EDEXCEL GCSE METHODS IN MATHEMATICS

MATHS



EXAM QUESTION PACK

UNIT 2 FOUNDATION TIER 5MM2F PAPERS

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Methods in Mathematics

Unit 2: Methods 2

For Approved Pilot Centres ONLY

Foundation Tier

Tuesday 20 June 2017 – Afternoon
Time: 1 hour 45 minutes

Paper Reference
5MM2F/01

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- **Calculators may be used.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.



Information

- The total mark for this paper is 100
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed.

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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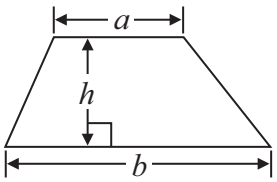
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GCSE Mathematics 2MM01

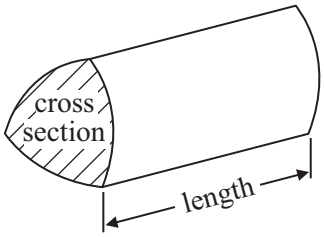
Formulae: Foundation Tier

You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.

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



Volume of prism = area of cross section × length



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Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1 (a) Work out 14.8 + 309

.....

(1)

(b) Work out the difference between 42.3 and 65

.....

(1)

(c) Work out 6.4 × 100 + 23

.....

(1)

(d) Work out $\sqrt[3]{3.375}$

.....

(1)

(e) Work out $(-1.2)^3$

.....

(1)

(f) 4.2 × 2.9 is greater than 5.7 × 2.1

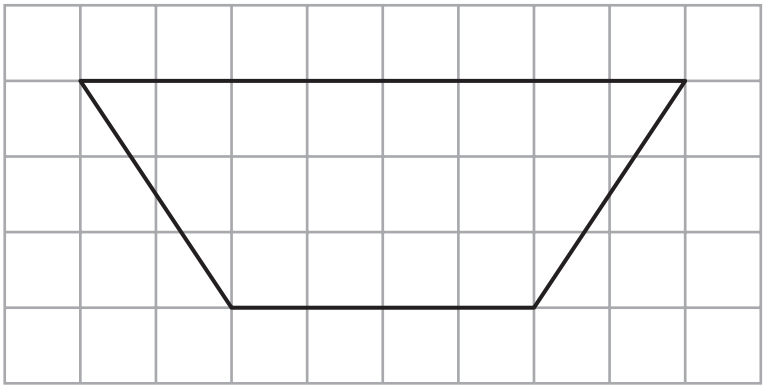
Show that this is true.

(2)

(Total for Question 1 is 7 marks)

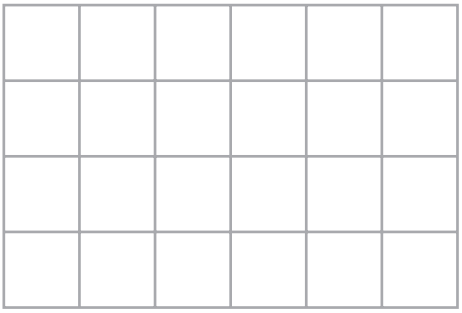
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2 Here is a shape on a grid.



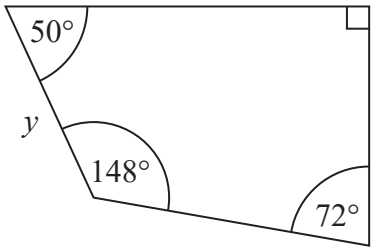
This shape can be made from **six** congruent triangles.

(a) On the grid below, draw **one** of these congruent triangles.



(1)

Here are two congruent quadrilaterals.



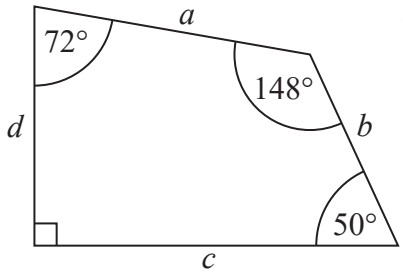


Diagram **NOT** accurately drawn

The length of the side marked y is equal to the length of one of the sides marked a or b or c or d.

(b) Which side?

.....

(1)

(Total for Question 2 is 2 marks)

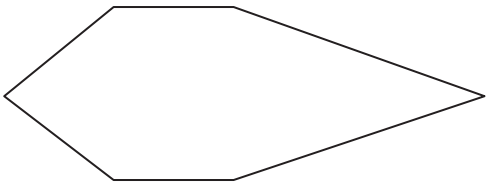
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3 (a) How many sides does a heptagon have?

.....

(1)

Here is a polygon with 6 sides.



(b) On the polygon, mark with arrows (>>) a pair of parallel lines.

(1)

(c) Write down the special name of this polygon.

.....

(1)

This polygon is **not** a regular polygon.

(d) Explain why.

.....

(1)

(Total for Question 3 is 4 marks)

4 (a) Work out the difference between –5 °C and 7 °C.

..... °C

(1)

At 3 am the temperature was –4 °C.
By midday the temperature had gone up by 11°C.
From midday to midnight the temperature went down by 9 °C.

(b) Work out the temperature at midnight.

..... °C

(2)

(Total for Question 4 is 3 marks)

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5 Here is a solid prism made from centimetre cubes.

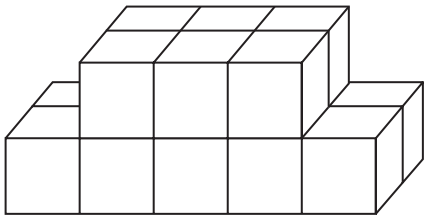


Diagram **NOT** accurately drawn

(a) Find the volume of the solid prism.

..... cm^3

(1)

A solid cuboid is also made from centimetre cubes.

The diagram shows the bottom layer of cubes in the cuboid.

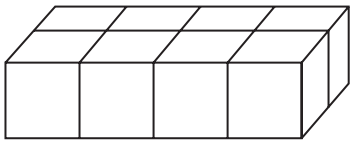


Diagram **NOT** accurately drawn

The volume of the cuboid is 96 cm^3.

(b) Find the height of the cuboid.

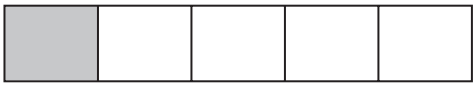
..... cm

(2)

(Total for Question 5 is 3 marks)

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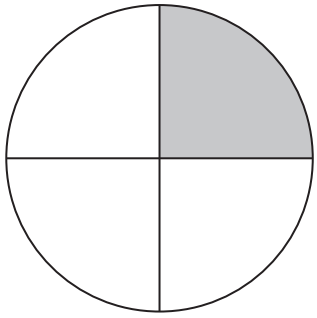
6 Here is a rectangle.



(a) What fraction of this rectangle is shaded?

.....

(1)



(b) What percentage of this circle is shaded?

.....%

(1)

(c) Write 0.8 as a fraction.
Give your answer in its simplest form.

.....

(2)

(d) Write 0.36 as a percentage.

..... %

(1)

(e) Write 37 out of 50 as a percentage.

.....%

(2)

(f) Write 45 out of 500 as a decimal.

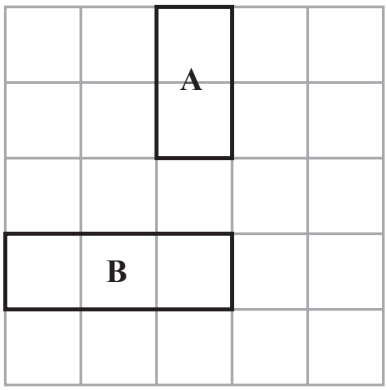
.....

(1)

(Total for Question 6 is 8 marks)

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7 Tile **A** and tile **B** are shown on the grid.



Dan has 8 more tiles.
He has

4 more of tile **A**
and 4 more of tile **B**.

Show how Dan can use these 8 tiles to cover the rest of the grid completely.

(Total for Question 7 is 2 marks)

8 (a) Work out $\frac{1}{8}$ of 240

.....

(1)

$\frac{2}{5}$ of a number is 32

(b) Find the number.

.....

(2)

(c) Work out 20% of £600

£.....

(2)

(Total for Question 8 is 5 marks)

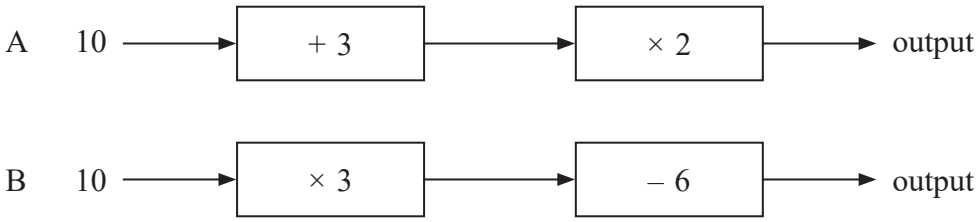
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9 *(a) Here are two number machines, A and B.

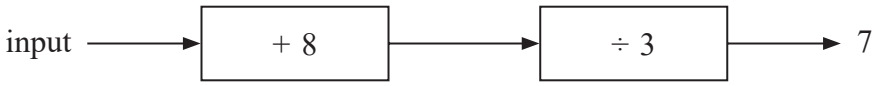


The input for each number machine is 10

Which number machine gives the greater output?
You must show all your working.

(3)

Here is a different number machine.

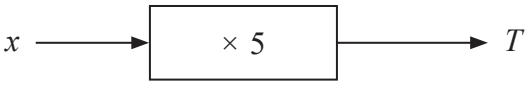


(b) Work out the input for this number machine.

.....

(2)

(c) The input for this number machine is x.
The output for this number machine is T.



Write down a formula for T in terms of x.

.....

(2)

(Total for Question 9 is 7 marks)

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10 (a) Write these numbers in order of size.
Start with the smallest number.

0.6 0.36 0.06 0.3 0.63

.....

(1)

(b) Write these fractions in order of size.
Start with the smallest fraction.

$\frac{1}{6}$ $\frac{3}{8}$ $\frac{11}{24}$ $\frac{1}{3}$ $\frac{5}{12}$

.....

(2)

(c) Write these numbers in order of size.
Start with the smallest number.

$\frac{1}{2}$ 40% 0.52 $\frac{4}{9}$ 0.6

.....

(2)

(Total for Question 10 is 5 marks)

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11 $e = 3f$
$f = 12$

(a) Work out the value of e.

$e =$ .....
(1)

$a = 2c + 5d$
$c = 4$
$d = 6$

(b) Work out the value of a.

$a =$ .....
(2)

$w = 3x + 4y$
$x = 7$
$y = -1$

(c) Work out the value of w.

$w =$ .....
(2)

(Total for Question 11 is 5 marks)

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12 Three different whole numbers have a sum greater than 20 and less than 24
Each whole number is less than 10

(a) What could the three numbers be?

..... , ... , ...

(2)

(b) Find the number that is halfway between –5 and 6

.....

(2)

(Total for Question 12 is 4 marks)

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13 Here is a rule for working out the area of a kite.

Multiply the lengths of the diagonals together and then divide by 2

A kite has diagonals of length 8 cm and 11 cm.

(a) Use the rule to work out the area of the kite.

..... cm^2

(2)

A different kite has an area of 40 cm^2.
One of its diagonals has a length of 5 cm.

(b) Work out the length of the other diagonal.

..... cm

(3)

(Total for Question 13 is 5 marks)

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14 Debbie thinks of a number.
She divides the number by 5

Her answer is 12

(a) What number did Debbie think of?

.....

(1)

Lewis thinks of a number.

He multiplies the number by 3
He then subtracts 18

His answer is 51

(b) What number did Lewis think of?

.....

(2)

(Total for Question 14 is 3 marks)

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15 The diagram shows two cuboids, **A** and **B**.

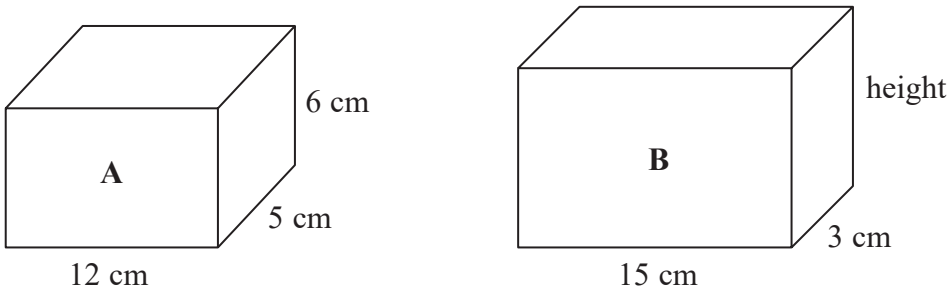


Diagram **NOT** accurately drawn

The two cuboids have the same volume.

Work out the height of cuboid **B**.

..... cm

(Total for Question 15 is 3 marks)

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***16**

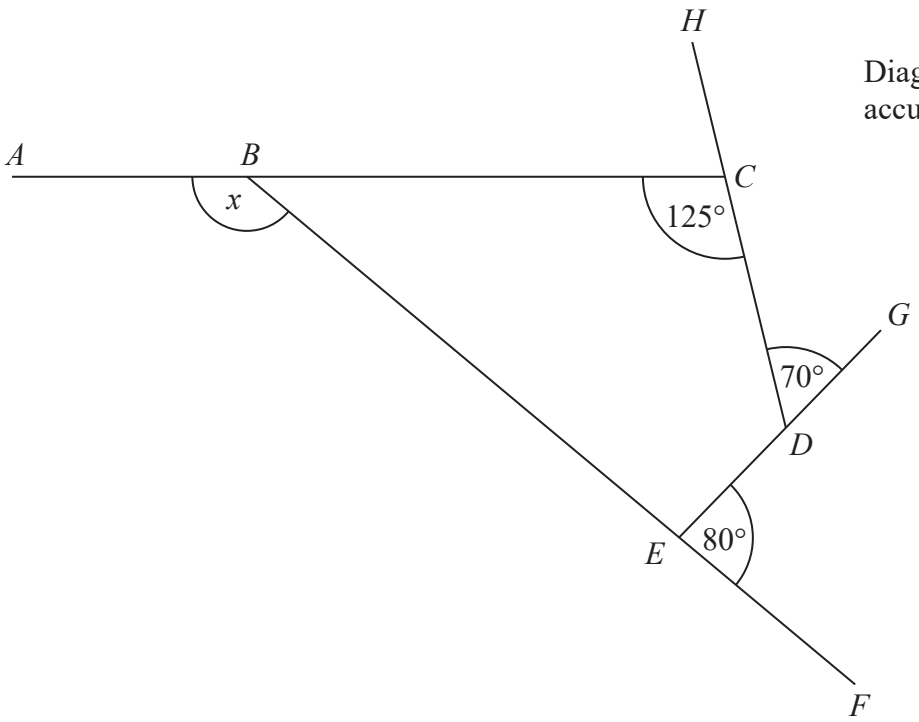


Diagram **NOT** accurately drawn

BCDE is a quadrilateral.
ABC, *EDG*, *BEF*, and *DCH* are straight lines.

Work out the size of the angle marked *x*.
Give reasons for your answer.

(Total for Question 16 is 5 marks)

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***17** There are 120 counters in a bag.

40% of the counters are red.

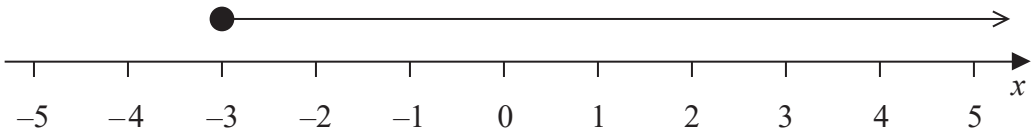
$\frac{3}{8}$ of the counters are yellow.

The rest of the counters are green.

Show that less than a quarter of the counters are green.

(Total for Question 17 is 4 marks)

18 Here is a number line.

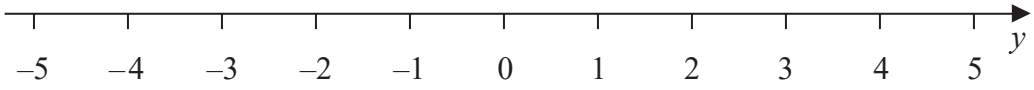


(a) Write down the inequality shown on the number line.

.....

(1)

Here is a number line.



(b) On this number line, show the inequality $-2 < y \leqslant 4$

(2)

n is an integer and $-1 \leqslant n < 5$

(c) Write down all the possible values of n.

.....

(2)

(Total for Question 18 is 5 marks)

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19 David has x counters.

Lisa has 5 more counters than David.
Samia has 4 times as many counters as David.

The total number of counters is T.

(a) Write a formula for T in terms of x.
Give your answer in its simplest form.

.....

(3)

(b) Make e the subject of the formula $p = q + 3e$

.....

(2)

(Total for Question 19 is 5 marks)

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***20**

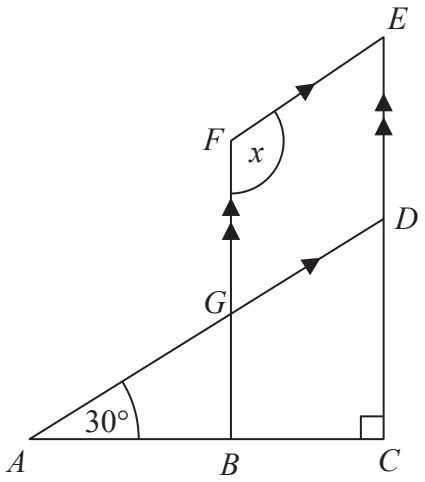


Diagram **NOT** accurately drawn

ABC is a straight line.
BGF is parallel to *CDE*.
AGD is parallel to *FE*.

Angle *CAD* = 30°
Angle *ACD* = 90°

Work out the size of the angle marked *x*.
Give reasons for your answer.

(Total for Question 20 is 4 marks)

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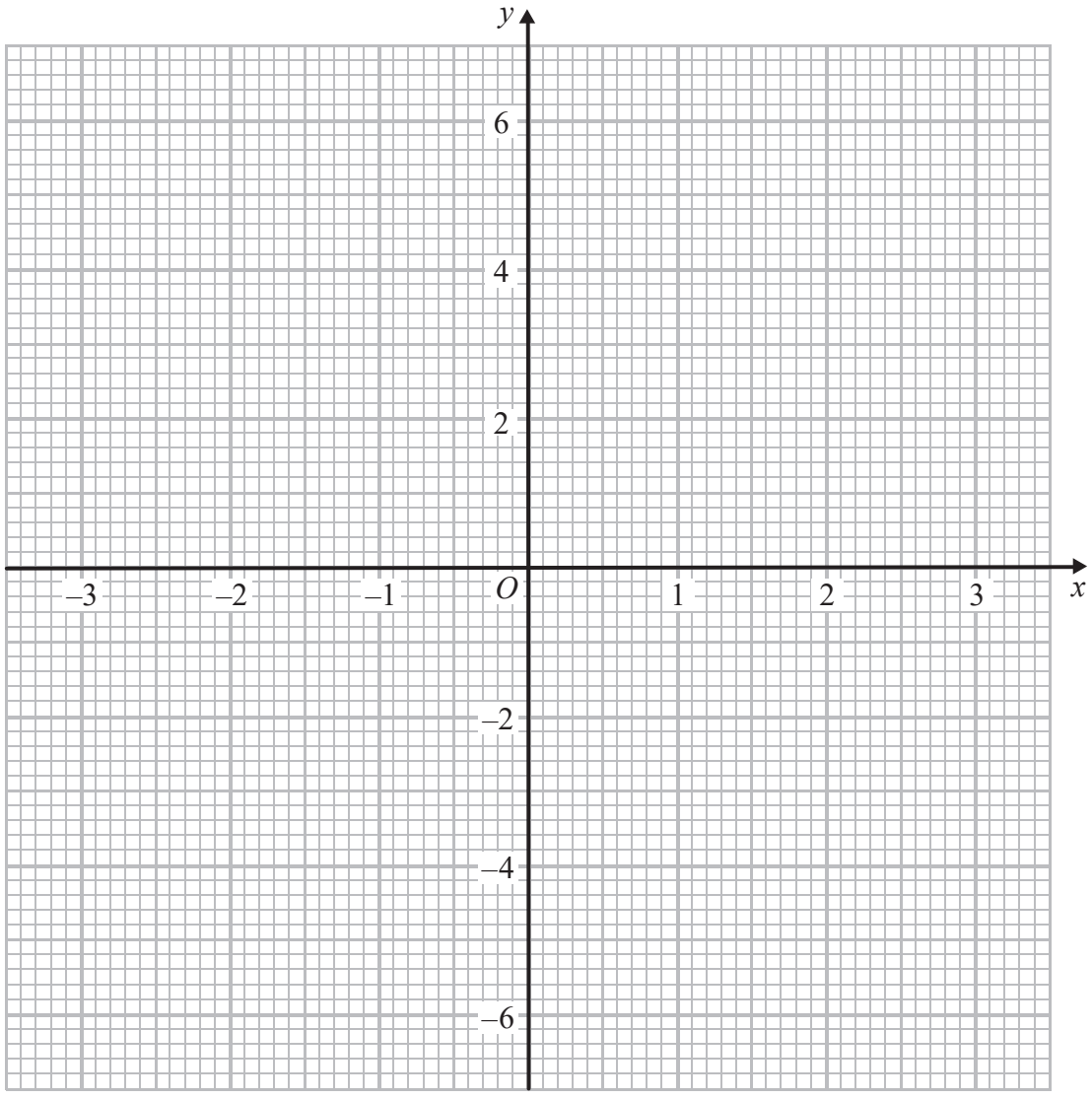
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21 (a) Complete the table of values for $y = x^2 - 5$

x	–3	–2	–1	0	1	2	3
y	4		–4			–1	

(2)

(b) On the grid, draw the graph of $y = x^2 - 5$ for values of x from –3 to 3



(2)

(c) Use the graph to find the values of x for which $x^2 - 5 = 0$

.....

