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**F**

# Thursday 21 June 2012 – 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 | |
|---|---|---|---|

| 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 **90**.
- This document consists of **20** pages. Any blank pages are indicated.

**You are permitted to use a calculator for this paper**

This paper has been pre modified for carrier language

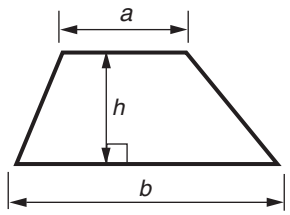


OCR is an exempt Charity

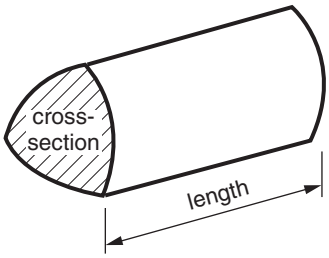
**Turn over**

## 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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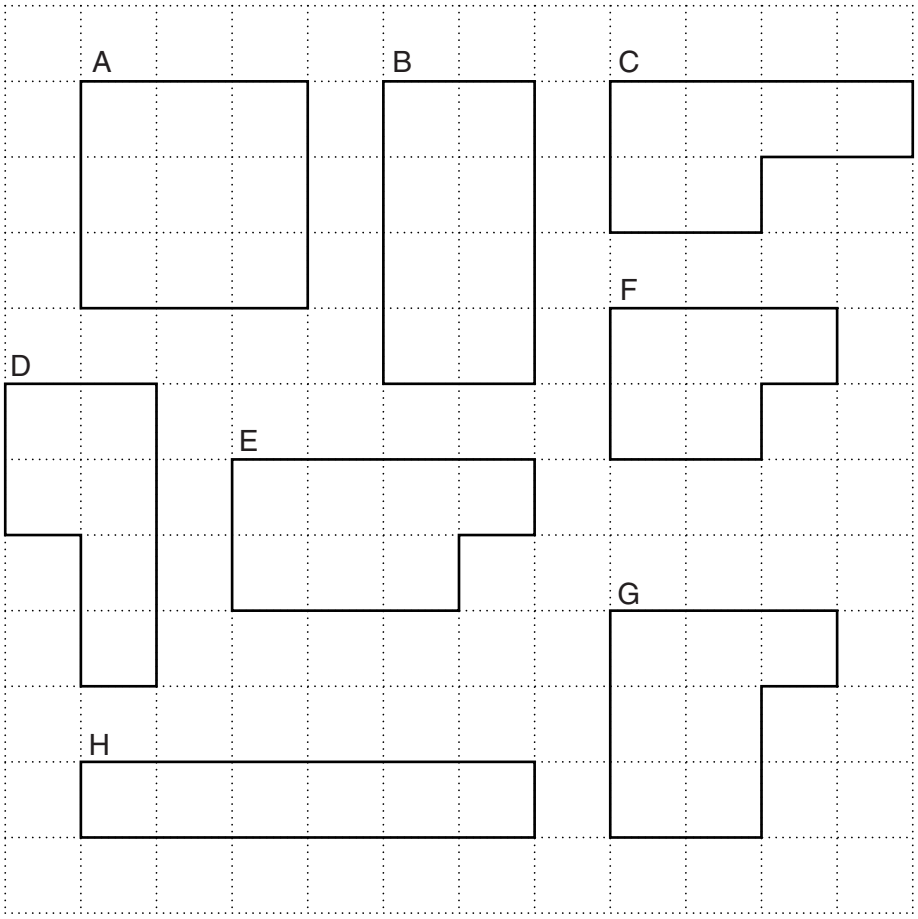
**1** These shapes are drawn on a one-centimetre square grid.




**(a)** Which shape has the largest perimeter?

**(a)** _____ **[2]**

**(b)** Which shape has the smallest area?

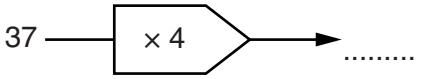
**(b)** _____ **[2]**

**(c)** Which two shapes are congruent?

**(c)** _____ **[1]**

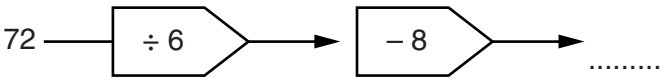
**2** Fill in the missing numbers in these diagrams.

