampton. She travels to work by bus.

A single bus ticket costs £2.45.

A return bus ticket costs £4.20.

A weekly bus ticket costs £18.00.

One week Maria travels to and from work on five days.

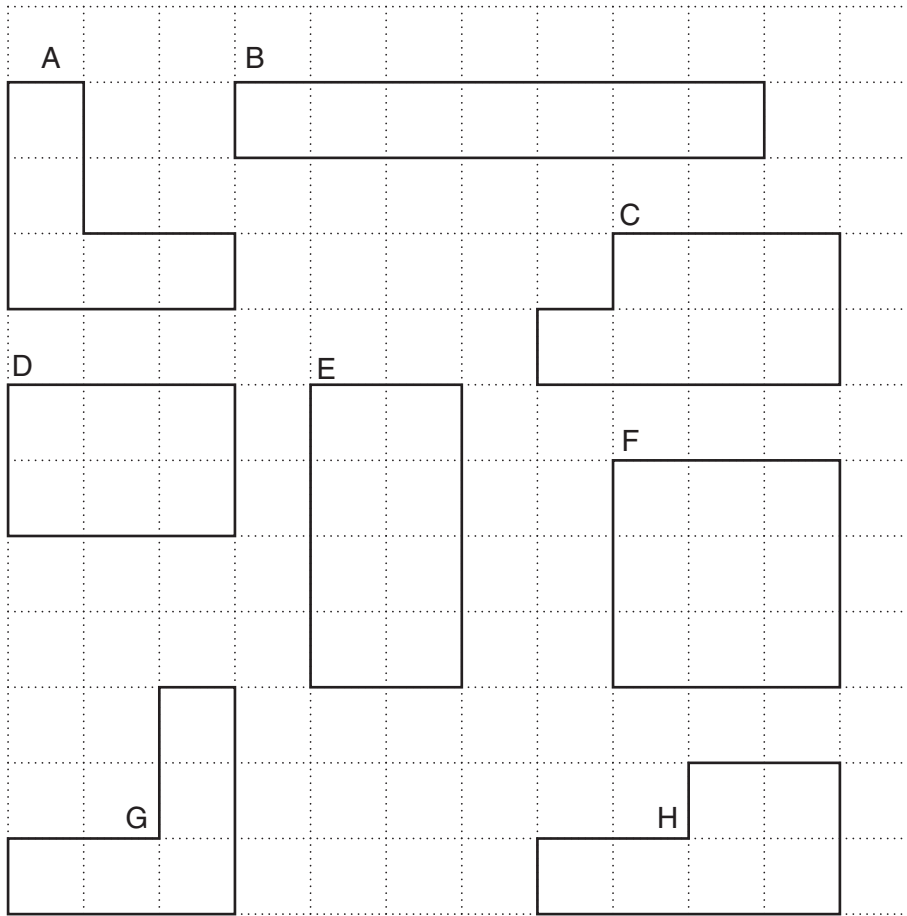
(a) How much will she save that week if she buys return tickets every day instead of single tickets?

(a) £ ..... [2]

(b) How much will she save that week if she buys a weekly ticket instead of single tickets?

(b) £ ..... [2]

5 These shapes are drawn on a one-centimetre grid.



(a) Which shape has the same area as shape D?

(a) ..... [1]

(b) Which shape has the largest perimeter?

(b) ..... [2]

(c) Which two shapes are congruent?

(c) ..... and ..... [1]

6

6 In this grid, the letters  $a$ ,  $b$  and  $c$  represent different numbers. The total of the numbers in a row is given at the end.

$a$	$a$	$a$	72
$a$	$b$	$b$	86
$a$	$b$	$c$	84

Work out the values of  $a$ ,  $b$  and  $c$ .

$a = \dots\dots\dots b = \dots\dots\dots c = \dots\dots\dots$  [3]

7 Work out.

(a)  $\frac{3}{5}$  of £840

(a) £  $\dots\dots\dots$  [2]

(b) 75% of £840

(b) £  $\dots\dots\dots$  [2]

(c) 10% of £90

(c) £  $\dots\dots\dots$  [1]

(d) 15% of £70

(d) £  $\dots\dots\dots$  [2]

- 8 (a) The product of two prime numbers is 299.