(2)

(Total for Question 21 is 6 marks)

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22

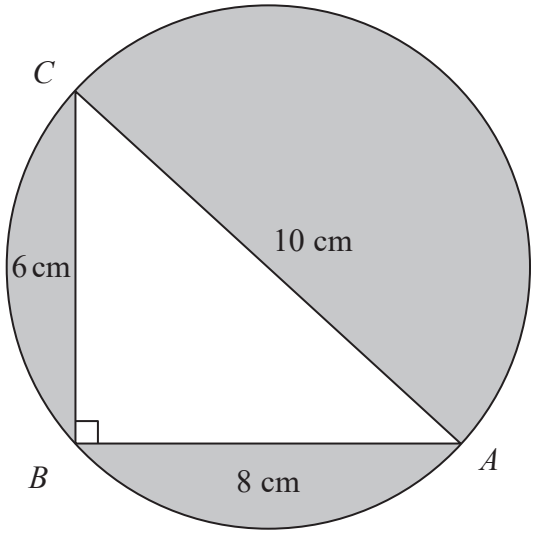


Diagram **NOT** accurately drawn

A, *B* and *C* are points on a circle with *AC* as a diameter.
ABC is a right-angled triangle.

Work out the total area of the regions shaded in the diagram.
Give your answer correct to 1 decimal place.

..... cm^2

(Total for Question 22 is 5 marks)

TOTAL FOR PAPER IS 100 MARKS

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Write your name here

Surname	Other names

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Centre Number | | | | | |

Candidate Number | | | | |

Methods in Mathematics

Unit 2: Methods 2

For Approved Pilot Centres ONLY

Foundation Tier

Wednesday 12 November 2014 – Morning
Time: 1 hour 45 minutes

Paper Reference
5MM2F/01

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators may be used.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.



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  – *use this as a guide as to how much time to spend on each question.*
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Advice

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- Keep an eye on the time.
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- Check your answers if you have time at the end.

Turn over ▶

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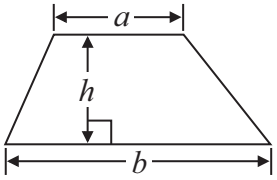
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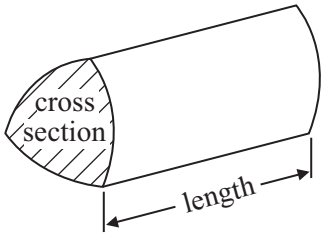
Formulae: Foundation Tier

You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.

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



Volume of prism = area of cross section × length



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Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1 (a) Work out 0.4^2

.....

(1)

(b) Work out $3 \times (0.6 + 0.04)$

.....

(1)

(c) Work out $\dfrac{0.32}{0.4}$

.....

(1)

(d) Work out $0.8 - 0.4 \times 0.7$

.....

(1)

(e) Work out $\sqrt{6.76}$

.....

(1)

(Total for Question 1 is 5 marks)

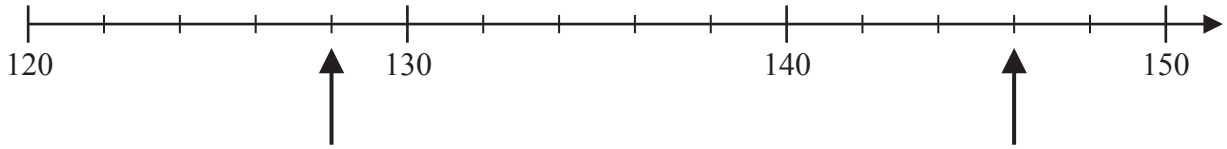
2 (a) Find the sum of two times each of these numbers.

5 8 6 4 9

.....

(2)

(b)



Each arrow points to a number.

What is the difference between the two numbers?

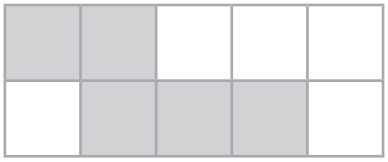
.....

(2)

(Total for Question 2 is 4 marks)

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3 (a) What percentage of this shape is shaded?



.....%

(1)

(b) Write 0.25 as a fraction.

.....

(1)

(c) Write $\frac{7}{100}$ as a decimal.

.....

(1)

(d) Write 43% as a fraction.

.....

(1)

(Total for Question 3 is 4 marks)

4 $T = 5x - 25$

$x = 17$

(a) Work out the value of T.

$T =$ .....

(2)

$S = 3x + 4y$

$x = 4.2$
$y = 7.2$

(b) Work out the value of S.

$S =$ .....

(2)

(Total for Question 4 is 4 marks)

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5 Here is a solid prism made from centimetre cubes.

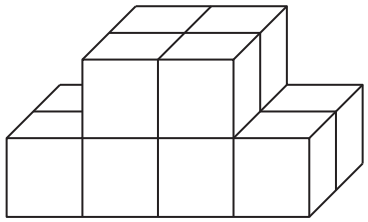


Diagram **NOT** accurately drawn

(a) Find the volume of the solid prism.

..... cm^3

(1)

A cuboid is also made from centimetre cubes.

The diagram shows the bottom layer of cubes in the cuboid.

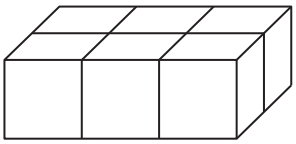


Diagram **NOT** accurately drawn

The volume of the cuboid is 96 cm^3.

(b) Find the height of the cuboid.

..... cm

(2)

(Total for Question 5 is 3 marks)

6 Write a number in each box to make the calculation correct.

(a) $0.78 + \square = 1$

(1)

(b) $\square - 2.73 = 2.73$

(1)

(c) $46 \times 10^2 = \square$

(1)

(Total for Question 6 is 3 marks)

7 (a) Edward thinks of a number.

He subtracts 11 from his number.
His answer is 3

What number did Edward first think of?

.....

(1)

(b) Alice thinks of a number.

She adds 8 to her number.
She then divides by 5
Her answer is 6

What number did Alice first think of?

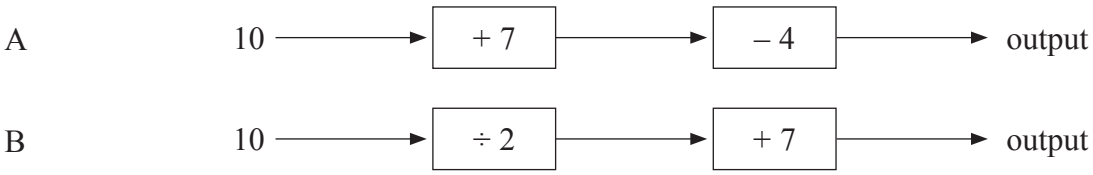
.....

(2)

(Total for Question 7 is 3 marks)

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8 *(a) Here are two number machines, A and B.

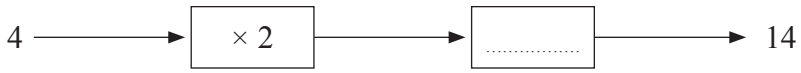


The input for each number machine is 10

Which number machine gives the greater output?
You must show all your working.

(3)

Here is a different number machine.



(b) Complete this number machine.

(1)

(Total for Question 8 is 4 marks)

9 Here is a rule for working out the area of a kite.

> Multiply the lengths of the diagonals together
>
> and then divide by 2

A kite has diagonals of length 7 cm and 12 cm.

(a) Use the rule to work out the area of the kite.

..... cm^2

(2)

A different kite has an area of 35 cm^2.
One of its diagonals has a length of 5 cm.

(b) Work out the length of the other diagonal.

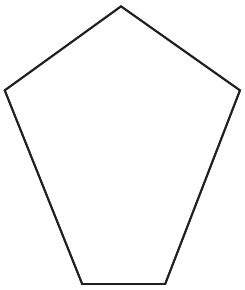
..... cm

(3)

(Total for Question 9 is 5 marks)

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10 (a) Write down the special names of each of these polygons.

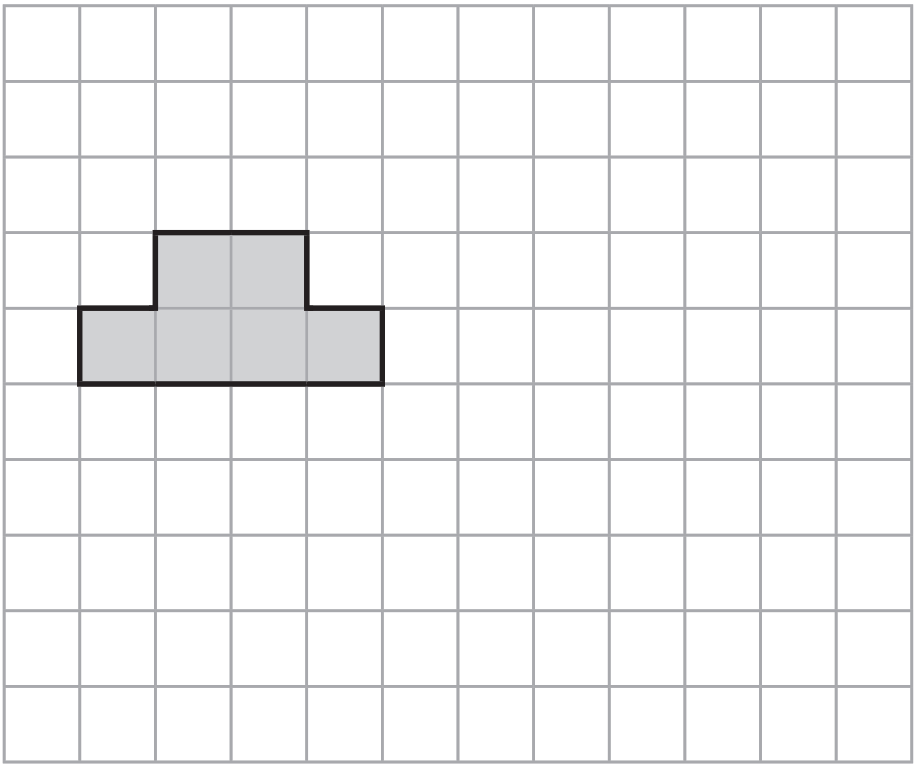




(i) ..... (ii) .....

(2)

(b) On the grid, show how the shaded shape tessellates.
You should draw at least 6 shapes.



(2)

(Total for Question 10 is 4 marks)

11 (a) Write these decimals in order of size.
Start with the smallest decimal.

0.35 0.053 0.305 5.03 3.05

.....

(1)

(b) Write these numbers in order of size.
Start with the smallest number.

$\frac{3}{4}$ 60% $\frac{7}{10}$ 0.65

.....

(2)

(Total for Question 11 is 3 marks)

12 Three different whole numbers have a sum greater than 17 and less than 20
Each number is less than 9

What could the three numbers be?

....., ..., ...

(Total for Question 12 is 2 marks)

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13 $p + q = 8$

Write down the value of

(i) $3(p + q)$

.....

(ii) $\frac{p + q}{2}$

.....

(Total for Question 13 is 2 marks)

14 (a) Work out $\frac{1}{6}$ of 120

.....

(1)

$\frac{3}{5}$ of a number is 27

(b) Find the number.

.....

(2)

(c) Find the number that is halfway between –6 and 8

.....

(2)

(Total for Question 14 is 5 marks)

15 Here are five number cards.

–2	4	–9	12	–6

(i) Use two of the number cards to make this a correct calculation.

☐ + ☐ = 10

(ii) Use two of the number cards to make this a correct calculation.

☐ – ☐ = –3

(Total for Question 15 is 2 marks)

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16 Here is a quadrilateral.

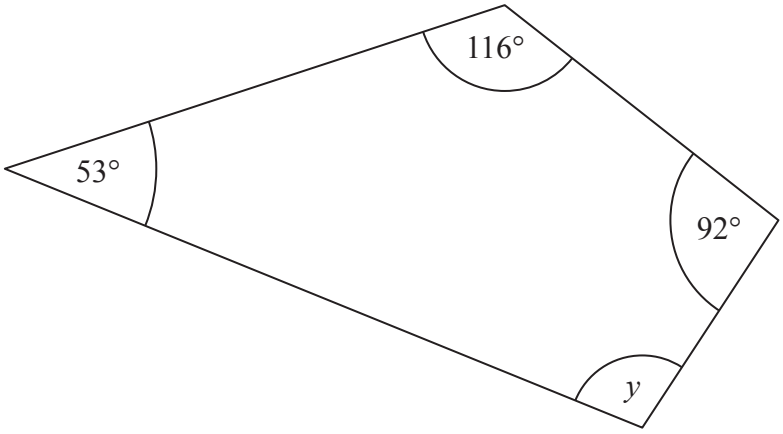


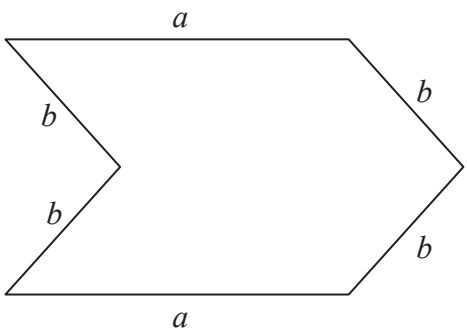
Diagram **NOT** accurately drawn

Work out the size of the angle marked y.

.....°

(Total for Question 16 is 2 marks)

17 P is the total length of the six sides of this shape.



Write a formula for P in terms of a and b.

.....

(Total for Question 17 is 3 marks)

***18** Which answer is the smaller

35% of 36 or $\frac{3}{10}$ of 40 ?

You must show all your working.

(Total for Question 18 is 4 marks)

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***19** The diagram shows three straight lines forming a triangle.

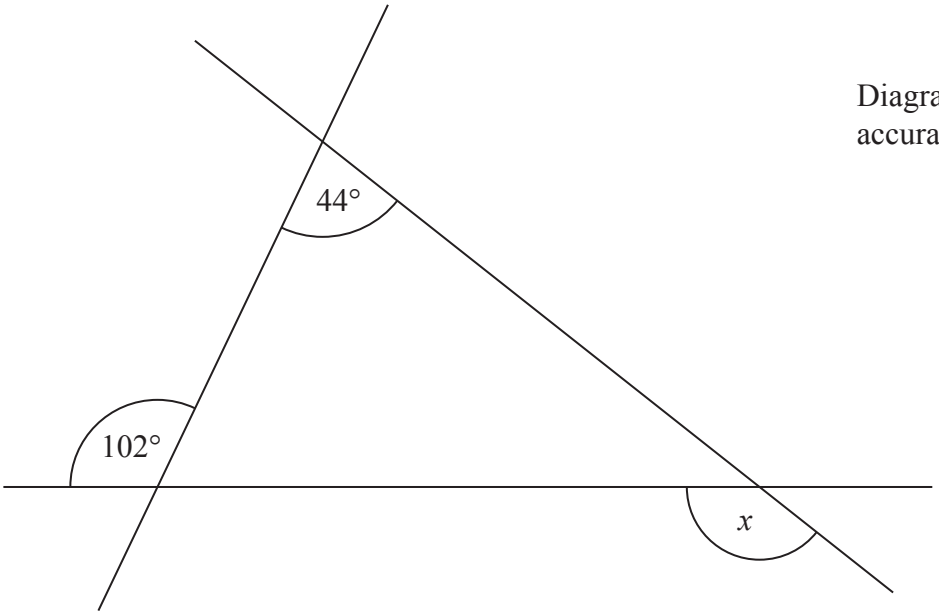


Diagram **NOT** accurately drawn

Work out the size of the angle marked x.
Give reasons for your answer.

(Total for Question 19 is 3 marks)

20 The diagram shows a cuboid and a cube.

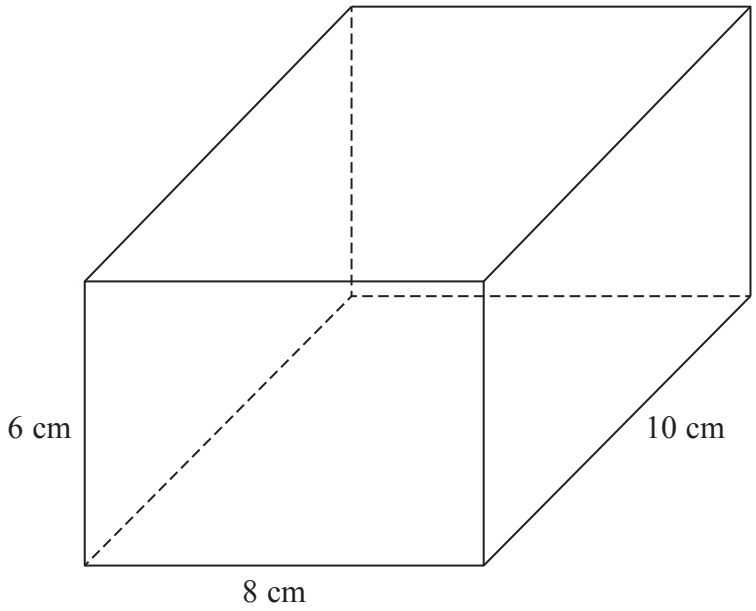
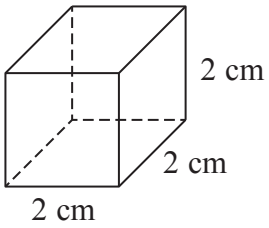


Diagram **NOT** accurately drawn



Work out how many of the cubes are needed to fill the cuboid completely.

.....

(Total for Question 20 is 3 marks)

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21 Here is a diagram showing a circle and a square.

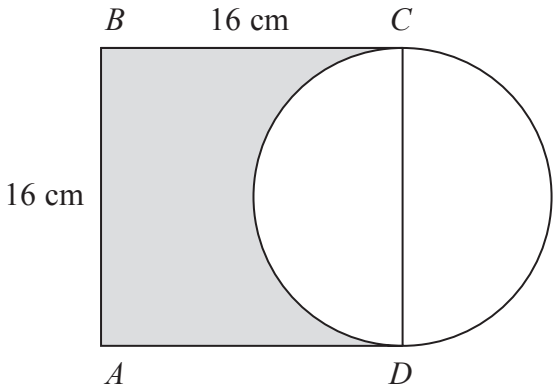


Diagram **NOT** accurately drawn

The square, *ABCD*, has sides of length 16 cm.
The circle has a radius of 8 cm.

(a) Calculate the perimeter of the shaded shape.
Give your answer correct to 1 decimal place.

..... cm

(3)

(b) Calculate the percentage of the area of the square that is shaded.
Give your answer correct to 1 decimal place.

..... %

(4)

(Total for Question 21 is 7 marks)

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***22** The diagram shows a solid shape made from a square-based pyramid and a cuboid.

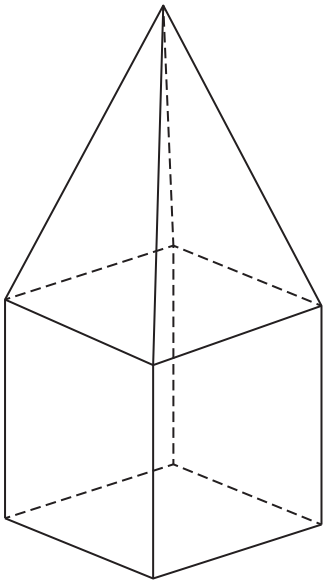


Diagram **NOT** accurately drawn

The shape has

1 face in the shape of a square,
4 faces in the shape of a triangle,
4 faces in the shape of a rectangle.

The area of each rectangle is 12% of the total surface area of the shape.
The total surface area of the shape is 600 cm^2
The area of each triangle is 62 cm^2

Which has the greater area, the square face or a rectangular face?
You must show all your working.

(Total for Question 22 is 6 marks)

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23 $-9 < 4n \leqslant 12$

n is an integer.