**(a)**



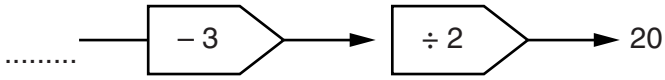

**[1]**

**(b)**



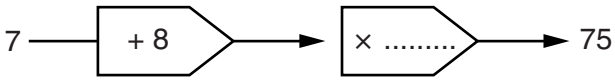

**[1]**

**(c)**




**[2]**

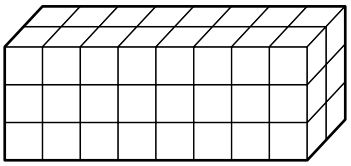
**(d)**




**[1]**

**3** Damien has some small cubes.
Each cube is 1 cm by 1 cm by 1 cm.

**(a)** Damien arranges some of his cubes to form a **cuboid** as shown in the diagram.



How many cubes has he used?

**(a)** _____ **[1]**

**(b)** Damien then arranges 80 of his cubes to form a **cuboid**.

Work out possible dimensions for this cuboid.

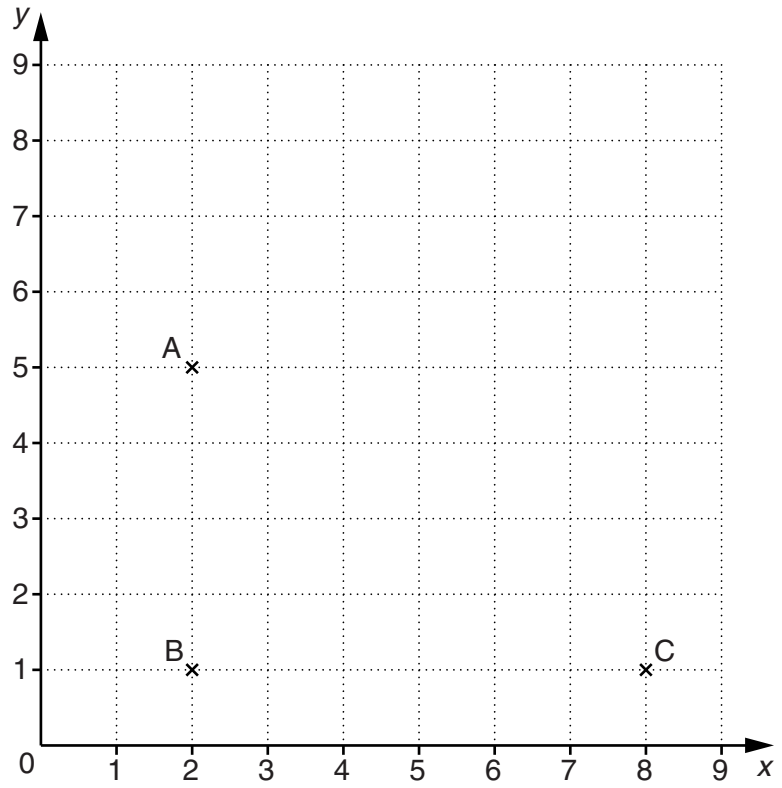
**(b)** _____ cm by _____ cm by _____ cm **[2]**

**(c)** Damien has 100 small cubes.
He arranges some of his cubes into a bigger **cube**.

What is the biggest **cube** he can make?

**(c)** _____ **[2]**

**4** Points A, B and C are plotted on the centimetre grid.




**(a)** ABCD is a rectangle.

Find the coordinates of D.

**(a)** (_____, _____) **[2]**

**(b)** Find the coordinates of the midpoint of AC.

**(b)** (_____, _____) **[2]**

**(c)** Find the area of triangle ABC.

**(c)** _____ $cm^2$ **[2]**

**5** Complete.

**(a)** $\frac{1}{5}$ of 425 = _____ **[1]**

**(b)** 75% of 84 = _____ **[2]**

**(c)** 25% of _____ = 150 **[2]**

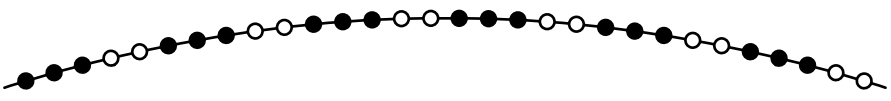
**6** **(a)** A necklace is made from brown beads and orange beads.
For each orange bead there are four brown beads.

Fill in this table for necklaces of different lengths.

| Number of brown beads | Number of orange beads | Total number of beads |
|---|---|---|
| | 8 | |
| 20 | | |
| | | 50 |

**[3]**

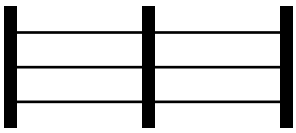
**(b)** A different necklace is made from black beads and white beads.