Find the two prime numbers.

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

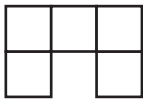
- (b)  $n$  is an integer and  $-2 < n \leq 4$ .

Write down all the possible values of  $n$ .

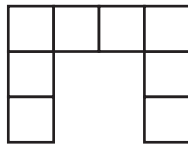
(b) ..... [2]

- 9 Each shape in this sequence is made from square tiles.

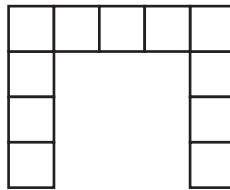
1st shape



2nd shape



3rd shape



- (a) How many tiles are there in the **5th** shape in the sequence?

(a) ..... [2]

- (b) Which shape in the sequence uses exactly 44 tiles?

(b) ..... [3]

10 Work out the value of each expression when  $r = 8$ ,  $s = 5$  and  $t = \frac{1}{4}$ .

(a)  $rs$

(a) ..... [1]

(b)  $4(r+s)$

(b) ..... [1]

(c)  $rt$

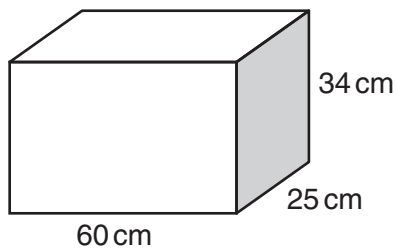
(c) ..... [1]

(d)  $t^2$

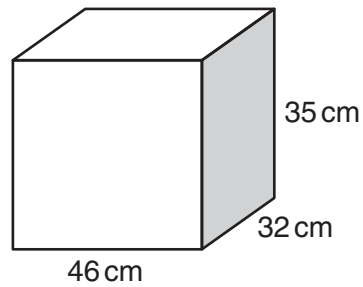
(d) ..... [1]

11\* These boxes are both cuboids.

A



B



Which box has the greater volume?  
You must justify your decision.

.....

.....

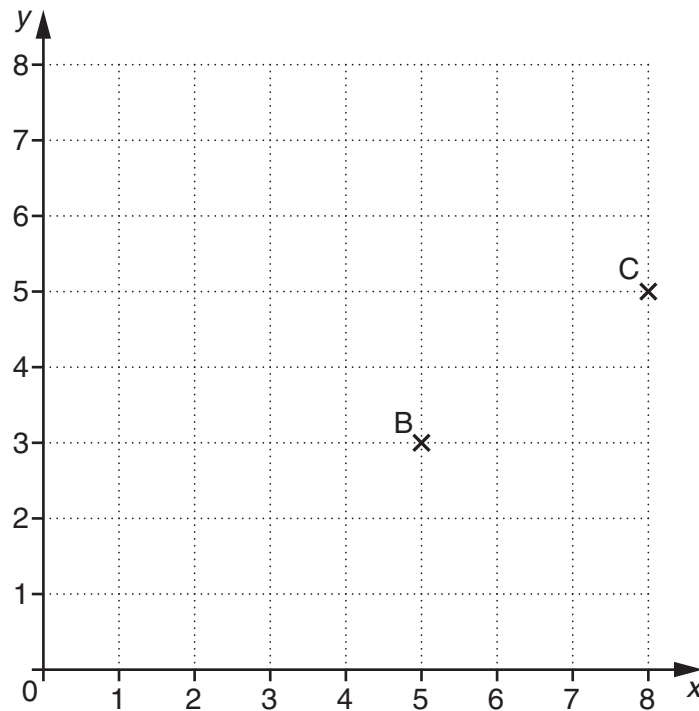
.....

.....

..... [3]



12 Points B and C are plotted on the one-centimetre grid below.



(a) Write down the coordinates of points B and C.