Write down all the possible values of n.

.....

(Total for Question 23 is 3 marks)

24

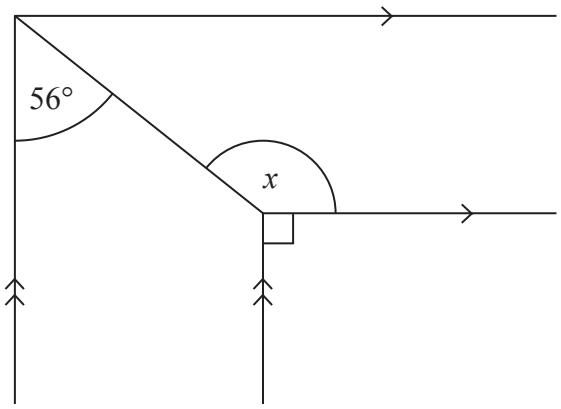


Diagram **NOT** accurately drawn

Work out the size of the angle marked x.

$x =$ ..... °

(Total for Question 24 is 3 marks)

25 Make x the subject of the formula $y = 3(x + 2)$

.....

(Total for Question 25 is 2 marks)

26 The diagram shows a solid prism.

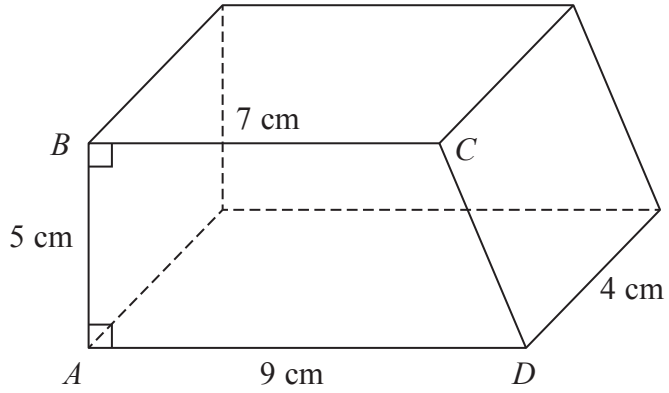


Diagram **NOT** accurately drawn

The cross section of the prism is a trapezium.
$AB = 5$ cm
$BC = 7$ cm
$AD = 9$ cm
The prism has a length of 4 cm.

(a) Calculate the volume of the prism.

..... cm^3

(3)

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Here is the face *ABCD* of the prism.
This face is a trapezium.

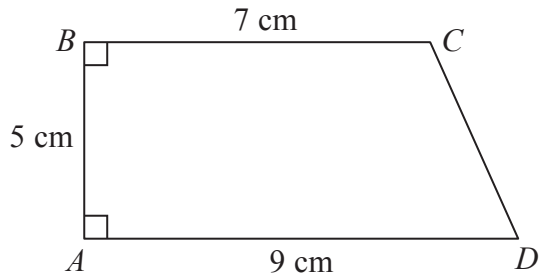


Diagram **NOT** accurately drawn

(b) Calculate the length of *CD*.
Give your answer correct to 3 significant figures.

..... cm

(4)

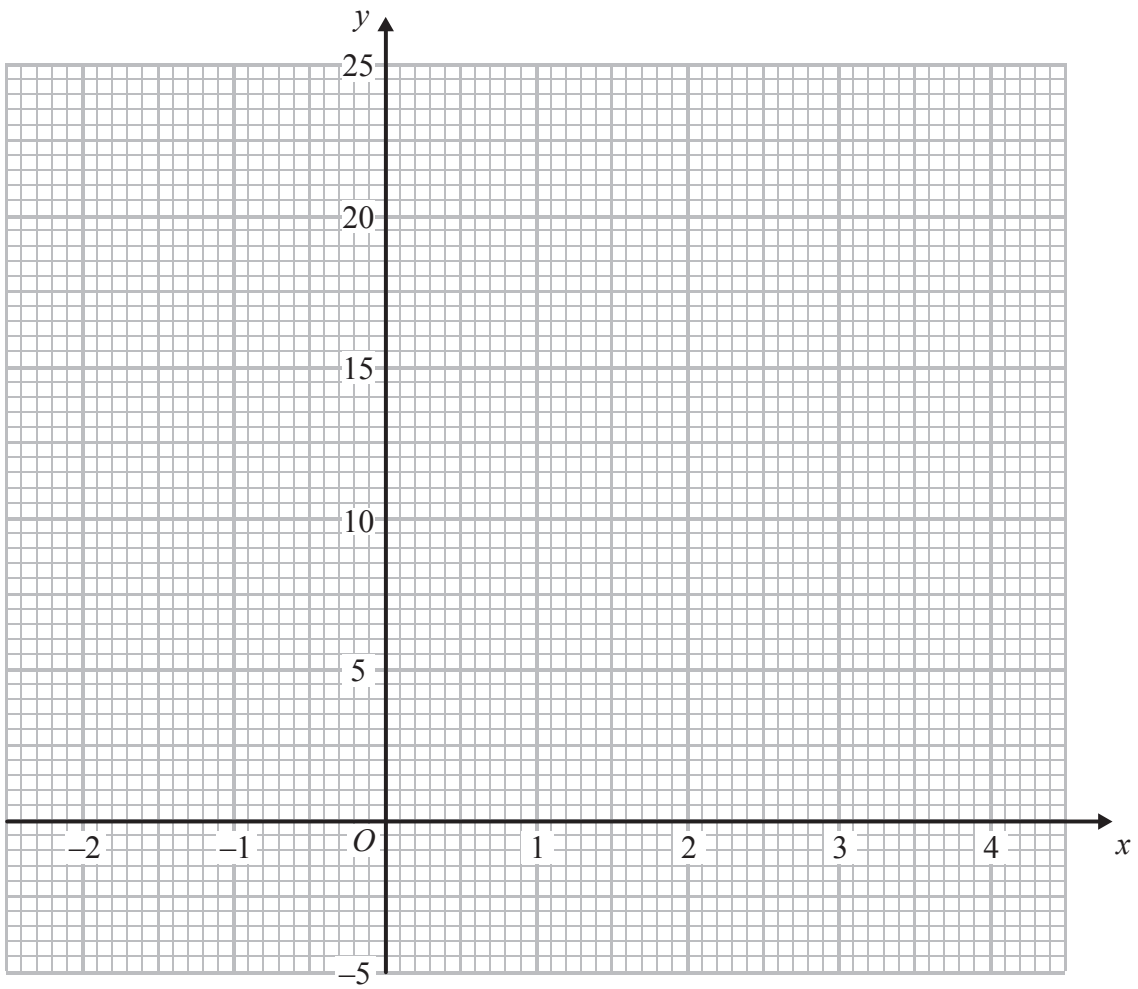
(Total for Question 26 is 7 marks)

27 (a) Complete the table for $y = 2x^2 - 5x$

x	–2	–1	0	1	2	3	4
y		7				3	

(2)

(b) On the grid, draw the graph of $y = 2x^2 - 5x$



(2)

(Total for Question 27 is 4 marks)

TOTAL FOR PAPER IS 100 MARKS

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Mark Scheme (Results)

November 2014

Pearson Edexcel GCSE
Linked Pair Pilot in Mathematics
Methods in Mathematics
Foundation: (Calculator) Unit 2

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NOTES ON MARKING PRINCIPLES

1 All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.

2 Mark schemes should be applied positively.

3 All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e if the answer matches the mark scheme. Note that in some cases a correct answer alone will not score marks unless supported by working; these situations are made clear in the mark scheme. Examiners should be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.

4 Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.

5 Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

6 Mark schemes will award marks for the quality of written communication (QWC).
The strands are as follows:

i) *ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear*
Comprehension and meaning is clear by using correct notation and labelling conventions.

ii*) select and use a form and style of writing appropriate to purpose and to complex subject matter*
Reasoning, explanation or argument is correct and appropriately structured to convey mathematical reasoning.

iii) *organise information clearly and coherently, using specialist vocabulary when appropriate*.
The mathematical methods and processes used are coherently and clearly organised and the appropriate mathematical vocabulary used.

With working

If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.
If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.
If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.
If there is no answer on the answer line then check the working for an obvious answer.
Partial answers shown (usually indicated in the ms by brackets) can be awarded the method mark associated with it (implied).
Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks; transcription errors may also gain some credit. Send any such responses to review for the Team Leader to consider.
If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.

8 Follow through marks

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.
Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

9 Ignoring subsequent work

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: e.g. incorrect cancelling of a fraction that would otherwise be correct
It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect e.g. algebra.

10 Probability

Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).
Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.
If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.
If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

Linear equations

Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded (embedded answers).

12 Parts of questions

Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

13 Range of answers

Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1)

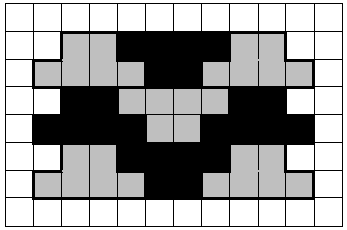
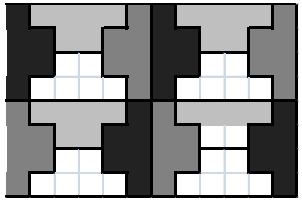
14 The detailed notes in the mark scheme, and in practice/training material for examiners, should be taken as precedents over the above notes.

Guidance on the use of codes within this mark scheme
M1 – method mark for appropriate method in the context of the question A1 – accuracy mark B1 – Working mark C1 – communication mark QWC – quality of written communication oe – or equivalent cao – correct answer only ft – follow through sc – special case dep – dependent (on a previous mark or conclusion) indep – independent isw – ignore subsequent working

PAPER: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
1	(a)		0.16	1	B1 cao
	(b)		1.92	1	B1 cao
	(c)		0.8	1	B1 accept $\frac{4}{5}$
	(d)		0.52	1	B1
	(e)		2.6	1	B1
2	(a)		64	2	M1 for adding the 5 given numbers 5+8+6+4+9 (= 32) A1 cao or M1 for doubling at least one of the numbers given A1 cao
	(b)		18	2	M1 for 146 or 128 indicated or a gap value of 2 shown A1 cao

PAPER: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
3	(a)		50%	1	B1 cao
	(b)		$\frac{1}{4}$	1	B1 or equivalent fraction
	(c)		0.07	1	B1 cao
	(d)		$\frac{43}{100}$	1	B1
4	(a)		60	2	M1 for $5 \times 17 - 25$ A1 cao
	(b)		41.4	2	M1for 3×4.2 (= 12.6) and 4×7.2 (= 28.8) A1 cao
5	(a)		12	1	B1 cao
	(b)		16	2	M1 for 96÷2 (= 48) or 96÷3 (= 32) or 96÷6 oe A1 cao
6	(a)		0.22	1	B1
	(b)		5.46	1	B1
	(c)		4600	1	B1

PAPER: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
7	(a)		14	1	B1 cao
	(b)		22	2	M1 for 6 × 5 (= 30) or 6×5-8 A1 cao
*8	(a)	A 10 + 7 – 4 = 13 B 10 ÷ 2 + 7 = 12	Machine A with supportive working	3	M1 for 17 – 4 (= 13) or 5 + 7 (= 12) A1 for 13 and 12 C1ft (dep on M1 and two suitable answers to compare) Machine A gives the greater answer
	(b)		+ 6 or × 1.75	1	B1 for + 6 or × 1.75
9	(a)		42	2	M1 7 × 12 ÷ 2 oe A1 cao
	(b)		14	3	M1 35 × 2 (= 70) or 35 ÷ 5 (= 7) M1 (dep) "35 ×2"÷5 or "35 ÷5"×2 A1 cao or M1 $\frac{5x}{2} = 35$ oe M1 $5x = 70$ oe or $\frac{x}{2} = 7$ oe A1 cao

PAPER: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
10	(a)(i)		pentagon	2	B1
	(ii)		hexagon		B1
	(b)	e.g.  e.g.  etc	tessellation	2	B2 for at least 6 correct tessellating shapes, including the initial shape, and no incorrectly drawn shapes or gaps [B1 for at least 3 correct tessellating shapes, including initial shape; ignore any additional shapes attempted, gaps or incorrect shapes]

PAPER: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
11	(a)		0.053, 0.305, 0.35, 3.05, 5.03	1	B1 cao
	(b)	0.75, 0.60, 0.7(0), 0.65 or 75%, 60%, 70%, 65%	60%, 0.65, $\frac{7}{10}$, $\frac{3}{4}$	2	M1 for writing all numbers in the same format eg as decimals or percentages (condone one omission or conversion error) A1 for a correctly ordered list [SC: B1 three values only in the correct order or all values in the correct reverse order if M1 not scored]
12		8, 7, 3 8, 7, 4 8, 6, 4 8, 6, 5 7, 6, 5	Any correct combination	2	M1 for correctly adding 3 whole numbers < 9 or correctly adding 3 whole numbers whose sum is 18 or 19 A1
13	(i)		24	2	B1 cao
	(ii)		4		B1 cao

PAPER: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
14	(a)		20	1	B1 cao
	(b)		45	2	M1 for 27 ÷ 3 (= 9) or 27 × 5 (= 135) A1 cao
	(c)		1	2	M1 for 8 – -6 (= 14) or a numberline with -6 and 8 clearly indicated A1 cao
15	(i)		-2 and 12	2	B1 cao (any order)
	(ii)		-9 and -6		B1 cao
16			99	2	M1 for 360 – (53 + 116 + 92) A1 cao
17		$P = a + a + b + b + b + b$	$P = 2a + 4b$	3	B3 for $P = 2a + 4b$ or equivalent (B2 for $2a + 4b$ oe or $P = 2a + kb$ $k \neq 0$ oe or $P = ka + 4b$ $k \neq 0$ oe) (B1 for $2a$ or $4b$ or $P = kb$ $k \neq 0$ or $P = ka$ $k \neq 0$ oe or $P = a + b$)

PAPER: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
*18			$\frac{3}{10}$ of 40 is smaller with supportive working	4	M1 for a method to find 35% of 36 (= 12.6) M1 for a method to find $\frac{3}{10}$ of 40 (= 12) A1 12 and 12.6 C1 ft (dep M1) for a statement identifying the smaller consistent with their two calculated figures
*19			122 and reasons	3	M1 for a complete method to find the required angle A1for $x = 122(^{o})$ cao (Can be shown on the diagram) C1 (dep M1) for the fully correct reasons relating to the working shown. Reasons from: 'sum of the angles on a straight line is 180' 'exterior angle of a triangle is equal to the sum of the interior opposite angles' 'exterior angles of a polygon add up to 360' 'angles in a triangle add up to 180'

PAPER: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
20			60	3	M1 for 6 × 8 × 10 (= 480) or 2 × 2 × 2 (= 8) M1 (dep) for "480" ÷ "8" A1 cao OR M1for attempting one division (eg 6 ÷ 2) may be implied by marks or numbers on a side of the cuboid M1 (dep) for "3" × "4" × "5" A1 cao
21	(a)		73.1	3	M1 for a method to find circumference of the circle; eg. π × 16 or 50.26..... M1 for a fully complete method, eg. π × 16 ÷ 2 + 3 × 16 A1 for answer in range 73.1 to 73.2
	(b)		60.7	4	M1 for 16 × 16 (= 256) M1 for a correct method to find the area of the circle; eg. π × 8 × 8 (= 64π or 201.06....) M1(dep on M1) for a fully complete method to find the required percentage; eg. (256 – "64π ÷ 2") ÷ "256" × 100 A1 for answer in range 60.7 to 60.8

PAPER: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
*22			Rectangular face is greater with supporting working	6	M1 for a correct method to find 12% of 600; eg. 0.12 × 600 (= 72), the area of each rectangle M1 (dep) for the total area of the 4 rectangles, eg. 4 × "72" (= 288) M1 (indep) for the total area of the 4 triangles, eg. 4 × 62 (= 248) M1for 600 – 4 × "72" – "4 × 62" A1 for 64 C1 ft (dep M3) for a clear statement that the area of the rectangle is greater OR M1 for 62 ÷ 600 × 100 (= $10\frac{1}{3}$ (%)) M1 (dep) for 4 × "10⅓" (= $41\frac{1}{3}$ (%)) M1 (indep) for 4 × 12 or 48(%) M1 for 100 – ("4 × 12" + 4 × "$10\frac{1}{3}$") A1 for $10\frac{2}{3}$ (%) C1 ft (dep M3) for a clear statement that the area of the rectangle is greater

PAPER: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
23			-2, -1, 0, 1, 2, 3	3	M1 for $-\frac{9}{4} < n$ or $n \leq \frac{12}{4}$ or -9 ÷ 4, -8 ÷ 4, ... , 12 ÷ 4 (dividing at least three numbers between -9 and 12 by 4) or -2.25, -2, ... , 3 seen (at least three values seen) A2 for all six integers given (A1 for a list containing at least 4 correct integers, condone no more than 1 incorrect integer)
24			146	3	M1 for a complete method to find another angle on the diagram M1 for a complete method to the angle x A1 cao OR M2 for 56 + 90 as part of a corresponding angle method (M1 for splitting angle x into a right angle and an acute angle) A1 cao
25			$x = \frac{y - 6}{3}$ or $x = \frac{y}{3} - 2$	2	M1 $3x + 6 = y$ or $x + 2 = \frac{y}{3}$ A1 $x = \frac{y - 6}{3}$ or $x = \frac{y}{3} - 2$

PAPER: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
26	(a)		160	3	M1 for a correct method to find the area of the cross section; eg. $\frac{5}{2}(7 + 9)$ (= 40) or for a correct method to find the volume of an appropriate prism, eg. 5 × 7 × 4 (= 140) or 5 × 9 × 4 (=180) M1 (dep) for a fully correct method to find the required volume; eg. "40" × 4 or "140" + 0.5 × 2 × 5 × 4 or "180"- 0.5 × 2 × 5 × 4 A1 cao
	(b)		5.39	4	M1 for 9 – 7 (= 2) M1 for $5^2 + "2"^2$ M1 for $\sqrt{5^2 + "2"^2}$ ($=\sqrt{"29"}$) A1 in the range 5.3 - 5.4
27	(a)	<table><tr><td>*x*</td><td>-2</td><td>-1</td><td>0</td></tr><tr><td>*y*</td><td>18</td><td>7</td><td>0</td></tr></table> <table><tr><td>*x*</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>*y*</td><td>-3</td><td>-2</td><td>3</td><td>12</td></tr></table>	18, 0, -3, -2, 12	2	B2 all correct (B1 any three correct)
	(b)		Correct graph	2	M1 for 5 or more "points" plotted correctly, provided at least B1 scored in (a) A1 cao for the correct curve

Modifications to the mark scheme for Modified Large Print (MLP) papers.

Only mark scheme amendments are shown where the enlargement or modification of the paper requires a change in the mark scheme.

The following tolerances should be accepted on marking MLP papers, unless otherwise stated below:
Angles: ±5º
Measurements of length: ±5 mm

PAPER: 5MM2F_01			
Question		**Modification**	**Notes**
2	(b)	2 cm gaps. Arrows put above the line	
4	(b)	MLP x changed to e y changed to f	
5		Models for both parts for all candidates MLP also provided with diagrams. Both text & diagrams inform that each cube represents a one centimetre cube.	
10	(a) (b)	Polygons labelled (i) & (ii) 2 cm grid 5 shapes asked for instead of 6 cut out shape provided	

PAPER: 5MM2F_01			
Question		**Modification**	**Notes**
13	(i) and (ii)	Question has been reworded but the answer has not been altered.	
20		2 models for all. MLP: diagram also provided. Measurements on the diagram of the cube have been moved to match the positioning of measurements on the cuboid.	
22		1 model for all. MLP: diagram also provided.	
24		Wording added: 'There are two pairs of parallel lines. Three angles are marked: 56°, x and a right angle'.	
25		MLP x changed to e y changed to f	
26	(a)	Model provided for all.	
		MLP diagram also provided. Wording added: 'Angle ABC = angle BAD = 90°	
27		y axis: 1 square for 1. y axis stopped at 20. x axis: 1 square for 0.5	

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Surname	Other names

Pearson Edexcel GCSE

Centre Number | | | | | |

Candidate Number | | | | |

Methods in Mathematics

Unit 2: Methods 2

For Approved Pilot Centres ONLY

Foundation Tier

Thursday 19 June 2014 – Morning
Time: 1 hour 45 minutes

Paper Reference
5MM2F/01

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators may be used.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.



Information

- The total mark for this paper is 100
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed.

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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5/5/6/C2/

P 4 3 4 0 3 A 0 1 2 8

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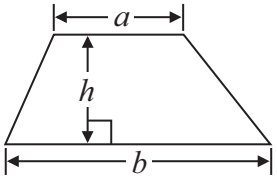
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GCSE Mathematics 2MM01

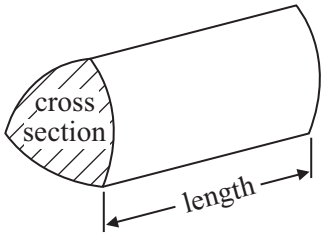
Formulae: Foundation Tier

You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.