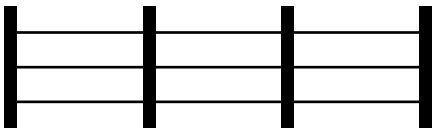
Write the ratio of black beads to white beads in its simplest form.

**(b)** _____ to _____ **[2]**

**7** A fence is made from vertical posts and horizontal rails.



3 posts
6 rails



4 posts
9 rails

**(a)** Complete the table below.

| Number of posts | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| Number of rails | | 6 | 9 | | |

**[2]**

**(b)** How many rails are there for 20 posts?
Explain how you can work this out without drawing a diagram.

There are _____ rails because _____

_____

_____ **[3]**

**8** This is a set of consecutive numbers: 8, 9, 10, 11, 12, 13

**(a)** **(i)** Find the total of each of these sets of three consecutive numbers.
The first one is done for you.

| Consecutive numbers | Total |
|---|---|
| 4, 5, 6 | 15 |
| 19, 20, 21 | |
| 24, 25, 26 | |
| 99, 100, 101 | |

**[2]**

**(ii)** Describe how you can work out the total of any three consecutive numbers by using the middle number.

_____

_____ **[1]**

**(b)** Find a rule for finding the sum of any **five** consecutive numbers by using the middle number.
You must show that your rule works.

_____

_____

_____ **[3]**

**(c)** In a set of seven consecutive numbers, *a* stands for the smallest number.

**(i)** In the boxes, write expressions for the other six numbers in terms of *a*.

| | | | | | | |
|---|---|---|---|---|---|---|
| *a* | | | | | | |

**[1]**

**(ii)** Hence, or otherwise, show that the sum of these seven consecutive numbers is $7(a + 3)$.

_____

_____

_____

_____ **[2]**

**9** Pratik and Steve are playing a game with two fair dice, one red and one blue.
Each dice has 8 faces, numbered 1 to 8.

The dice are thrown together.
The table below shows how each player can score a point.

*r* stands for the number on the red dice and *b* stands for the number on the blue dice.

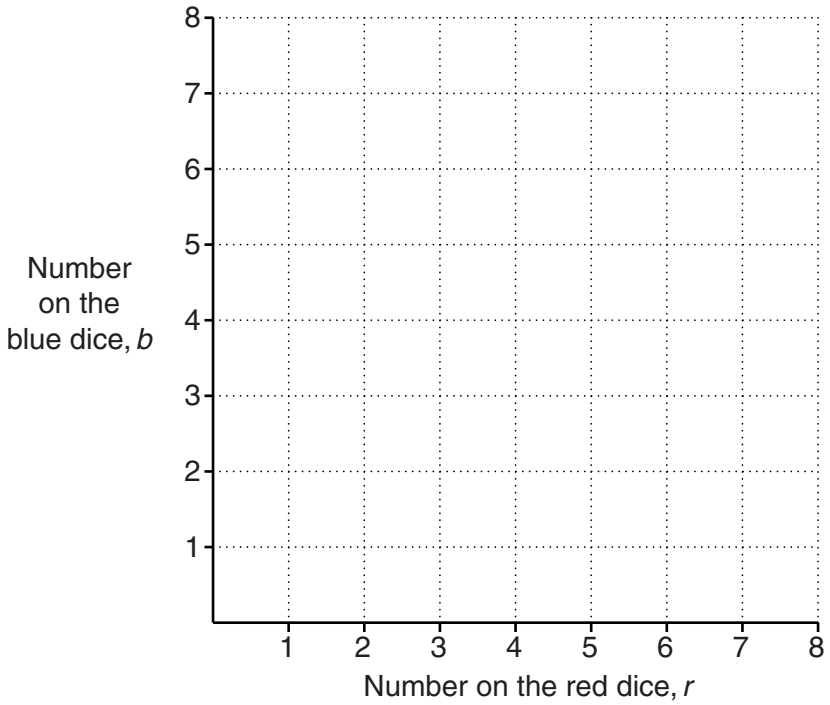
| | Rule in words | Rule using *r* and *b* |
|---|---|---|
| Pratik scores a point | Number on the red dice is the same as the number on the blue dice. | $r = b$ |
| Steve scores a point | | $r + b = 8$ |