(a) B ( ..... , ..... )

C ( ..... , ..... ) [2]

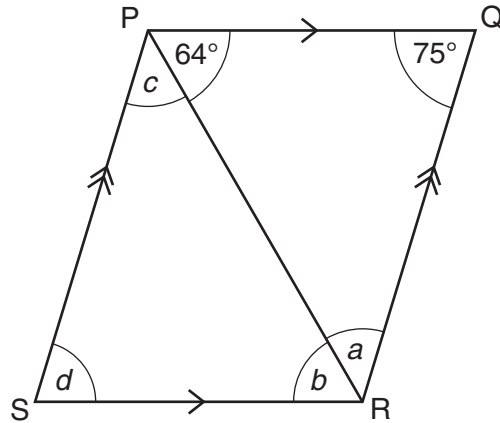
(b) B is the midpoint of the line AC.  
Find the coordinates of point A.

(b) A ( ..... , ..... ) [2]

(c) Use Pythagoras' rule to calculate the distance from B to C.  
Give your answer correct to 2 decimal places.

(c) ..... cm [3]

- 13 (a) PQRS is a parallelogram.  
 Angle QPR =  $64^\circ$  and angle PQR =  $75^\circ$ .

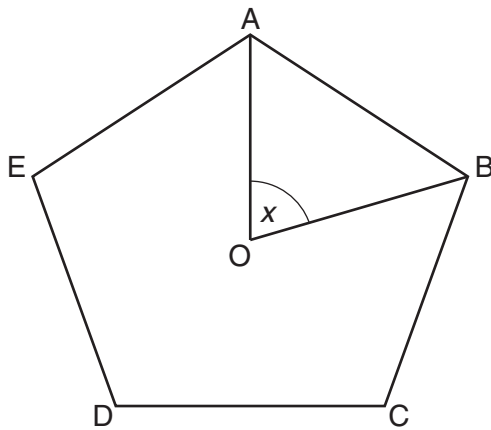


Not to scale

Find angles  $a$ ,  $b$ ,  $c$  and  $d$ .

- (a)  $a = \dots\dots\dots^\circ$   
 $b = \dots\dots\dots^\circ$   
 $c = \dots\dots\dots^\circ$   
 $d = \dots\dots\dots^\circ$  [4]

- (b) ABCDE is a regular pentagon. O is the centre of the pentagon.



Not to scale

- (i) Work out angle  $x$ .

(b)(i)  $x = \dots\dots\dots^\circ$  [2]

- (ii) Work out the size of the interior angle of a regular pentagon.

(ii)  $\dots\dots\dots^\circ$  [2]

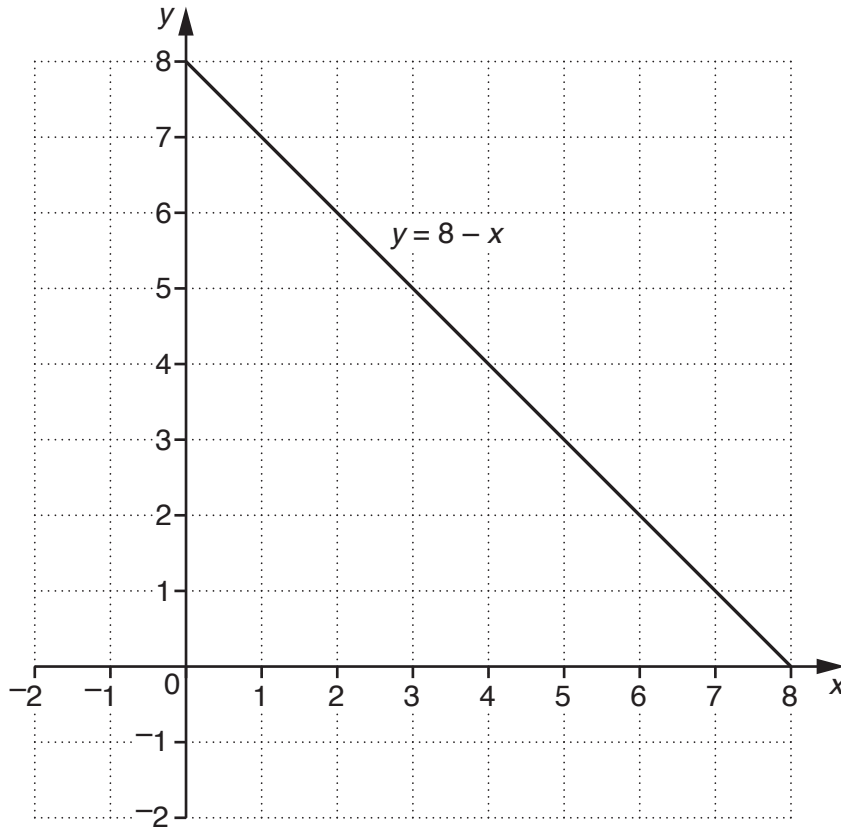
14 (a) Complete the table for  $y = 2x - 1$ .