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



Volume of prism = area of cross section × length



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Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1 (a) Work out $6.3 + 2.1 + 5.7$

.....

(1)

(b) Work out -3×-2

.....

(1)

(c) Work out $24 \div -1.5$

.....

(1)

(d) Work out $9 \times (8.32 + 1.68)$

.....

(1)

(e) Work out $4 - 1.3^2$

.....

(1)

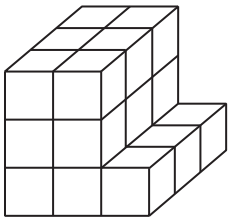
(f) Work out the difference between 16.8 and 22

.....

(1)

(Total for Question 1 is 6 marks)

2 Prism **A** is a solid prism made from centimetre cubes.



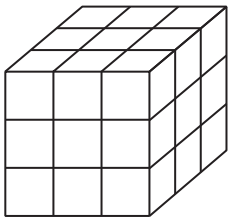
Prism **A**

Diagram **NOT** accurately drawn

(a) Find the volume of prism **A**.

..... cm^3

(2)



Prism **B**

Diagram **NOT** accurately drawn

Prism **B** is a solid cube made from centimetre cubes.
Prism **B** is made from more centimetre cubes than prism **A**.

(b) How many more centimetre cubes?

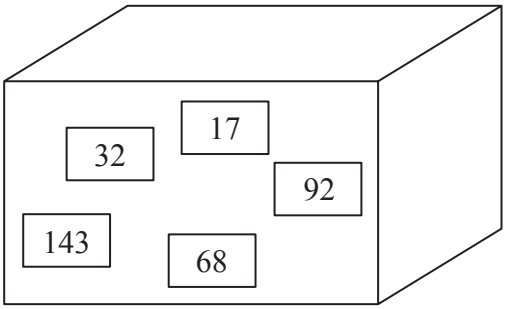
.....

(1)

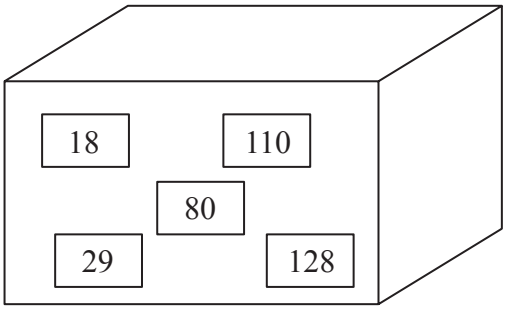
(Total for Question 2 is 3 marks)

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3 There are five cards with numbers on them in Box **P**.
There are five cards with numbers on them in Box **Q**.



Box P



Box Q

Anne finds the total of the five numbers in each box.

Which box has the greater total?
You must show how you got your answer.

Box .....

(Total for Question 3 is 2 marks)

4 (a) Write 29% as a fraction.

.....

(1)

(b) Write 0.07 as a fraction.

.....

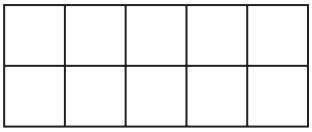
(1)

(c) Write 3% as a decimal.

.....

(1)

(d) Shade $\frac{2}{5}$ of this shape.



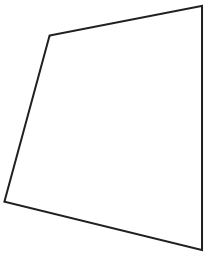
(1)

(Total for Question 4 is 4 marks)

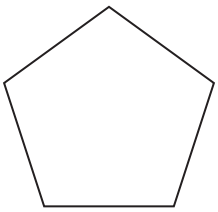
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5 Here are 5 polygons.

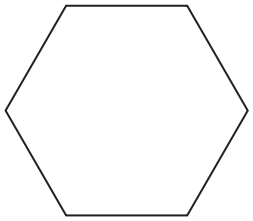
Polygon **A**



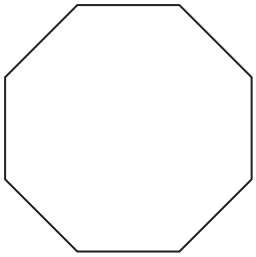
Polygon **B**



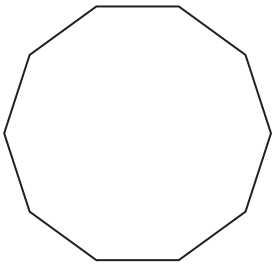
Polygon **C**



Polygon **D**



Polygon **E**



Match each of the polygons **A**, **B**, **C**, **D** and **E** to its mathematical name in the table.

Mathematical name	**Polygon**
pentagon	
decagon	
octagon	
quadrilateral	
hexagon	

(Total for Question 5 is 3 marks)

***6** Which is bigger $\frac{5}{8}$ or $\frac{2}{3}$?

You must show clearly how you got your answer.

(Total for Question 6 is 3 marks)

7 Joshua and Mary both think of the same number.

Joshua adds 14 to the number.
His answer is 39

Mary subtracts 14 from the number.

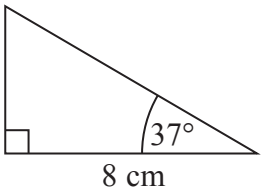
What is her answer?

.....

(Total for Question 7 is 3 marks)

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8 These two triangles are congruent.



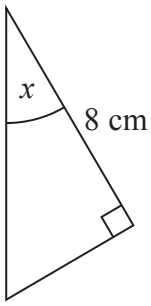


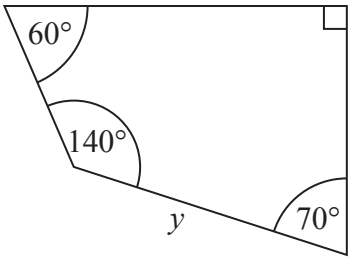
Diagram **NOT** accurately drawn

(a) Write down the size of the angle marked x.

.....°

(1)

These two quadrilaterals are congruent.



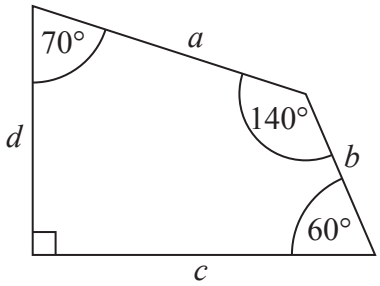


Diagram **NOT** accurately drawn

Side y is equal to one of the sides, a or b or c or d.

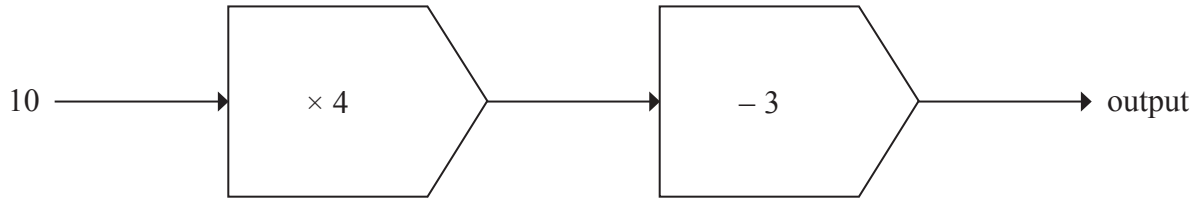
(b) Which side?

.....

(1)

(Total for Question 8 is 2 marks)

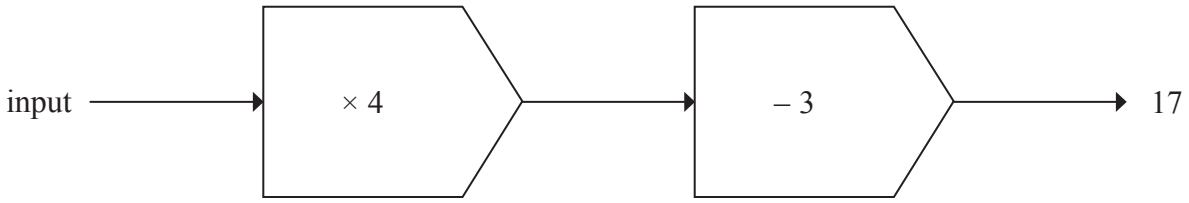
9 (a) Work out the output for this number machine.



.....

(1)

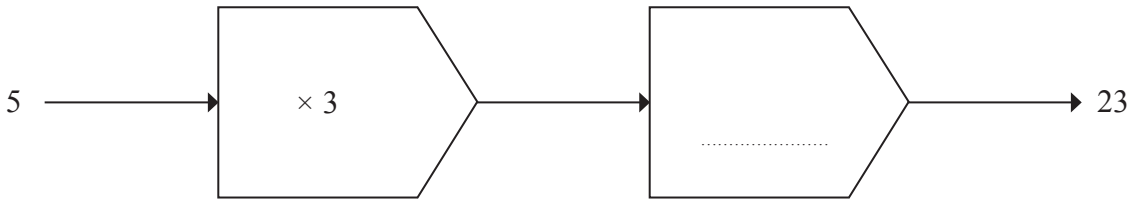
(b) Work out the input for this number machine.



.....

(2)

(c) Complete this number machine.



(1)

(Total for Question 9 is 4 marks)

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10 (a) Work out the difference in temperature between −5 °C and −9 °C.

..... °C

(1)

(b) What temperature is 3 °C lower than 1 °C?

..... °C

(1)

−3 °C is halfway between temperature A and temperature B.

Temperature A is 2 °C.

(c) Work out temperature B.

..... °C

(2)

(Total for Question 10 is 4 marks)

11 (a) Write these decimals in order of size.
Start with the smallest decimal.

0.76 0.6 0.07 0.59 0.63

.....

(1)

(b) Write these numbers in order of size.
Start with the smallest number.

35% $\frac{3}{8}$ $\frac{2}{5}$ 25% $\frac{3}{10}$

.....

(2)

(Total for Question 11 is 3 marks)

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12 $C = p - 37$

$p = 50$

(a) Work out the value of C.

.....

(1)

$D = r + 2q$

$r = 4.3$
$q = 6.2$

(b) Work out the value of D.

.....

(2)

$E = 4w - 3t$

$w = -5$
$t = -1$

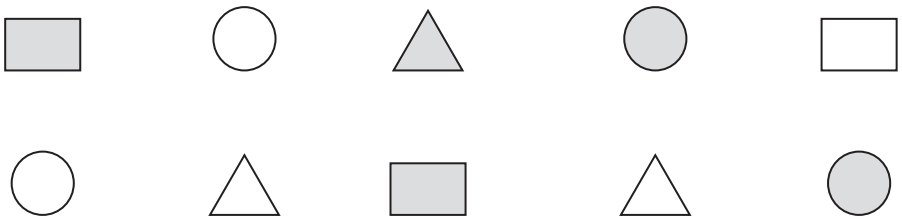
(c) Work out the value of E.

.....

(2)

(Total for Question 12 is 5 marks)

13 Here are some white shapes and some grey shapes.



(a) What percentage of the shapes are white shapes?

.....%

(1)

Ali takes some of the shapes.

$\frac{3}{7}$ of the shapes that are left are white shapes.

(b) How many white shapes and how many grey shapes did Ali take?

white shapes .....

grey shapes .....

(2)

(Total for Question 13 is 3 marks)

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14 The diagram shows two cuboids, **A** and **B**.

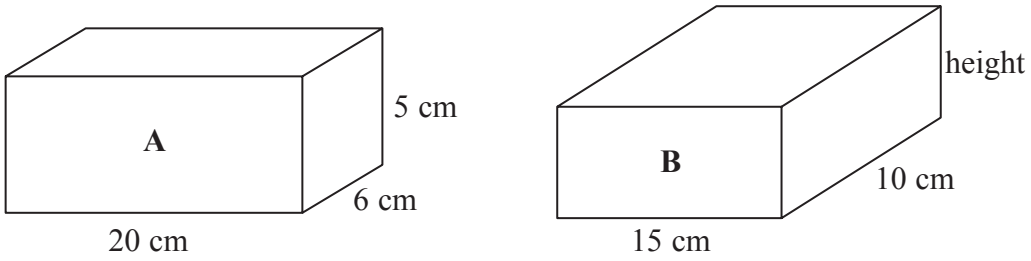


Diagram **NOT** accurately drawn

The two cuboids have the same volume.

Work out the height of cuboid **B**.

..... cm

(Total for Question 14 is 3 marks)

15 Here are four shapes.

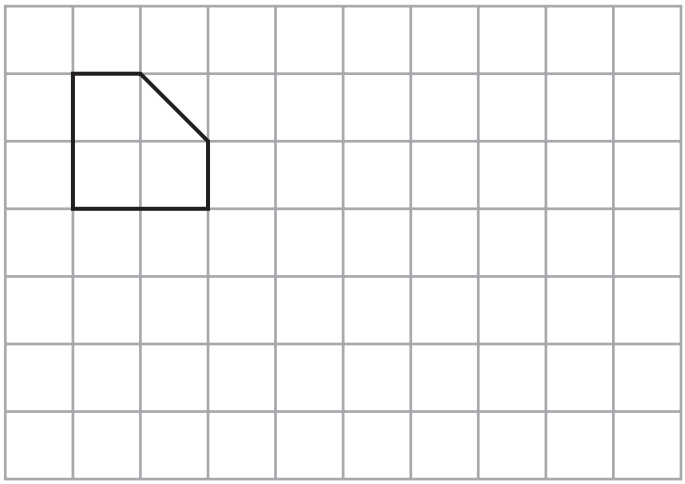


One of these shapes does **not** tessellate.

(a) Draw a circle around this shape.

(1)

Here is a shape drawn on a grid.



(b) On the grid, show how this shape will tessellate.
You must draw at least 6 more shapes.

(2)

(Total for Question 15 is 3 marks)

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16 Here is a rule for working out the volume of a pyramid.

> Multiply the base area by the height
>
> and then divide by 3

A pyramid has a base area of 9 cm^2 and a height of 4 cm.

(a) Use the rule to work out the volume of this pyramid.

..... cm^3

(2)

A different pyramid has a volume of 20 cm^3.
The base area of this pyramid is 10 cm^2.

(b) Work out the height of this pyramid.

..... cm

(3)

(Total for Question 16 is 5 marks)

***17**

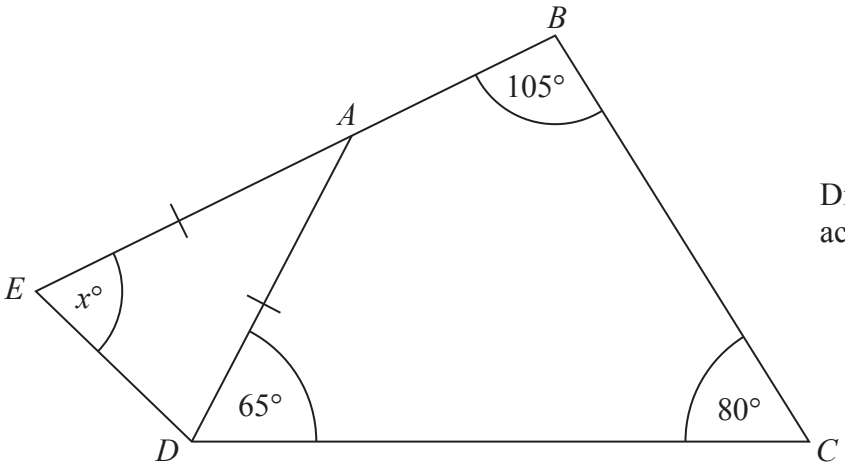


Diagram **NOT** accurately drawn

ABCD is a quadrilateral.
EAB is a straight line.
ADE is an isosceles triangle with $AD = AE$

Work out the value of x.
Give reasons for your answer.

(Total for Question 17 is 4 marks)

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18 (a) Work out 18% of £614

£ .....

(2)

(b) Write 36 as a percentage of 48

..... %

(2)

(Total for Question 18 is 4 marks)

19 The diagram shows a quarter circle.

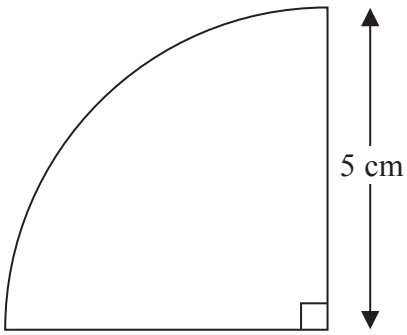


Diagram **NOT** accurately drawn

The radius of the quarter circle is 5 cm.

Work out the area of the quarter circle.
Give your answer correct to 3 significant figures.

.....

(Total for Question 19 is 4 marks)

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20 Peter has x counters.

Lia has 7 more counters than Peter.
Soraya has 3 times as many counters as Peter.

The total number of counters is T.

Write a formula for T in terms of x.

.....

(Total for Question 20 is 3 marks)

21 The total weight of 55 identical items is 2.75 kg.

Work out the total weight of 22 of these identical items.

..... kg

(Total for Question 21 is 2 marks)

22 *ABCD* is a rectangle.

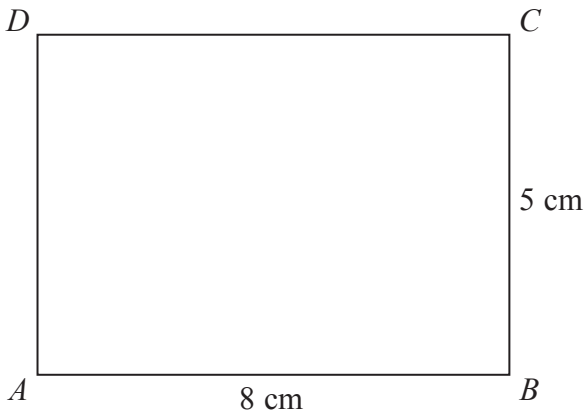


Diagram **NOT** accurately drawn

$AB = 8$ cm
$BC = 5$ cm

Work out the length of AC.
Give your answer correct to 3 significant figures.

..... cm

(Total for Question 22 is 3 marks)

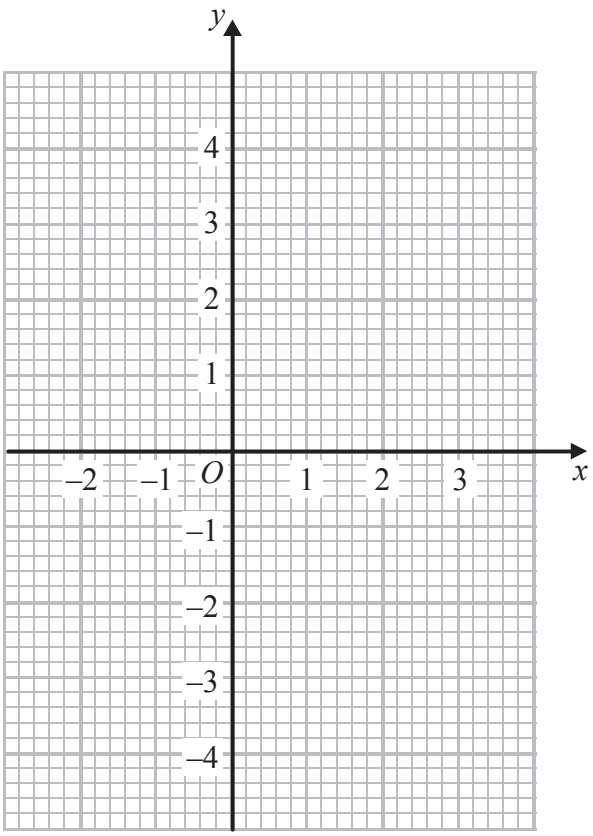
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23 (a) Complete the table of values for $y = x^2 - x - 3$

x	–2	–1	0	1	2	3
y		–1		–3	–1	

(2)

(b) Draw the graph of $y = x^2 - x - 3$ for values of x from –2 to 3



(2)

(c) Use your graph to find estimates for the solutions of $x^2 - x - 3 = 0$

.....

(2)

(Total for Question 23 is 6 marks)

24 Here is a 6-sided polygon.

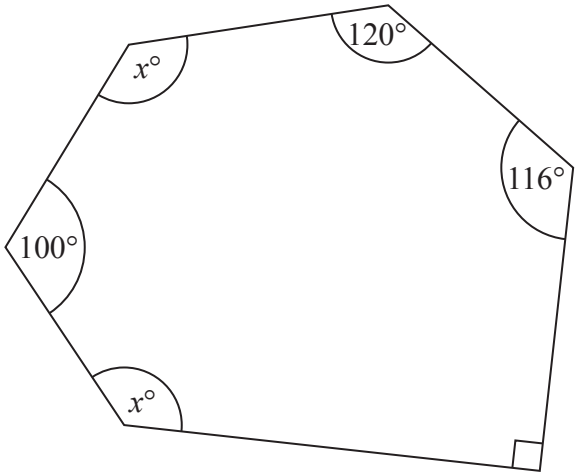


Diagram **NOT** accurately drawn

Work out the value of x.