**(a)** Describe Steve's rule in words.
Write your description in the table. **[1]**

**(b)** On the grid below draw the graphs of

**(i)** $r = b$, **[1]**

**(ii)** $r + b = 8$. **[2]**



**(c)** Pratik and Steve **both** score a point for one pair of numbers.

**(i)** Which pair of numbers is this?

_____ on the red dice and _____ on the blue dice. **[1]**

**(ii)** How can you find this pair of numbers from the graph?

_____

_____ **[1]**

**10*** These are two special deals at the *Spice* take-away.

| Deal 1 | OR | Deal 2 |
|---|---|---|
| 4 meals for the price of 3 | | Spend over £25 and get a 20% discount |

Anna is buying 4 of the same meal.
She looks at the balti section of the menu.

| | |
|---|---|
| *Chicken balti* | *£8.50* |
| *Lamb balti* | *£8.80* |

Anna wants the 4 meals for the lowest price.

Should she choose deal 1 or deal 2?
Show clearly how you decide.

_____

_____

_____ **[4]**

**11** **(a)** The charge for a conference at the *Warsash* hotel is £360 for hiring the room plus £25 per person.

**(i)** How much will the hotel charge for a conference for 60 people?

**(a)(i)** £ _____ **[1]**

**(ii)** Write down a formula for the charge, £$W$, for a conference for $n$ people at this hotel.

**(ii)** $W =$ _____ **[2]**

**(b)** The *Hamble* hotel uses a different formula to work out the charge, £$H$, for a conference for $n$ people.

$$H = 18n + 400$$

**(i)** Rearrange the formula to make $n$ the subject.

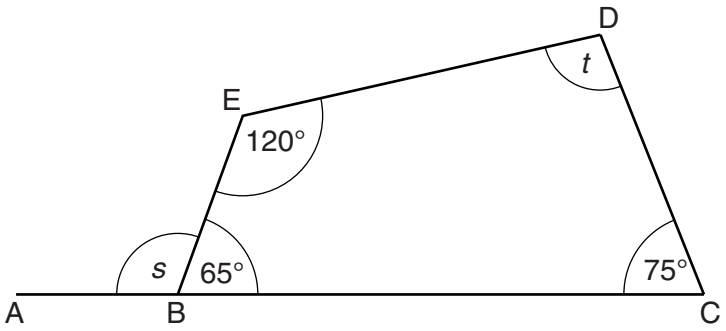
**(b)(i)** _____ **[2]**

**(ii)** A company is charged £1210 for a conference at the *Hamble* hotel.

How many people were at the conference?

**(ii)** _____ **[2]**

**12 (a)** ABC is a straight line.



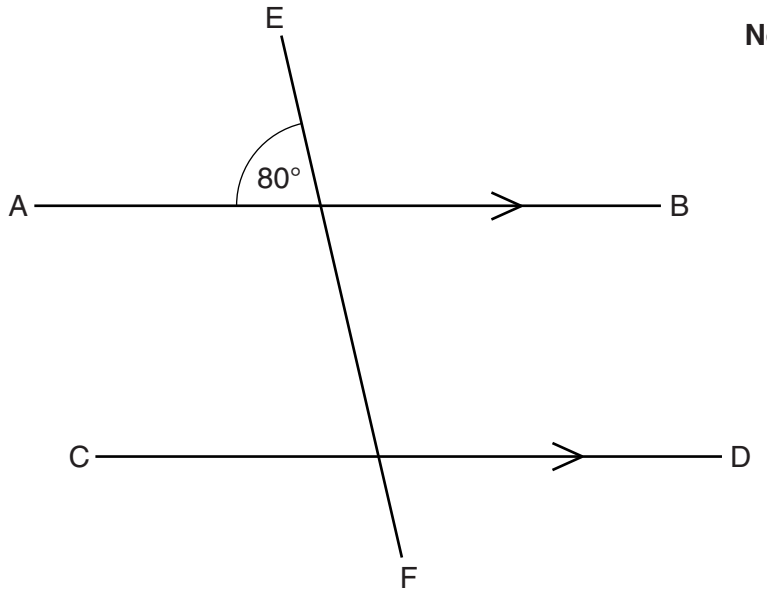

**Not to scale**

Find the size of angle *s* and angle *t*.

**(a)** $s =$ _____ °

$t =$ _____ ° **[2]**

**(b)** AB and CD are parallel lines.
EF is a straight line crossing AB and CD.

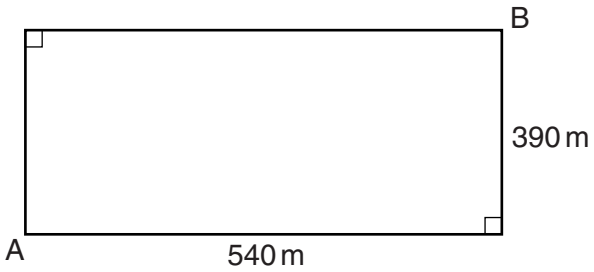



**Not to scale**

An angle of 80° is marked.