$x$	0	1	2	3	4
$y$					

[2]

(b) The graph of  $y = 8 - x$  is drawn on the grid below.

Draw the graph of  $y = 2x - 1$  on the same grid.



[2]

(c) Use the graphs to solve the equation  $8 - x = 2x - 1$ .

(c)  $x = \dots\dots\dots$  [2]

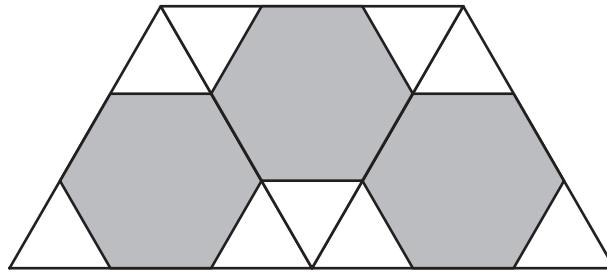
15 (a) Convert  $\frac{2}{15}$  to a decimal.

(a) ..... [2]

(b) Write 0.175 as a fraction in its lowest terms.

(b) ..... [2]

16 The tiling pattern below is made of regular hexagons and equilateral triangles.



(a) Find exactly the proportion of the area of the pattern taken up by the regular hexagons.

(a) ..... [3]

(b) The ratio of the number of hexagon tiles to the number of triangle tiles is 3 : 9.

Write this ratio in its simplest form.

(b) ..... [1]

(c)\* Emily has 50 of the equilateral triangle tiles and 15 of the hexagon tiles. She uses them to continue the tiling pattern shown above.

Which does she run out of first, the triangles or the hexagons? Explain how you know.

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

17 A shop employs 15 women and 8 men.

- (a) What percentage of the employees are men?  
Give your answer to an appropriate degree of accuracy.

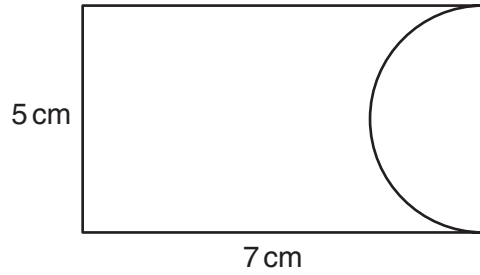
(a) ..... % [3]

- (b) Some of the employees from the shop go out for a meal.  
20% of the people at the meal are men.

How many women and how many men are at the meal? Give one possible answer.

(b) women ..... men ..... [3]

- 18 (a) The shape below is made by removing a semicircle from a rectangle. The rectangle had length 7 cm and width 5 cm. The diameter of the semicircle is 5 cm.

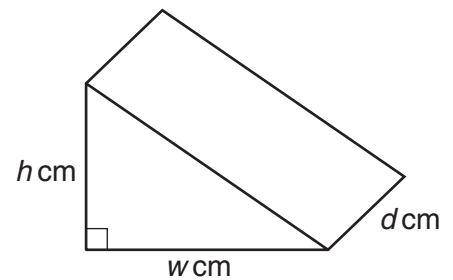


Not to scale

Find the area of the shape. Give the units of your answer.

(a) ..... [4]

- (b) The diagram shows a prism. The cross-section of the prism is a right-angled triangle. The lengths of the two shorter sides of the triangle are  $w$  cm and  $h$  cm. The length of the prism is  $d$  cm. The volume of the prism is  $30 \text{ cm}^3$ .



Find possible values of  $w$ ,  $h$  and  $d$ .

(b)  $w$  .....  
 $h$  .....  
 $d$  ..... [3]

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