.....

(Total for Question 24 is 4 marks)

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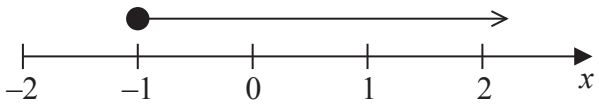
25 £360 is shared in the ratio 1 : 3 : 5

Work out the difference between the largest share and the smallest share.

£ .....

(Total for Question 25 is 3 marks)

26 Here is a number line.



(a) Write down the inequality shown on the number line.

.....

(1)

(b) Solve $5y - 2 < 18$

.....

(2)

(Total for Question 26 is 3 marks)

27 Beth has 600 counters.

$\frac{3}{5}$ of the counters are yellow.

25% of the counters are red.
The rest of the counters are green.

Beth is given some more red counters.
Now the ratio of the number of green counters to the number of red counters is 1 : 2

How many red counters was Beth given?

.....

(Total for Question 27 is 4 marks)

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***28**

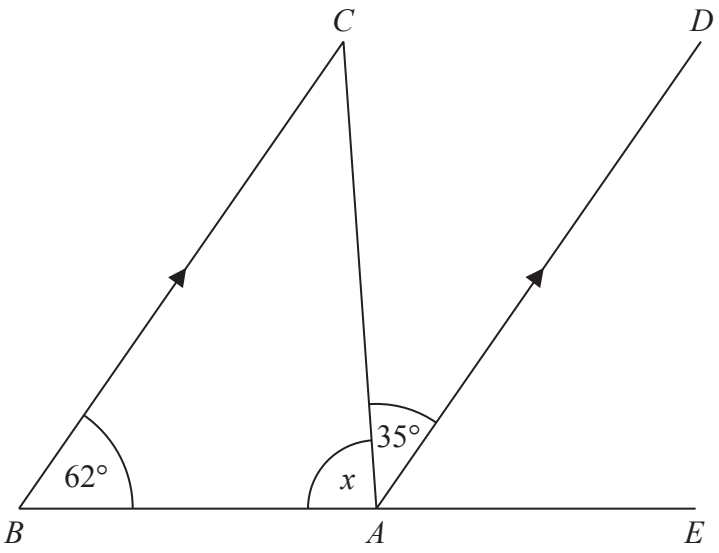


Diagram **NOT** accurately drawn

ABC is a triangle.
BC is parallel to *AD*.
BAE is a straight line.

Work out the size of the angle marked *x*.
You must give reasons for your answer.

(Total for Question 28 is 4 marks)

TOTAL FOR PAPER IS 100 MARKS

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Mark Scheme (Results)

Summer 2014

Pearson Edexcel GCSE
Linked Pair Pilot in Mathematics
Methods in Mathematics (2MM01)
Foundation Paper 2F

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Summer 2014
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NOTES ON MARKING PRINCIPLES

1 All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.

2 Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.

3 All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.

4 Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.

5 Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

6 Mark schemes will indicate within the table where, and which strands of QWC, are being assessed. The strands are as follows:

i) *ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear*
Comprehension and meaning is clear by using correct notation and labeling conventions.

ii*) select and use a form and style of writing appropriate to purpose and to complex subject matter*
Reasoning, explanation or argument is correct and appropriately structured to convey mathematical reasoning.

iii) *organise information clearly and coherently, using specialist vocabulary when appropriate*.
The mathematical methods and processes used are coherently and clearly organised and the appropriate mathematical vocabulary used.

7 With working

If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.

If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.

If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.

If there is no answer on the answer line then check the working for an obvious answer.

Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.

If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.

8 Follow through marks

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.

Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

9 Ignoring subsequent work

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: e.g. incorrect canceling of a fraction that would otherwise be correct

It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect e.g. algebra.

Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

10 Probability

Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).

Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.

If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.

If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

11 Linear equations

Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded.

12 Parts of questions

Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

13 Range of answers

Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1)

Guidance on the use of codes within this mark scheme
M1 – method mark A1 – accuracy mark B1 – Working mark C1 – communication mark QWC – quality of written communication oe – or equivalent cao – correct answer only ft – follow through sc – special case dep – dependent (on a previous mark or conclusion) indep – independent isw – ignore subsequent working

PAPER: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
1	(a)		14.1	1	B1 for 14.1 oe
	(b)		6	1	B1 cao
	(c)		–16	1	B1 cao
	(d)		90	1	B1 cao
	(e)		2.31	1	B1 for 2.31
	(f)		5.2	1	B1 for 5.2 or − 5.2 or ± 5.2 oe
2	(a)		21	2	M1 for 7 × 3 or 9 + 6 + 6 or 15 A1 cao
	(b)		6	1	B1 for 6 or ft from (a)
3			Box Q	2	M1 for 32 + 17 + 68 + 92 + 143 **or** 352 seen **or** 18 + 29 + 80 + 128 + 110 **or** 365 seen A1 for Q with 352 **and** 365 seen

PAPER: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
4	(a)		$\frac{29}{100}$	1	B1 for $\frac{29}{100}$ oe
	(b)		$\frac{7}{100}$	1	B1 for $\frac{7}{100}$ oe
	(c)		0.03	1	B1
	(d)		4 squares	1	B1 for any 4 squares shaded
5			BEDAC	3	B3 for all 5 correct (B2 for 3 or 4 correct, B1 for 1 or 2 correct)
*6		eg $\frac{5}{8} = \frac{15}{24}$ $\frac{2}{3} = \frac{16}{24}$ OR $\frac{5}{8}$ = 0.625 or 62.5% $\frac{2}{3}$ = 0.66... or 66.6...% or 0.67 or 67%	$\frac{2}{3}$ bigger + correct working	3	M1 for attempting to change to fractions with a common denominator; at least one correct A1 for 2 correct fractions C1 (ft) (dep on M1) for correct answer for their two fractions OR M1 for attempting to change both fractions to decimals or percentages; at least one correct A1 for 2 correct decimals or percentages which can be used to compare C1 (ft) (dep on M1) for correct answer for their two decimals or percentages OR M1 for attempting to find $\frac{5}{8}$ and $\frac{2}{3}$ of a number; at least one correct A1 for 2 correct solutions C1 (ft) (dep on M1) for correct answer for their two solutions

PAPER: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
7			11	3	M1 for 39 – 14 (= 25) M1 for '25' – 14 A1 cao OR for 14 + 14 (= 28) M1 for 39 – '28' A1 cao
8	(a)		37	1	B1 cao
	(b)		*a*	1	B1 cao
9	(a)		37	1	B1 cao
	(b)		5	2	M1 for 17 + 3 (=20) seen or $4x - 3 = 17$ oe A1 cao
	(c)		+8	1	B1 for +8 or × 1.5333(333...) or × $\frac{23}{15}$ or ÷ $\frac{15}{23}$
10	(a)		4	1	B1 for 4 (accept – 4)
	(b)		–2	1	B1 cao
	(c)		−8	2	M1 for correct method for finding difference 5 or −5 between 2 and −3 Eg 2 − −3 or −3 – 2 or indication on number line A1 cao

PAPER: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
11	(a)	0.07, 0.59, 0.6, 0.63, 0.76	order	1	B1 cao
	(b)	35%, 37.5%, 40%, 25%, 30% 0.35, 0.375, 0.4, 0.25, 0.3	order	2	M1 for conversion of all 5 numbers into the same form for comparison with at least one correct conversion or 4 in the correct order or all 5 in reverse order A1 for 25%, $\frac{3}{10}$, 35%, $\frac{3}{8}$, $\frac{2}{5}$ oe
12	(a)		13	1	B1 cao
	(b)		16.7	2	M1 for $4.3 + 2 \times 6.2$ oe A1 cao
	(c)		–17	2	M1 for correct substitution into the formula $4\times{-5} - 3\times{-1}$ or $-20 - -3$ oe A1 cao
13	(a)		50	1	B1 cao
	(b)		white 2 grey 1	2	M1 for two answers that total 3 **or** white =2 **or** white=3, grey=4 A1 cao
14			4	3	M1 for $20 \times 6 \times 5$ or 600 seen M1 for "600" ÷ (15 × 10) oe A1 cao

PAPER: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
15	(a)			1	B1 cao
	(b)		tessellation	2	B2 for at least 6 correct shapes including initial shape, correctly tessellating. (B1 for at least 4 correct shapes, which may include initial shape, correctly tessellating, ignore the rest of the diagram)
16	(a)		12	2	M1 for $9 \times 4 \div 3$ oe A1 cao
	(b)		6	3	M1 for a correct first step eg $20 \times 3 (= 60)$ or $20 \div 10 (= 2)$ or giving equation eg $10h \div 3 = 20$ M1 for complete method to give height eg '60' ÷ 10 or '2' × 3 or $h = 20 \times 3 \div 10$ oe A1 cao
*17			$x = 55$ + reasons	4	M1 for $<BAD = 360 - 80 - 105 - 65 (=110)$ M1(dep) for complete method to find x A1 for $x = 55°$ C1 for fully correct appropriate reasons for complete method used Angles in a quadrilateral add up to 360° Exterior angle of a triangle equals the sum of the interior opposite angles **or** Angles on a straight line add up to 180° **and** Angles in a triangle add up to 180° Base angles of isosceles triangle are equal

PAPER: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
18	(a)		110.52	2	M1 for $614 \times 18 \div 100$ oe A1 cao
	(b)		75	2	M1 for $36 \div 48 \times 100$ oe A1 cao
19			19.6 cm^2	4	M1 for $\pi \times 5^2$ (=78.5…) M1 for "78.5" $\div 4$ oe A1 for 19.6 – 19.64 B1 indep for cm^2
20		$x + x + 7 + 3x = T$	$T = 5x + 7$	3	B3 for $T = 5x + 7$ oe (B2 for $5x + 7$ oe or $T = 5x + a$ oe, $a \neq 0$ or $T = bx + 7$ oe, $b \neq 0$ B1 for $x + 7$ or $3x$ or T = a linear expression in x or $5x + a$ oe, $a \neq 0$ or $bx + 7$ oe, $b \neq 0$)
21			1.1	2	M1 for $2.75 \div 55 \times 22$ oe, eg $\frac{2}{5} \times 2.75$ A1 cao
22			9.43	3	M1 for $8^2 + 5^2$ or 64 + 25 or 89 M1 for $\sqrt{8^2 + 5^2}$ or $\sqrt{64 + 25}$ or $\sqrt{89}$ A1 for 9.43(39811...)

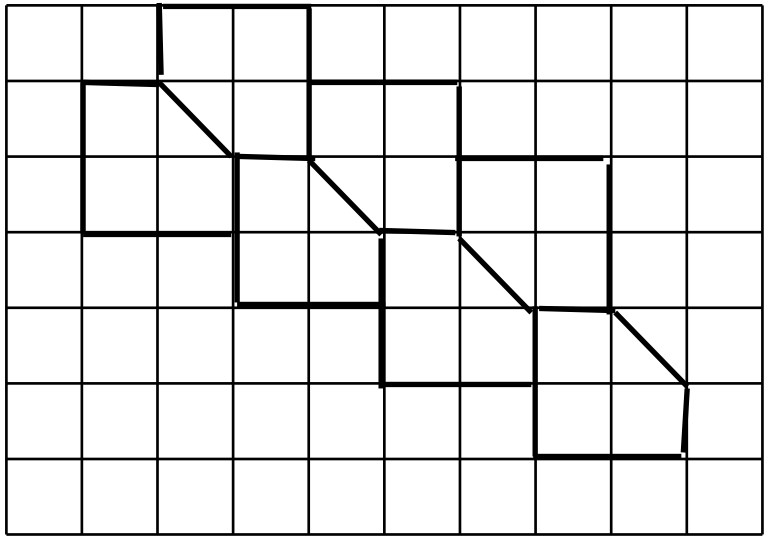
PAPER: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
23	(a)	<table><tr><td>*x*</td><td>–2</td><td>–1</td><td>0</td><td>1</td><td>2</td><td>3</td></tr><tr><td>*y*</td><td>**3**</td><td>–1</td><td>**–3**</td><td>–3</td><td>–1</td><td>**3**</td></tr></table>	3, –3, 3	2	B2 for all 3 correct (B1 for 2 correct)
	(b)		Graph	2	M1 for 5 or 6 of 'points' plotted correctly (provided B1 is awarded in part a) A1 for correct graph
	(c)		–1.3, 2.3	2	B1 ft for '–1.3' ± 0.2 B1 ft for '2.3' ± 0.2
24			147	4	M1 for correct method to find sum of interior angles of a hexagon A1 for 720 M1 (dep on M1) for ['720' – (100 + 120 + 116 + 90)] ÷ 2 oe A1 cao OR M1 for 360 – (80 + 90 +64 + 60) condone one incorrect exterior angle A1 for 66 M1 (dep on M1) for 180 – ('66' ÷ 2) A1 cao

PAPER: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
25			160	3	M1 for 360 ÷ (1 + 3 + 5) (= 40) M1 (dep) for 5 × '40' (= 200) A1 cao OR M1 for 360 ÷ (1 + 3 + 5) (= 40) M1 (dep) for 5 – 1 (= 4) A1 cao
26	(a)		$x \geq -1$	1	B1 cao
	(b)		$y < 4$	2	M1 for clear intention to add 2 onto each side of an inequality (or equation) or clear intention to divide all terms by 5 as a first step or (y =) 4 A1 cao

PAPER: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
27			30	4	M1 for Y: 600 ÷ 5 × 3 oe (= 360) M1 for R: 600 × 25 ÷ 100 oe (= 150) M1 (dep on M2) for (600 – '360' – '150') × 2 – '150' oe A1 cao OR M1 for Y: 3 ÷ 5 × 100 (= 60%) M1 for G: 100 – '60' – 25 (= 15) **and** '15' ÷ 100 × 600 (= 90) M1 (dep on M2) for '90' × 2 − 150 A1 cao OR M1 for $\frac{12}{20}+\frac{5}{20}$ $(=\frac{17}{20})$ oe M1 for $\left(1-'\frac{17}{20}'\right)\times 600$ (= 90) M1 (dep on M2) for '90' × 2 − 150 A1 cao

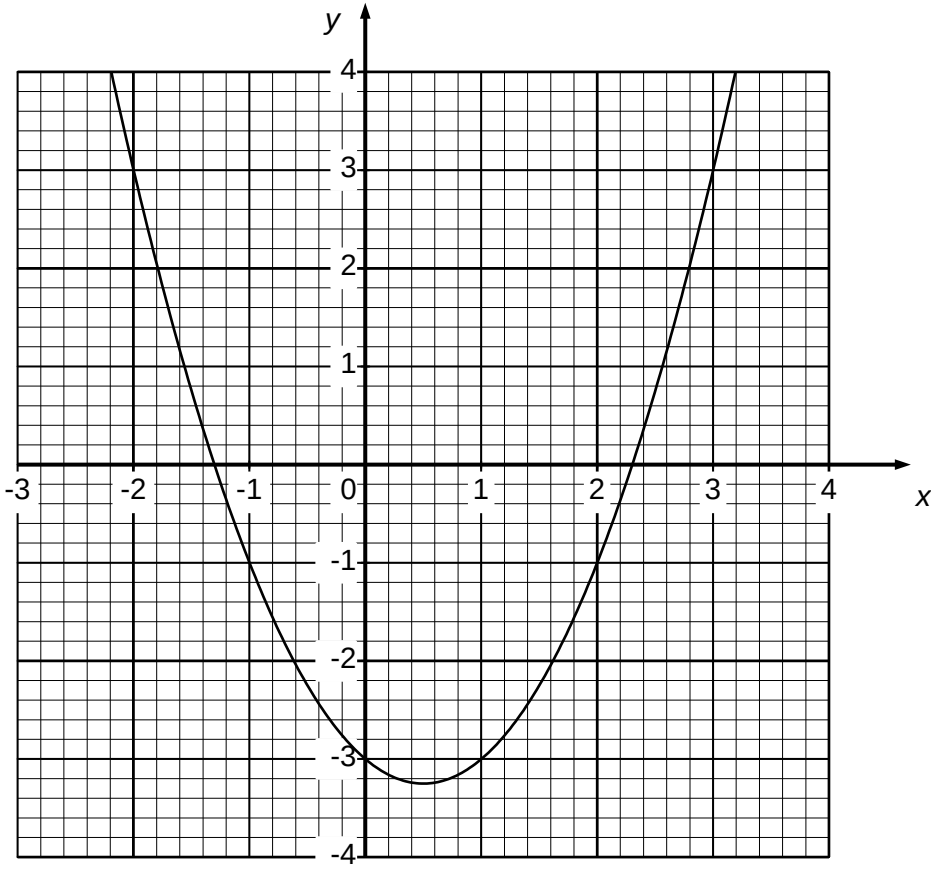
PAPER: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
*28			$x = 83°$ and reasons	4	M2 for 180 – 62 – 35 (=83) (M1 for angle *ACB* = 35° (could be on the diagram)) C2 for $x = 83°$ **and** alternate angles are equal **and** angles in a triangle add up to 180° (C1 for 1 relevant reason (dep on M1)) OR M2 for 180 – 62 – 35 (=83) (M1 for angle *DAE* = 62° (could be on the diagram)) C2 for $x = 83°$ **and** corresponding angles are equal **and** angles on a straight line add up to 180° (C1 for 1 relevant reason (dep on M1)) OR M2 for 180 – 62 – 35 (=83) C2 for $x = 83°$ **and** co-interior (allied) angles add up to 180° (C1 for co-interior (allied) angles add up to 180°)

Question 15



Question 23 $y = x^2 - x - 3$

x	–2	–1	0	1	2	3
y	**3**	–1	**–3**	–3	–1	**3**



Modifications to the mark scheme for Modified Large Print (MLP) papers.

Only mark scheme amendments are shown where the enlargement or modification of the paper requires a change in the mark scheme.

The following tolerances should be accepted on marking MLP papers, unless otherwise stated below:
Angles: ±5º
Measurements of length: ±5 mm

PAPER: 5MM2F_01			
Question		**Modification**	**Notes**
Q2		Models provided as well as diagrams Wording inserted 'Each cube represents a one centimetre cube' Original references to 'centimetre' removed	Standard mark scheme
Q3		No diagrams. Information given	Standard mark scheme
Q4	(d)	2 cm squares	Standard mark scheme
Q8	(b)	*a*, *b*, *c* and *d* are replaced by *p*, *q*, *r* and *s*	B1 for *p*
Q12	(c)	*t* changed to *p*	Standard mark scheme
Q13		'grey' changed to 'shaded' in text Dotty shading in the diagram	Standard mark scheme
Q14		Models provided as well as diagrams	Standard mark scheme

PAPER: 5MM2F_01			
Question		**Modification**	**Notes**
Q15	(a)	Diagrams labelled *A, B, C, D* Candidates asked to write the letter of the shape – not to circle	B1 for C
	(b)	5 shapes asked for not 6 Final 2 columns removed from the grid 2cm grid. A cut out shape is provided for use	B2 for at least 5 correct shapes including initial shape, correctly tessellating. (B1 for at least 4 correct shapes, which may include initial shape, correctly tessellating, ignore the rest of the diagram)
Q17		Wording changed 'Work out the size of the angle marked $x°$	Standard mark scheme
Q22		Diagram labelled: *DC* = 8cm *DA* = 5cm Wording changed in question to match	Standard mark scheme
Q23	(a)	Table changed to vertical layout	Standard mark scheme
	(b)	2cm grid	
Q24		Wording changed 'Work out the size of the angle marked $x°$	Standard mark scheme
Q26		Number line – line and arrow is extended so it obviously goes past 2	Standard mark scheme

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Centre Number | | | | | |

Candidate Number | | | | |

Methods in Mathematics

Unit 2: Methods 2

For Approved Pilot Centres ONLY

Foundation Tier

Wednesday 13 November 2013 – Morning

Time: 1 hour 45 minutes

Paper Reference

5MM2F/01

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- **Calculators may be used.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.



Information

- The total mark for this paper is 100
- The marks for **each** question are shown in brackets – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed.

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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6/5/5/5/

P 4 3 6 0 7 A 0 1 2 4

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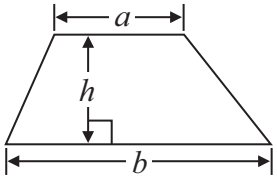
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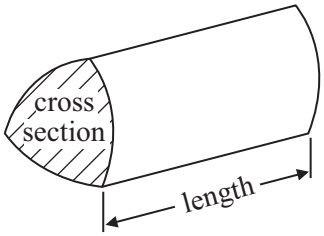
Formulae: Foundation Tier

You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.

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



Volume of prism = area of cross section × length



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Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1 (a) Work out $2.8 + 42 + 9$

.....

(1)

(b) Write down the value of $\sqrt{134}$

.....