Mark **all** other angles of 80°. **[2]**

**13 (a)** A recreation ground is 540 m by 390 m.
There are gates at A and B.



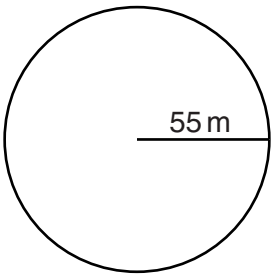

**Not to scale**

Dave walks around the edge of the ground from A to B.
Ewan walks diagonally across the ground from A to B.

Work out how much further Dave walks than Ewan.
Give your answer to a sensible degree of accuracy.

**(a)** _____ m **[4]**

**(b)** A cricket pitch is a circle with radius 55 m.




Work out the circumference of the circle.

**(b)** _____ m **[2]**

**14** The prices of some attractions are reduced for holders of a City Pass.

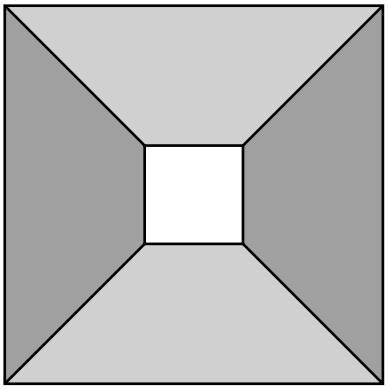
Complete this table.

| | Normal price | Reduced price | Percentage saving |
|---|---|---|---|
| Waterways cruise | £11 | £9.35 | 15% |
| Millennium tower | £12 | | 22½% |
| Open top bus tour | £8.80 | £5.72 | |

**[3]**

**[3]**

**15*** The design below is made from 4 congruent trapeziums and a small square.
They fit together to make a larger square.
Each trapezium has a line of symmetry.



**Not to scale**

Calculate the angles of one trapezium, giving reasons for your answers.

_____

_____

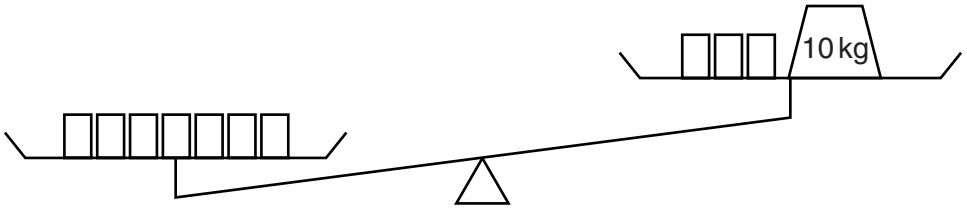
_____

_____

_____

_____ **[3]**

**16** A 10 kg weight and some tins are on a balance.
Each tin weighs $y$ kilograms.




**(a)** Draw a ring around the inequality which represents the situation shown in this diagram.

$7y > 3y + 10$ $7y \geqslant 3y + 10$ $7y < 3y + 10$ $7y \leqslant 3y + 10$ **[1]**

**(b) (i)** Solve the inequality you have ringed in part **(a)**.

**(b)(i)** _____ **[2]**

**(ii)** Describe this solution in words.

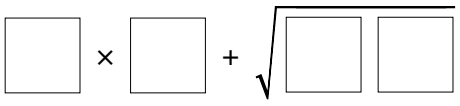
_____

_____ **[1]**

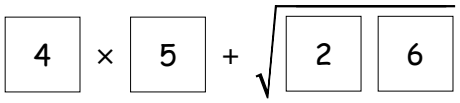
**17** **(a)** Find the reciprocal of 5.
Write your answer as a decimal.

**(a)** _____ **[2]**

**(b)** Joel throws a dice four times.
He gets the numbers 4, 2, 5 and 6.
He puts the numbers in the boxes.
He can put the numbers in the boxes in any order.



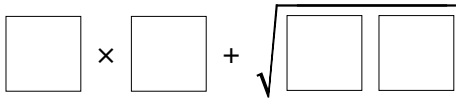
**(i)** Joel arranges the numbers like this.




Use your calculator to work out $4 \times 5 + \sqrt{26}$.

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

**(ii)** Put the numbers 4, 2, 5 and 6 in the boxes below to show how the **biggest** answer can be made.

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

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