(1)

(c) Work out $1000 - 99.9$

.....

(1)

(d) Write down the value of 4.7^2

.....

(1)

(e) Work out 3.24×15

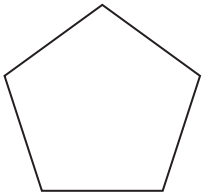
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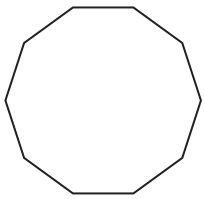
(1)

(Total for Question 1 is 5 marks)

2 Here are two regular polygons.

Write down the name of each polygon.

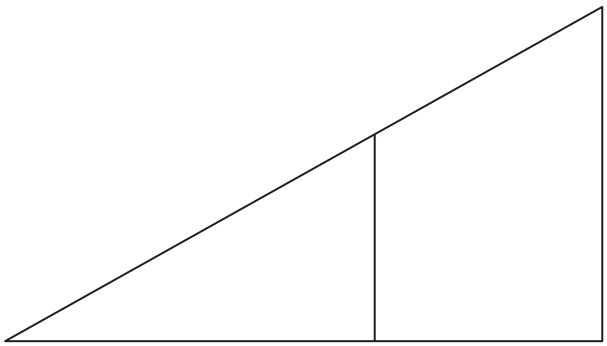




(i) ..... (ii) .....

(Total for Question 2 is 2 marks)

3



There is a pair of parallel lines in this diagram.

(a) Mark, with arrows (>>), the pair of parallel lines.

(1)

(b) Mark, with the letter *y*, two angles which are the same size.

(1)

(Total for Question 3 is 2 marks)

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4 (a) Write $\frac{1}{4}$ as a decimal.

.....

(1)

(b) Work out $\frac{1}{5}$ of 40

.....

(1)

(c) Work out 30% of £300

£.....

(2)

(Total for Question 4 is 4 marks)

5 (a) Write a number in each box to make each calculation correct.

(i) 3.57 × ..... = 3570

(ii) 3.68 ÷ ..... = 0.0368

(2)

3.57 + 12.81 is smaller than 3.68 + 12.75

(b) How much smaller?

.....

(2)

(Total for Question 5 is 4 marks)

6 (a) Work out the difference between –5 °C and 3 °C.

..... °C

(1)

(b) What temperature is 12 °C lower than –5 °C?

..... °C

(1)

A temperature is –3 °C.
This temperature rises by 5 °C.

(c) What is the new temperature?

..... °C

(1)

Here are six temperatures.

–3 °C –5 °C 3 °C –2 °C –7 °C 6 °C

(d) Work out the difference between the highest temperature and the lowest temperature.

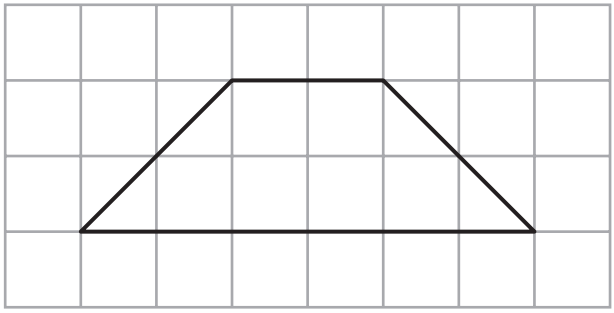
..... °C

(2)

(Total for Question 6 is 5 marks)

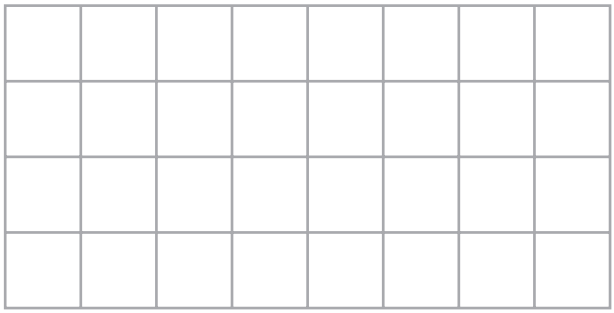
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7 Here is a shape on a grid.



This shape can be made from **four** congruent triangles.

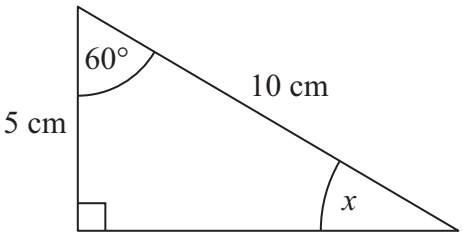
(a) On the grid below, draw **one** of these congruent triangles.

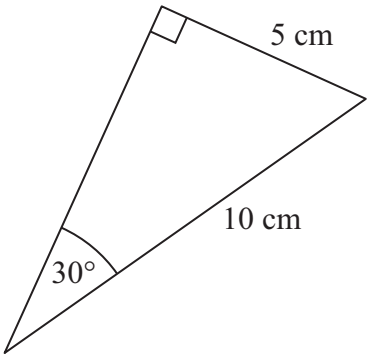


(1)

Here are two triangles.

Diagram **NOT** accurately drawn





These two triangles are congruent.

(b) Write down the size of the angle marked x.

.....°

(1)

(Total for Question 7 is 2 marks)

8 Ben thinks of a number.
He adds 7 to his number.
His answer is 18

(a) What number did Ben first think of?

.....

(1)

Josie thinks of a number.
She divides her number by 6
She then adds 13
Her answer is 16

(b) What number did Josie first think of?

.....

(2)

(Total for Question 8 is 3 marks)

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9 (a) Write these numbers in order of size.
Start with the smallest number.

0.48 0.5 0.4 0.03 0.05

.....

(1)

(b) Write these fractions in order of size.
Start with the smallest fraction.

$\frac{3}{4}$ $\frac{9}{16}$ $\frac{5}{8}$ $\frac{3}{5}$ $\frac{13}{20}$

.....

(2)

(Total for Question 9 is 3 marks)

10 (a) Change 17% to a fraction.

.....

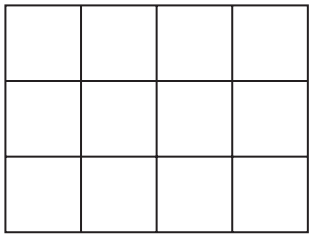
(1)

(b) Change 84% to a decimal.

.....

(1)

Here is a shape.



(c) Shade $\frac{2}{3}$ of this shape.

(1)

(d) Write 36 as a fraction of 54
Give your fraction in its simplest form.

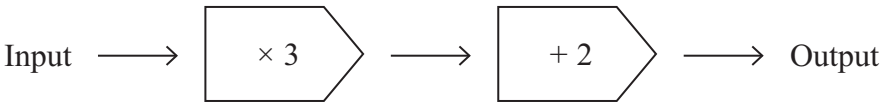
.....

(2)

(Total for Question 10 is 5 marks)

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11 Here is a number machine.



(a) Complete the table for this number machine.

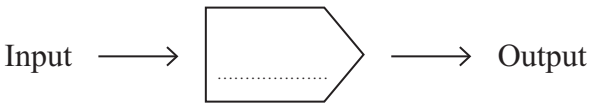
Input	Output
1	5
2	8
3	11
4	.....
.....	29

(2)

This is a table for a different number machine.

Input	Output
1	2
2	4
3	6
4	8
5	10

(b) Complete the number machine for this table.

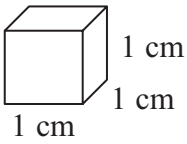


(1)

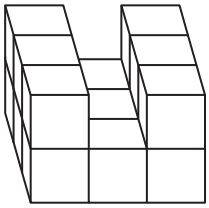
(Total for Question 11 is 3 marks)

12 Shapes are made from solid cubes.
Each cube has sides of length 1 cm.

Diagrams **NOT** accurately drawn



Here is a solid prism made from these cubes.

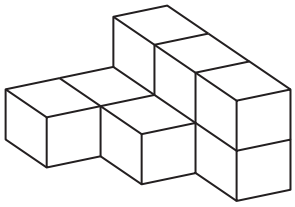


(a) How many cubes have been used to make this solid prism?

.....

(2)

Diagram **NOT** accurately drawn



(b) How many more cubes of side 1 cm need to be added to this solid shape to make a cube of side 3 cm?

.....

(2)

(Total for Question 12 is 4 marks)

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13 $e = 3f$
$f = 8$

(a) Work out the value of e.

$e =$ .....

(1)

$a = 2c + 5d$
$c = 3$
$d = 4$

(b) Work out the value of a.

$a =$ .....

(2)

$w = 3x + 4y$
$x = 5$
$y = -2$

(c) Work out the value of w.

$w =$ .....

(2)

(Total for Question 13 is 5 marks)

14 You can use this rule to find the sum, in degrees, of the interior angles of a polygon.

Subtract 2 from the number of sides then multiply by 180

A polygon has 14 sides.

(a) Use the rule to work out the sum, in degrees, of the interior angles of this polygon.

.....°

(2)

The sum of the interior angles of a different polygon is 2880°.

(b) Work out how many sides this polygon has.

.....

(3)

(Total for Question 14 is 5 marks)

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***15**

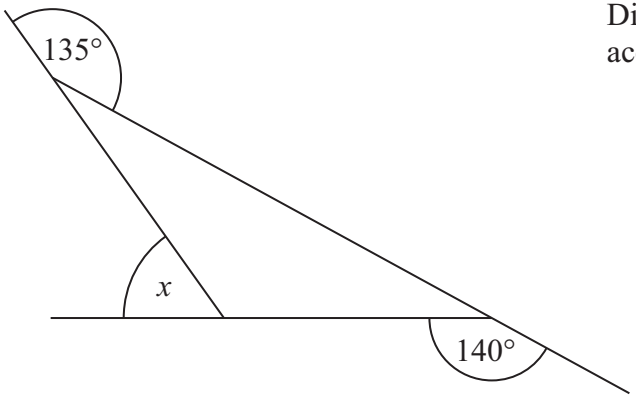


Diagram **NOT** accurately drawn

Work out the size of the angle marked x.
Give a reason for your answer.

(Total for Question 15 is 3 marks)

16 (a) Write the ratio 10 : 16 in its simplest form.

.....

(1)

(b) Change $\frac{3}{8}$ into a percentage.

.....%

(2)

(c) Write $\frac{7}{20}$ as a decimal.

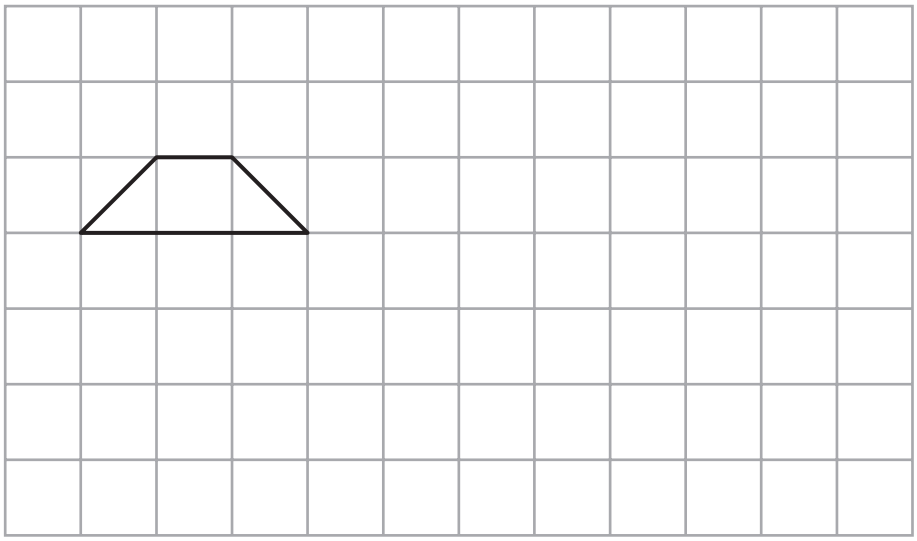
.....

(2)

(Total for Question 16 is 5 marks)

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17 On the grid below, show how the quadrilateral tessellates.
You should draw at least 6 shapes.



(Total for Question 17 is 2 marks)

***18** Here are three cards.
There is a maths problem on each card.

A	B	C
80 – 48	35% of 80	$\frac{3}{8}$ of 80

Which card shows the maths problem with the largest answer?

(Total for Question 18 is 4 marks)

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19 Some counters are red or green or blue.

$\frac{3}{10}$ of the counters are red.

$\frac{1}{10}$ of the counters are green.

The rest of the counters are blue.

There are 60 blue counters.

How many red counters are there?

.....

(Total for Question 19 is 4 marks)

20 Increase £180 by 20%

£.....

(Total for Question 20 is 3 marks)

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21 $-2 < n \leqslant 3$
n is an integer.

(a) Write down all the possible values of n.

.....

(2)

(b) Solve $2x + 3 < 8$

.....

(2)

(Total for Question 21 is 4 marks)

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22 The diagram shows a solid L-shaped prism.

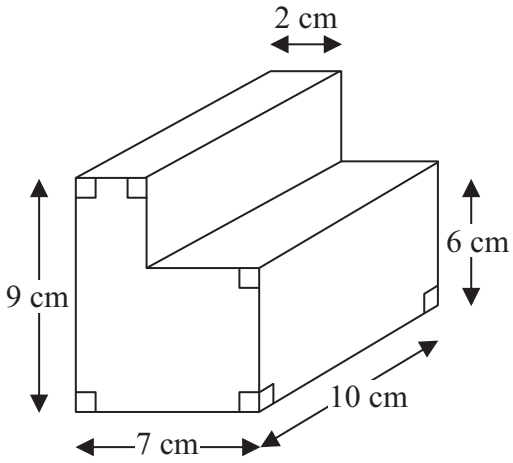


Diagram **NOT** accurately drawn

Calculate the volume of this prism.

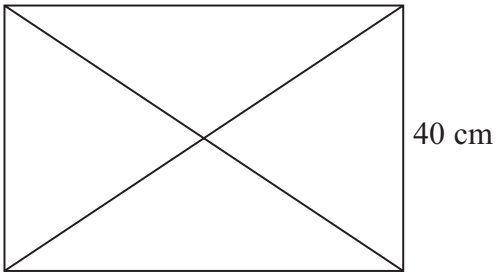
..... cm^3

(Total for Question 22 is 3 marks)

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23 The diagram shows two diagonals in a rectangle.

Diagram **NOT** accurately drawn



Work out the total length of the four sides of the rectangle and the two diagonals.

..... cm

(Total for Question 23 is 5 marks)

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24 There are only red beads and green beads in a bag.

The ratio of the number of red beads to the number of green beads is 5 : 9

(a) What fraction of the beads are red?

.....

(1)

There is a total of 84 beads in the bag.

(b) How many of the beads are green?

.....

(3)

Susie is going to put some more beads in the bag.
There will still be only red beads and green beads in the bag.

Susie wants to have twice as many green beads as red beads in the bag.

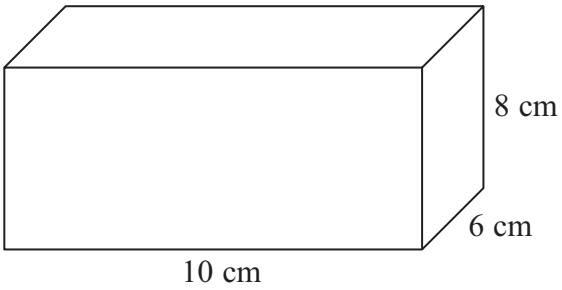
*(c) What beads should she put in the bag?
You must explain your answer.

(3)

(Total for Question 24 is 7 marks)

25 The diagram shows a solid cuboid.

Diagram **NOT** accurately drawn



Find the total surface area of this cuboid.

.....

(Total for Question 25 is 4 marks)

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***26**

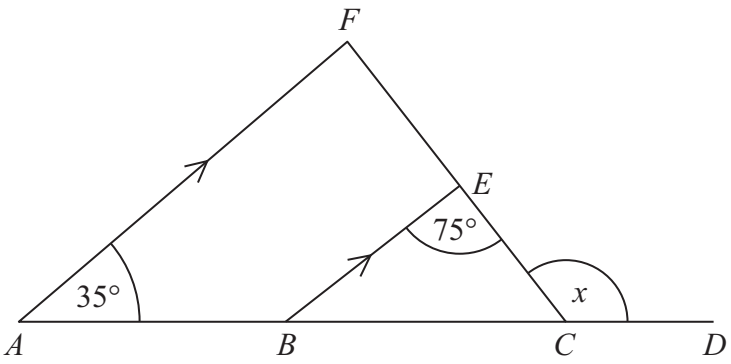


Diagram **NOT** accurately drawn

ABCD is a straight line.
AF is parallel to *BE*.
Angle *FAB* = 35°
Angle *CEB* = 75°

Work out the size of the angle marked *x*.
Give reasons for your answer.

(Total for Question 26 is 4 marks)

TOTAL FOR PAPER IS 100 MARKS

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Mark Scheme (Results)

November 2013

Pearson Edexcel GCSE
Linked Pair Pilot in Mathematics
Methods in Mathematics (2MM01)
Foundation Paper 2F

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NOTES ON MARKING PRINCIPLES

1 All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.

2 Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.

3 All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.

4 Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.

5 Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

6 Mark schemes will indicate within the table where, and which strands of QWC, are being assessed. The strands are as follows:

i) *ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear*
Comprehension and meaning is clear by using correct notation and labeling conventions.

ii*) select and use a form and style of writing appropriate to purpose and to complex subject matter*
Reasoning, explanation or argument is correct and appropriately structured to convey mathematical reasoning.

iii) *organise information clearly and coherently, using specialist vocabulary when appropriate*.
The mathematical methods and processes used are coherently and clearly organised and the appropriate mathematical vocabulary used.

7 With working

If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.
If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.
If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.
If there is no answer on the answer line then check the working for an obvious answer.
Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.
If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.

8 Follow through marks

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.
Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

9 Ignoring subsequent work

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: e.g. incorrect canceling of a fraction that would otherwise be correct
It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect e.g. algebra.
Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

10 Probability

Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).
Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.
If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.
If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

11 Linear equations

Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded.

12 Parts of questions

Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

13 Range of answers

Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1)

Guidance on the use of codes within this mark scheme
M1 – method mark A1 – accuracy mark B1 – Working mark C1 – communication mark QWC – quality of written communication oe – or equivalent cao – correct answer only ft – follow through sc – special case dep – dependent (on a previous mark or conclusion) indep – independent isw – ignore subsequent working

PAPER: 5MM2F_01					
Question		Working	Answer	Mark	Notes
1	(a)		53.8	1	B1 cao
	(b)		11.5758....	1	B1 for 11.5 - 11.6
	(c)		900.1	1	B1 cao
	(d)		22.09	1	B1 cao
	(e)		48.6	1	B1 cao
2	(i)		Pentagon	2	B1
	(ii)		Decagon		B1
3	(a)		The pair of parallel lines marked on diagram	1	B1 cao
	(b)		Two angles of the same size marked	1	B1 cao
4	(a)		0.25	1	B1 cao
	(b)		8	1	B1 cao
	(c)		90	2	M1 a fully correct method to find 30% of £300 A1 cao

PAPER: 5MM2F_01					
Question		Working	Answer	Mark	Notes
5	(ai) (aii) (b)		1000 100 0.05	2 2	B1 cao B1 cao M1 for a fully complete method containing a correct addition or subtraction A1 cao
6	(a) (b) (c) (d)		8 –17 2 13	1 1 1 2	B1 for 8 or –8 B1 cao B1 cao M1 identification of 6 or –7 A1 for 13 or –13
7	(a) (b)		Triangle drawn 30	1 1	B1 for drawing of the triangle this could be on original shape. B1 cao
8	(a) (b)		11 18	1 2	B1 cao M1 for subtracting 13 and multiplying 6 in any order A1 cao

PAPER: 5MM2F_01					
Question		Working	Answer	Mark	Notes
9	(a)		0.03, 0.05,0.4,0.48,0.5	1	B1 cao
	(b)		$\frac{9}{16}, \frac{3}{5}, \frac{5}{8}, \frac{13}{20}, \frac{3}{4}$	2	M1 attempt to convert at least 3 fractions to decimals or to fractions with common denominator A1 oe SC: B1 for 4 fractions in the correct order or for all fractions in correct reverse order
10	(a)		$\frac{17}{100}$	1	B1 for $\frac{17}{100}$ oe
	(b)		0.84	1	B1 cao
	(c)		8 squares shaded	1	B1 oe (part and whole squares acceptable)
	(d)		$\frac{2}{3}$	2	M1 for $\frac{36}{54}$ oe A1 cao
11			14	2	B1 cao
			9		B1 cao
	(b)		×2	1	B1 oe
12	(a)		15	2	B2 for 15 B1 for 13 or 3 × 5
	(b)		18	2	M1 for use of 27 or 3 + 6 + 9 or 8 + 7 + 3 or 3 by 3 cube drawn A1 cao (ignore units) SC B2 for 17, 19 or 20 if M0 scored

PAPER: 5MM2F_01					
Question		Working	Answer	Mark	Notes
13	(a)		24	1	B1 cao
	(b)		26	2	M1 for 2×3 + 5×4 oe A1 cao
	(c)		7	2	M1 for 3× 5 + 4 × –2 oe A1 cao
14	(a)		2160	2	M1 for (14–2) × 180; (condone missing brackets) A1 cao
	(b)		18	3	M1 for 2880 ÷ 180 (=16) M1 for "16" + 2 A1 cao or M1 for 2880 = (x–2)×180 or equivalent reverse flowchart M1 for an attempt to rearrange A1 cao
*15			85	3	M1 for a fully correct method e.g. 360 – 135 – 140 A1 cao C1 (dep M1 for appropriate reason) Exterior angles of a polygon add up to 360^o or Angles on a straight line add up to 180^o **and** angles in a triangle add up to 180^o

PAPER: 5MM2F_01					
Question		Working	Answer	Mark	Notes
16	(a)		5 : 8	1	B1 cao
	(b)		37.5	2	M1 for $\frac{3}{8} \times 100$ oe A1 cao
	(c)		0.35	2	M1 for $7 \div 20$ or $\frac{35}{100}$ A1 cao
17			Correct tessellation	2	B2 for at least 6 correct tessellating shapes, including the initial shape, and no incorrectly drawn shapes or gaps. (B1 for at least 3 correctly tessellating shapes, (meeting at a point) including initial shape; ignore any additional shapes attempted, gaps or incorrect shapes)
*18			card A gives largest answer	4	M1 for a correct method for finding 35% of 80 M1 for a correct method for finding $\frac{3}{8}$ of 80 A1 for 32, 28 and 30 C1 (dep on M1) for statement correctly identifying the card with the largest answer from their three results. .

PAPER: 5MM2F_01					
Question		Working	Answer	Mark	Notes
19			30	4	M2 for correct method to find fraction of blue counters, eg — — or $\frac{6}{10}$ seen (M1 for correct method to add $\frac{3}{10}, \frac{1}{10}$ or $\frac{4}{10}$ seen) M1 (dep on M2) for equating "$\frac{6}{10}$" with 60 blue counters (may be implied by correct answer) A1 cao OR (starting with *n* counters in bag stated, eg *n* = 100) M2 for correct method to find number of blue counters in bag, eg — — (=60) (M1 for — (=30) and — (=10) or — (=40)) M1 (dep on M2) for equating — (=60) with 60 blue counters (may be implied by correct answer) A1 cao [NB accept equivalent calculations involving percentages or decimals]

PAPER: 5MM2F_01					
Question		Working	Answer	Mark	Notes
20			216	3	M2 for a correct method to increase 180 by 20% (M1 for a correct method to find 20% of 180) A1 cao
21	(a)		–1,0,1,2,3	2	B2 for –1, 0, 1, 2, 3 (B1 for one error or one omission or one addition)
	(b)		$x < 2.5$	2	M1 for subtracting 3 from both sides or dividing both sides by 2, condone equality or incorrect inequality signs or (x=) 2.5 A1 for $x < 2.5$ oe
22			480	3	M1 for correct method to find the area of cross-section, eg $9 \times 7 - (9 - 6) \times (7 - 2)$ (= 48) M1 (dep) for their cross-section × 10 A1 cao or M1 for a correct method to find volume of any cuboid, eg $9 \times 7 \times 10$ (= 630) M1 (dep) for correct method to find total volume eg $9 \times 7 \times 10$ (= 630) − $5 \times 3 \times 10$ (= 150) A1 cao
23			308	5	M1 $50^2 + 40^2$ or 2500 + 1600 or 4100 M1 for $\sqrt{2500+1600}$ or $\sqrt{4100}$ A1 for 64 (.03…) seen or implied by correct answer M1(dep on M1) for $2 \times 50 + 2 \times 40 + 2 \times$ "64(.03…)" A1 for 308 – 308.1

PAPER: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
24	(a)		$\frac{5}{14}$	1	B1 for $\frac{5}{14}$ oe fraction
	(b)		54	3	M1 for 84 ÷ (5 + 9) (= 6) or 1–"(a)" (= $\frac{9}{14}$) M1 for 84 ÷ (5 + 9) × 9 oe or for "$\frac{9}{14}$" × 84 A1 cao
	*(c)		eg 6 green	3	M1 for correct method to find twice as many green beads as red beads, eg 2 × 30 (=60) or 2 × (84 – "54") or "54" + "6" (=60) A1 for 6 (green) OR if *n* reds are added then 2*n* + 6 (greens), where *n* and 2*n* could be numbers OR 30 (red) and 60 (green) C1 (dep on M1) for showing correct relevant working and clear conclusion stating number of green beads or stating total numbers of red beads and green beads
25			376 cm^2	4	M1 for finding the area of one face Eg 8 × 10, 8 × 6 or 6 × 10 M1 for a correct method to find the sum of the correct areas of at least 5 faces A1 for 376 B1 (indep) cm^2 Note: Any attempt to find the volume gets NO marks

PAPER: 5MM2F_01					
Question		Working	Answer	Mark	Notes
*26			110°	4	M1 for identifying *EBC* = 35 or *AFC* = 75 M1 (dep) for (*ECB* =) 180 – 75 – 35 (= 70) or (*EDC* =) 35 + 75 C2 for *x* = 110 oe from correct working and all reasons stated clearly (see below) (C1 (dep on M1) for appropriate reason) OR M1 for identifying *EBA* = 180 – 35 (= 145) M1 (dep) for (*ECB* =) "145" – 75 (=70) C2 for *x* = 110 oe from correct working and all reasons stated clearly (see below) (C1 (dep on M1) for appropriate reason) Correct reasons: *EBC* = 35 or *AFC* = 75 (corresponding angles are equal) *ECB* = 180 – 75 – 35 (angles in a triangle add up to 180^o) *x* = 110 (angles on a straight line add up to 180^o) OR *EBC* = 35 or *AFC* = 75 (corresponding angles are equal) *x* = 110 (exterior angle of a triangle is equal to the sum of the interior opposite angles) OR *EBA* = 145 (allied angles / co-interior angles add up to 180^o) *ECB* = "145" – 75 (=70) (exterior angle of a triangle is equal to the sum of the interior opposite angles) *EDC* = 110 (angles on a straight line add up to 180^o)


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Methods in Mathematics

Unit 2: Methods 2

For Approved Pilot Centres ONLY

Foundation Tier

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Time: 1 hour 45 minutes

Paper Reference
5MM2F/01

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators may be used.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.



Information

- The total mark for this paper is 100
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed.

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

P41234A

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6/6/8/5/

P 4 1 2 3 4 A 0 1 2 4

PEARSON

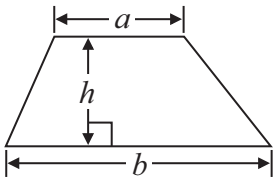
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GCSE Mathematics 2MM01

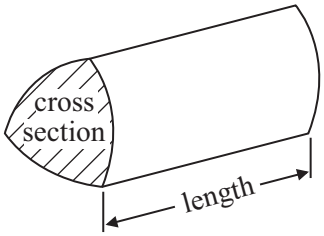
Formulae: Foundation Tier

You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.

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



Volume of prism = area of cross section × length



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Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1 Write in the numbers missing from the empty boxes.

(a) $5.58 + 3.1 =$ ☐

(1)

(b) $27.6 -$ ☐ $= 19.32$

(1)

(c) $0.75 \times 10 =$ ☐

(1)

(d) ☐ $\times$ 1000 = 54 000

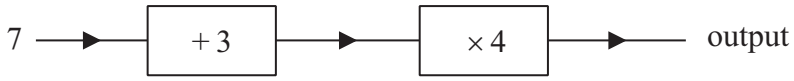
(1)

(e) $436 \div$ ☐ $= 4.36$

(1)

(Total for Question 1 is 5 marks)

2 (a) Work out the output for this number machine.



.....

(2)

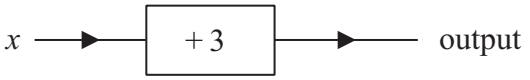
(b) Work out the input for this number machine.



.....

(2)

(c) The input for this number machine is x.

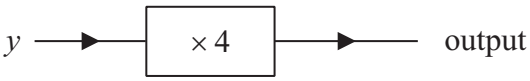


Find an expression, in terms of x, for the output.

.....

(1)

(d) The input for this number machine is y.



Find an expression, in terms of y, for the output.

.....

(1)

(Total for Question 2 is 6 marks)

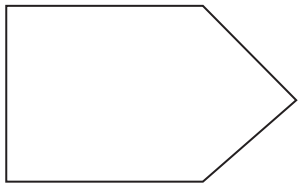
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3 (a) How many sides does an octagon have?

.....

(1)

Here is a polygon with 5 sides.



(b) On the polygon mark, with arrows (>>), a pair of parallel lines.

(1)

(c) Write down the special name of this polygon.

.....

(1)

This polygon is **not** a regular polygon.

(d) Explain why.

.....

(1)

(Total for Question 3 is 4 marks)

---

4 (a) Work out 5.1^2

.....

(1)

(b) Work out $\sqrt{34.81}$

.....

(1)

(c) Work out 0.4^3

.....

(1)

(d) Work out $\sqrt[3]{3.375}$

.....

(1)

(Total for Question 4 is 4 marks)

5 (a) Work out the difference between −6 °C and 4 °C.

..... °C

(1)

At 3 am the temperature is −3 °C.
By midday the temperature has gone up by 8 °C.
From midday to midnight the temperature goes down by 12 °C.

(b) Work out the temperature at midnight.

..... °C

(2)

(Total for Question 5 is 3 marks)

6 12 bags of cement cost £43.80

Work out the cost of 6 bags of cement.

£.....

(Total for Question 6 is 2 marks)

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7 Here is a solid prism made from centimetre cubes.

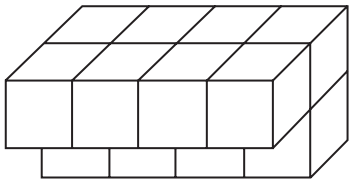


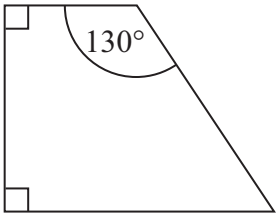
Diagram **NOT** accurately drawn

Find the volume of the prism.

..... cm^3

(Total for Question 7 is 1 mark)

8 Here are two congruent shapes.



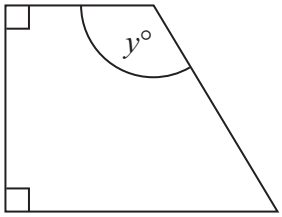


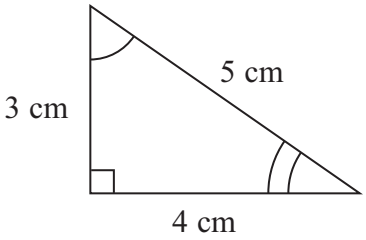
Diagram **NOT** accurately drawn

(a) Write down the value of y.

$y =$.....

(1)

Here are two mathematically similar right-angled triangles.



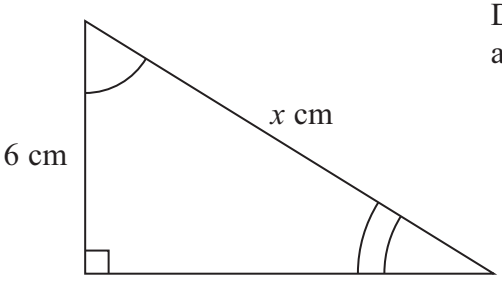


Diagram **NOT** accurately drawn

(b) The value of x is 10

Explain why.

.....

.....

(1)

(Total for Question 8 is 2 marks)

9 (a) Write 0.5 as a fraction.

.....

(1)

(b) Write $\frac{17}{100}$ as a decimal.

.....

(1)

(c) Write 40 out of 50 as a fraction.
Give your fraction in its simplest form.

.....

(2)

(d) Work out $\frac{3}{4}$ of 24

.....

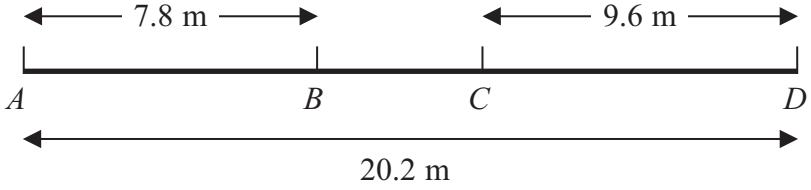
(2)

(Total for Question 9 is 6 marks)

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10 A, B, C and D are points on a straight line.

Diagram **NOT** accurately drawn



$AB = 7.8$ m
$CD = 9.6$ m
$AD = 20.2$ m

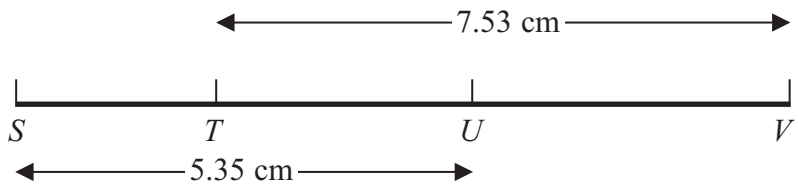
(a) Work out the length of BC.

..... m

(2)

S, T, U and V are points on another straight line.

Diagram **NOT** accurately drawn



$TU = 3.8$ cm

(b) Work out the length of SV.

..... cm

(2)

(Total for Question 10 is 4 marks)

11 You can use this formula to work out the surface area of a cube.

surface area = area of one face × 6

The area of one face of a cube is 8 cm^2.

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

..... cm^2

(2)

A different cube has a surface area of 144 cm^2.

(b) Work out the area of one face of this cube.

..... cm^2

(2)

(Total for Question 11 is 4 marks)

12 $P = 2m$

$m = 3$

(a) Work out the value of P.

.....

(1)

$T = 3x + 2y$

$x = 5$
$y = 4$

(b) Work out the value of T.

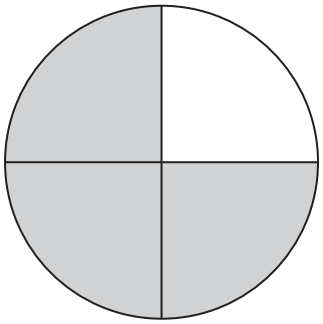
.....

(2)

(Total for Question 12 is 3 marks)

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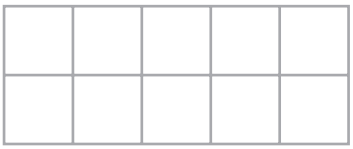
13 (a) What percentage of this shape is shaded?



..... %

(1)

(b) Shade 60% of this shape.



(1)

(c) Write 74 out of 200 as a percentage.

..... %

(2)

(d) Write these numbers in order of size.
Start with the smallest number.

$\frac{2}{7}$ 24% 0.35 $\frac{1}{4}$ 0.2

.....

(2)

(Total for Question 13 is 6 marks)

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14 (a) Write $0.\dot{3}$ as a fraction.

.....

(1)

(b) Two of these fractions are **not** recurring decimals.

$$\frac{1}{4} \qquad \frac{2}{9} \qquad \frac{1}{3} \qquad \frac{3}{8} \qquad \frac{5}{7}$$

Which two fractions?
You must show how you got your answer.

..... and .....

(2)

(Total for Question 14 is 3 marks)

15 Calculate the value of $\dfrac{2.59}{3.6 - 1.85}$

.....

(Total for Question 15 is 2 marks)

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***16** Here are two fractions.

$$\frac{3}{5} \quad \text{and} \quad \frac{5}{8}$$

Which is the larger fraction?
You must show clearly how you got your answer.

(Total for Question 16 is 3 marks)

17 There are 20 counters in a bag.
14 of these counters are red.
6 of these counters are blue.

(a) Write down the ratio of the number of red counters to the number of blue counters.
Give your ratio in its simplest form.

.....

(2)

5 counters are taken from the bag.
The ratio of the number of red counters to the number of blue counters is now 4 : 1

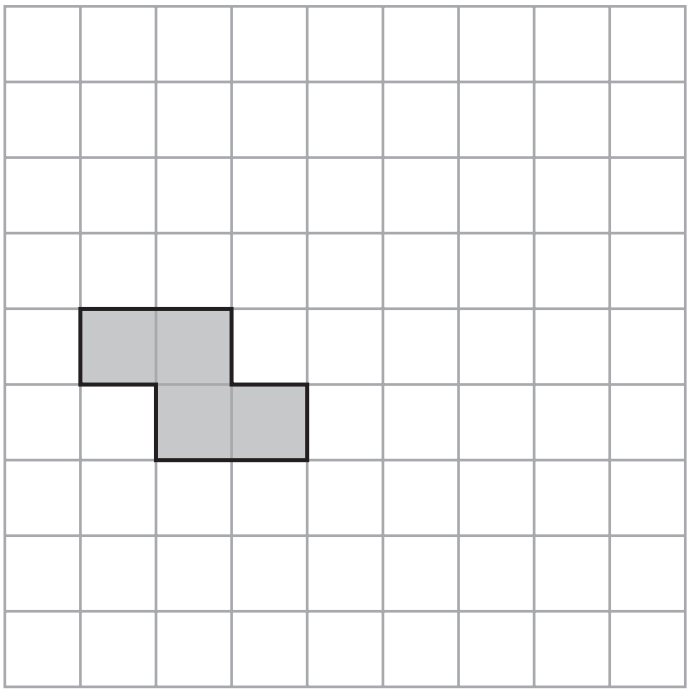
(b) How many red counters were taken from the bag?

.....

(3)

(Total for Question 17 is 5 marks)

18 On the grid, show how the shape tessellates.
You must draw at least 6 shapes.



(Total for Question 18 is 2 marks)

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***19**

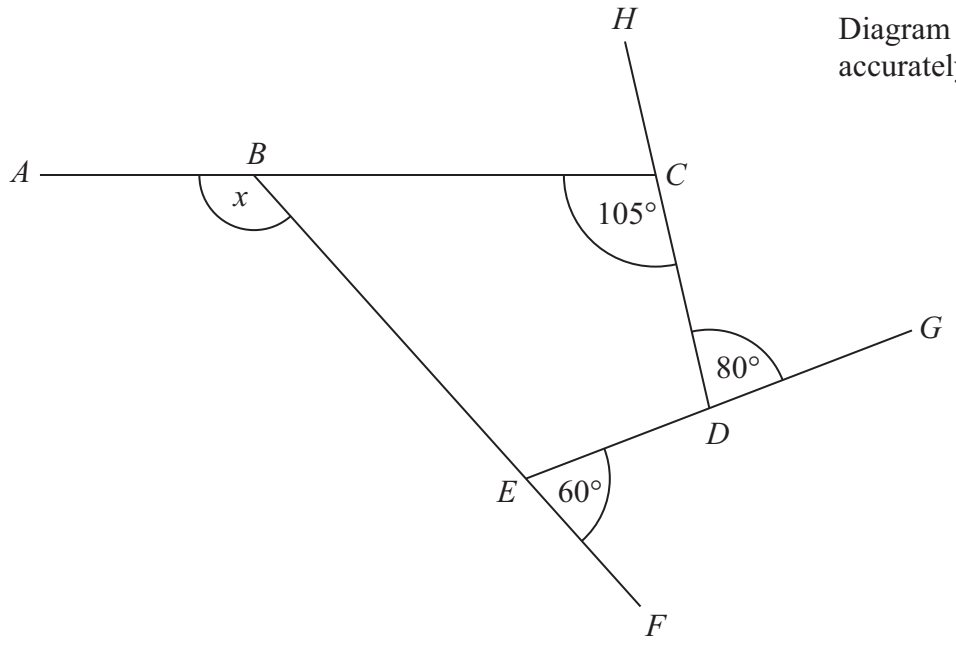


Diagram **NOT** accurately drawn

BCDE is a quadrilateral.
ABC, *EDG*, *BEF* and *DCH* are straight lines.

Work out the size of the angle marked *x*.
Give reasons for your answer.

(Total for Question 19 is 5 marks)

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20 (a) Work out 20% of 450

.....

(2)

(b) Decrease £320 by one eighth.

£ .....

(3)

(Total for Question 20 is 5 marks)

21 Here is a solid cuboid.

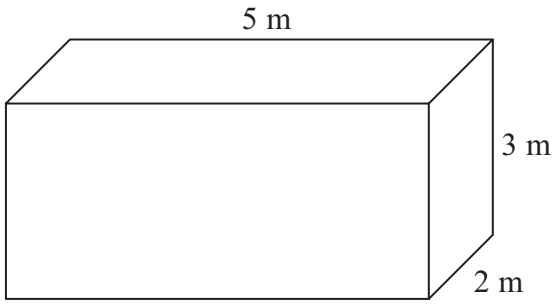


Diagram **NOT** accurately drawn

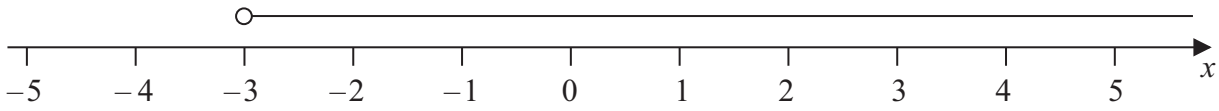
Work out the total surface area of this cuboid.

..... m^2

(Total for Question 21 is 3 marks)

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22 Here is a number line.

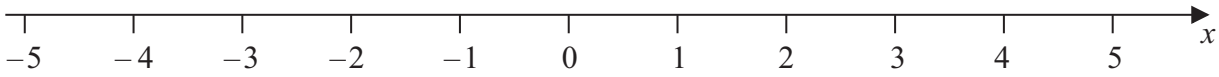


(a) Write down the inequality shown on the number line.

.....

(1)

Here is a number line.



(b) On this number line, show the inequality $-1 \leqslant x < 3$

(2)

(Total for Question 22 is 3 marks)

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***23**

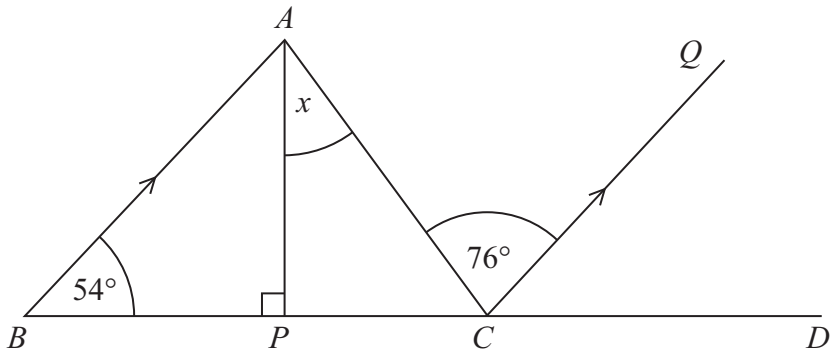


Diagram **NOT** accurately drawn

BPCD is a straight line.
BA is parallel to *CQ*.
AP is perpendicular to *BC*.
Angle *ABC* = 54°
Angle *ACQ* = 76°

Work out the size of the angle marked *x*.
Give reasons for your answer.

(Total for Question 23 is 4 marks)

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24 Here is a cylinder.

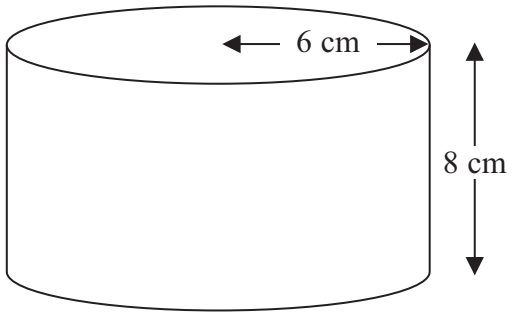


Diagram **NOT** accurately drawn

The formula to find the volume, V, of a cylinder is $V = \pi r^2 h$

The radius, r, of the cylinder is 6 cm.
The height, h, of the cylinder is 8 cm.

Work out the volume of the cylinder.
Give your answer correct to 3 significant figures.

.....cm^3

(Total for Question 24 is 2 marks)

25 The value of x is greater than 12

(a) Write down an inequality for x.

.....

(1)

The value of y is less than or equal to 20

(b) Write down an inequality for y.

.....

(1)

(Total for Question 25 is 2 marks)

26 Here is a right-angled triangle.

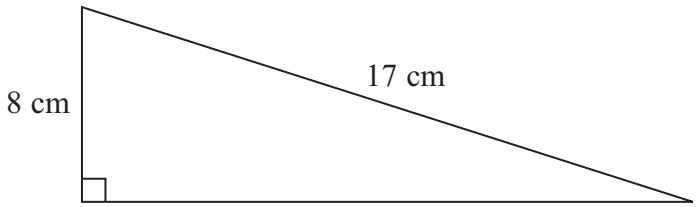


Diagram **NOT** accurately drawn

Work out the area of the triangle.

.....cm^2

(Total for Question 26 is 4 marks)

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27 Here is a rectangle.

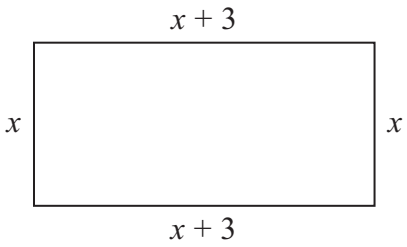


Diagram **NOT** accurately drawn

All measurements are in centimetres.

D cm is the total length of the four sides.

(a) Show that $D = 4x + 6$

(2)

(b) Make x the subject of the formula $D = 4x + 6$

.....

(2)

(Total for Question 27 is 4 marks)

Turn over for Question 28

28

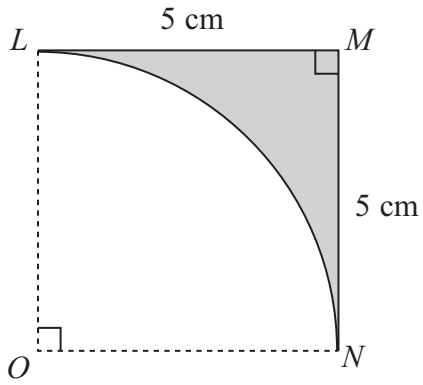


Diagram **NOT** accurately drawn

The arc LN is a quarter of a circle of radius 5 cm, centre O.

Find the perimeter of the shaded shape.
Give your answer correct to 2 decimal places.

.....cm

(Total for Question 28 is 3 marks)

TOTAL FOR PAPER IS 100 MARKS

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Mark Scheme (Results)

Summer 2013

GCSE Mathematics Linked Pair Pilot
Methods in Mathematics (2MM01)
Foundation (Calculator) Paper 2F

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NOTES ON MARKING PRINCIPLES

1 All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.

2 Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.

3 All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.

4 Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.

5 Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

6 Mark schemes will indicate within the table where, and which strands of QWC, are being assessed. The strands are as follows:

i) *ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear*
Comprehension and meaning is clear by using correct notation and labeling conventions.

ii*) select and use a form and style of writing appropriate to purpose and to complex subject matter*
Reasoning, explanation or argument is correct and appropriately structured to convey mathematical reasoning.

iii) *organise information clearly and coherently, using specialist vocabulary when appropriate*.
The mathematical methods and processes used are coherently and clearly organised and the appropriate mathematical vocabulary used.

7 With working

If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.

If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.

If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.

If there is no answer on the answer line then check the working for an obvious answer.

Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.

If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.

8 Follow through marks

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.

Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

9 Ignoring subsequent work

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: e.g. incorrect canceling of a fraction that would otherwise be correct

It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect e.g. algebra.

Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

10 Probability

Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).

Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.

If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.

If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

11 Linear equations

Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded.

12 Parts of questions

Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

13 Range of answers

Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1)

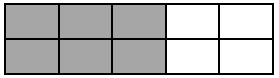
Guidance on the use of codes within this mark scheme
M1 – method mark A1 – accuracy mark B1 – Working mark C1 – communication mark QWC – quality of written communication oe – or equivalent cao – correct answer only ft – follow through sc – special case dep – dependent (on a previous mark or conclusion) indep – independent isw – ignore subsequent working

Paper: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
1	(a)		8.68	1	B1 for 8.68 oe
	(b)		8.28	1	B1 for 8.28 oe
	(c)		7.5	1	B1 for 7.5 (accept 7½) oe
	(d)		54	1	B1 cao
	(e)		100	1	B1 cao
2	(a)		40	2	M1 for 7 + 3 (= 10) A1 cao
	(b)		5	2	M1 for an intention to divide by 4 (÷4) or subtract 3 (–3) A1 cao
	(c)		$x + 3$	1	B1 for $x + 3$ or $3 + x$
	(d)		$4y$	1	B1 for $4y$ oe

Paper: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
3	(a)		8	1	B1 cao
	(b)		>> on both horizontal lines	1	B1 for >> on both horizontal lines and on no other line(s)
	(c)		Pentagon	1	B1 cao
	(d)		Reason	1	B1 for any correct reason that relates to the specific pentagon in this question
4	(a)		26.01	1	B1 for 26.01 oe
	(b)		5.9	1	B1for 5.9 oe
	(c)		0.064	1	B1 for 0.064 cao
	(d)		1.5	1	B1 for 1.5 oe
5	(a)		10	1	B1 for 10 or −10
	(b)		−7	2	M1 for a correct first step using two of the given figures; eg −3 + 8 (=5), −3 – 12 (= −15), 12 – 8 (= 4), 8 – 12 (= −4) A1 cao OR M1 for using a number line correctly to carry out at least one calculation. (may be simply seen by arcs on a number line) A1 cao

Paper: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
6		43.80 ÷ 12 = 3.65 3.65 × 6	21.90	2	M1 for 43.8(0) ÷ 2 or $\frac{1}{2} \times 43.8(0)$ or $\frac{1}{2}$ of 43.8(0) A1 for 21.9(0) OR M1 for (43.8(0) ÷ 12) × 6 A1 for 21.9(0)
7			12	1	B1 for 12
8	(a)		130	1	B1 cao
	(b)		Scale factor is 2	1	B1 for a correct explanation, eg; scale factor = 2 or 6 = 2 x 3 or 10 is 2 × 5
9	(a)		$\frac{1}{2}$	1	B1 for $\frac{1}{2}$ or an equivalent fraction
	(b)		0.17	1	B1 cao
	(c)		$\frac{4}{5}$	2	M1 for $\frac{40}{50}$ oe A1 cao
	(d)		18	2	M1for 24 ÷ 4× 3 oe A1 cao

Paper: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
10	(a)		2.8	2	M1 for a correct first step; eg. 20.2 – 7.8 (=12.4) or 20.2 – 9.6 (= 10.6) or 7.8 + 9.6 (=17.4) A1 cao
	(b)	7.53 + (5.35 – 3.8) = 7.53 + 1.55 Or 5.35 + (7.53 – 3.8) = 5.35 + 3.73	9.08	2	M1 for a fully correct method to find *SV* A1 cao
11	(a)		48	2	M1 for 8 × 6 A1 cao
	(b)		24	2	M1 for 144 ÷ 6 A1 cao
12	(a)		6	1	B1 cao
	(b)	3 × 5 + 2 × 4 = 15 + 8	23	2	M1 for 3 × 5 + 2 × 4 A1 cao

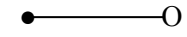
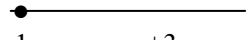
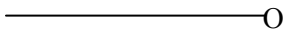
Paper: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
13	(a)		75	1	B1 cao
	(b)			1	B1 for any 6 of the 10 cells shaded
	(c)		37	2	M1 for $\frac{74}{200} \times 100$ or $\frac{37}{100}$ A1 cao
	(d)	0.285.. 0.24 0.35 0.25 0.2 28.5..%, 24%, 35%, 25%, 20%	0.2 24% $\frac{1}{4}$ $\frac{2}{7}$ 0.35	2	M1 for an attempt to write all numbers as decimals or percentages (condone one conversion error) A1 for a correctly ordered list [SC: B1 for 4 numbers only in the correct order if M0 scored]

Paper: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
14	(a)		$\frac{1}{3}$	1	B1 $\frac{1}{3}$ or equivalent fraction
	(b)		$\frac{1}{4}$ and $\frac{3}{8}$	2	M1 for an explanation that a recurring decimal does not terminate or that a non-recurring decimal does or shows that $\frac{1}{4} = 0.25$ or $\frac{3}{8} = 0.375$ or $\frac{2}{9} = 0.222\ldots$ or $\frac{1}{3} = 0.333\ldots$ or $\frac{5}{7} = 0.714285714285..$ A1 for $\frac{1}{4}$ and $\frac{3}{8}$ [SC: B1 for an answer of $\frac{1}{4}$ and $\frac{3}{8}$ if M0 scored]
15		2.59 ÷ 1.75	1.48 or $1\frac{12}{25}$	2	M1 for 2.59 ÷ "1.75" A1 for 1.48 or $1\frac{12}{25}$ oe
*16			$\frac{5}{8}$ is the larger fraction	3	M1 for attempting to change the fractions to equivalent fractions or decimals or percentages; one must be correct A1 for two correct fractions (with common denominator) or decimals or percentages C1 (dep on M1) for a correct statement following their two results OR M1 for attempting to find 3/5 and 5/8 of a number or a diagram; one must be correct A1 for two correct solutions or diagrams C1 (dep on M1) for a correct statement following their two results

Paper: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
17	(a)		7 : 3	2	M1 for 14 : 6 oe A1 for 7 : 3 [SC: B1 for 3 : 7 if M0 scored]
	(b)		2	3	M1 for $(20 - 5) \div (4 + 1)$ (= 3) M1 (dep) for $4 \times$ "3" A1 cao
18			A correct tessellation	2	B2 for at least 6 correct tessellating shapes, including the initial shape, and no incorrectly drawn shapes or gaps [B1 for at least 3 correct tessellating shapes, including initial shape; ignore any additional shapes attempted, gaps or incorrect shapes]

Paper: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
*19			$x = 145$	5	M1 for 180 – 105 (=75) C1 (dep on this M1) for "sum of the angles on a straight line is 180^o M1 for 360 – 60 – 80 – "75" C1 (dep on this M1) for 'the sum of the exterior angles of a polygon is 360^o A1 for $x = 145$ OR M1 for 180 – 60 (=120) or 180 – 80 (=100) C1 (dep on this M1) for "sum of the angles on a straight line is 180^o" M1 for 360 – 105 – "120" – "100" (=35) and 180 – "35" C1 (dep on this M1) for 'the sum of the angles of a quadrilateral is 360^o A1 for $x = 145$ Note: 145 seen without the 'x = (or ABE=)" gets A0 and 145 seen without any working gets B1 instead of the M2A1

Paper: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
20	(a)		90	2	M1 for a fully correct method to find 20% of 450 A1 cao
	(b)		280	3	M1 for $\frac{1}{8} \times 320$ oe (=40) M1 (dep) for 320 – '40' A1 cao OR M1 for $1-\frac{1}{8}$ or $\frac{7}{8}$ oe M1 (dep) for 320 ÷ 8 × 7 oe A1 cao
21			62	3	M1 for correct area of one face eg 5 × 3 or 5 × 2 or 2 × 3 M1 for a correct method to find the sum of the correct areas of at least 5 faces A1 cao Note: Any attempt to find volume gets NO marks

Paper: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
22	(a)		$x > -3$	1	B1 for $x > -3$ or $-3 < x$
	(b)			2	M1 for:  Accept this line drawn with any length OR  Accept this line drawn with any length OR OR  A1 for a fully correct diagram

Paper: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
*23		Angle $BAC = 76°$ Angle $BAP = 180° – 90° – 54° = 36°$ $x = 76° – 36°$ OR Angle $QCD = 54°$ Angle $ACP = 180° – 76° – 54° = 50°$ $x = 180° − 90° – 50°$	40^o	4	B1 for Angle $BAC = 76°$ (could be just on the diagram) M1 for $76° – (“180° – 90 – 54°”)$ A1 for $x = 40°$ (explicitly stated) C1 (dep on M1) for ‘the sum of the angles of a triangle is 180°’ and ‘alternate angles on parallel lines are equal’ OR B1 for Angle $QCD = 54°$ (could be just on the diagram) M1 for $180° – 90° – (“180° – 76 °– 54°”)$ A1 for $x = 40^o$ (explicitly stated) C1 (dep on M1) for ‘corresponding angles on parallel lines are equal’ and ‘sum of the angles on a straight line is 180^o’ and ‘the sum of the angles of a triangle is 180^o’ or ‘corresponding angles on parallel lines are equal’ and ‘exterior angle of a triangle is equal to the sum of the two interior opposite angles’ OR M1 for angle $QCB = 180 – 54$ (=126) M1 for $180 – 90 – “126 – 76”$ A1 for $x = 40^o$ (explicitly stated) C1 (dep on M1) for ‘sum of allied angles = 180^o’ and ‘the sum of the angles of a triangle is 180

Paper: 5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
24			905	2	M1 for $\pi \times 6^2 \times 8$ A1 for an answer in the range 904 to 905.2
25	(a)		$x > 12$	1	B1 for $x > 12$ or $12 < x$
	(b)		$y \leq 20$	1	B1 for $y \leq 20$ or $20 \geq y$
26			60	4	M1 for $8^2 + \text{base}^2 = 17^2$ oe or $17^2 - 8^2$ oe M1 for $\sqrt{(17^2 - 8^2)}$ M1 (indep) for their base $\times 8 \div 2$ A1 cao
27	(a)		Proof	2	M1 for $x + x + 3 + x + x + 3$ A1 for explicitly stating $D = 4x + 6$
	(b)		$x = \frac{D-6}{4}$	2	M1 for $4x = D - 6$ (a clear intention to subtract 6 from both sides) or $\frac{D}{4} = \frac{4x}{4} + \frac{6}{4}$ (a clear intention to divide all terms by 4) A1 for $x = \frac{D-6}{4}$ oe [SC: B1 for $x = D - 6 \div 4$ if M0 scored]
28		$(\pi \times 10) \div 4 = 7.854$ $7.854 + 5 + 5$	17.85	3	M1 for $\pi \times 10$ (= 31.4…) M1 for "$(\pi \times 10)$" $\div 4$ A1 for an answer in the range 17.85 - 17.86 [SC: B1 for 13.92.. if M0 scored]

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Methods in Mathematics

Unit 2: Methods 2

For Approved Pilot Centres ONLY

Foundation Tier

Tuesday 13 November 2012 – Morning
Time: 1 hour 45 minutes

Paper Reference
5MM2F/01

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators may be used.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.



Information

- The total mark for this paper is 100
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed.

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

P40678A

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6/6/7/3/

P 4 0 6 7 8 A 0 1 2 4

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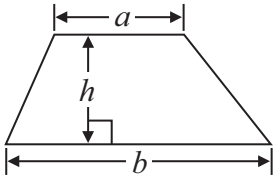
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GCSE Mathematics 2MM01

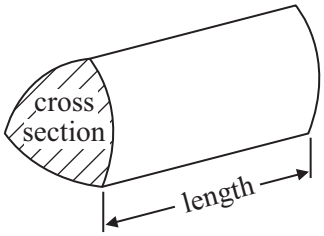
Formulae: Foundation Tier

You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.

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



Volume of prism = area of cross section × length



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Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1 Work out

(a) $6.24 + 38$

.....

(1)

(b) 5.1^2

.....

(1)

(c) $1.62 \times 10 + 4.92$

.....

(1)

(d) -3.1×-4.2

.....

(1)

(e) $78.4 \div -4$

.....

(1)

(Total for Question 1 is 5 marks)

2 Here is a solid prism made from centimetre cubes.

Find the volume of the solid prism.

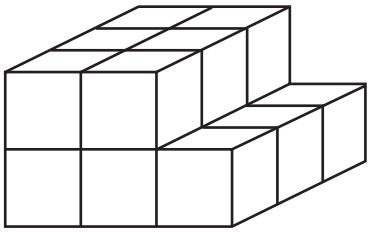
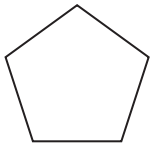


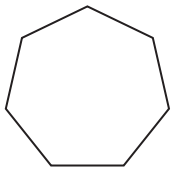
Diagram **NOT** accurately drawn

.....

(Total for Question 2 is 3 marks)

3 Write down the special name of each of these polygons.





(i) .....

(ii) .....

(Total for Question 3 is 2 marks)

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4 (a) Write 0.25 as a percentage.

.....%

(1)

(b) Write $\frac{3}{10}$ as a decimal.

.....

(1)

(c) Write 0.37 as a fraction.

.....

(1)

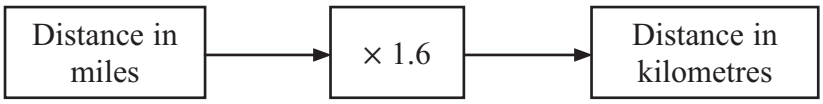
(d) Write 70% as a fraction.
Give your answer in its simplest form.

.....

(2)

(Total for Question 4 is 5 marks)

5 You can use this rule to change a distance in miles to a distance in kilometres.



(a) Change 20 miles to kilometres.

.....km

(1)

(b) Change 80 kilometres to miles.

.....miles

(2)

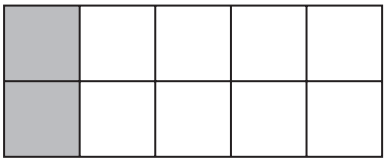
(Total for Question 5 is 3 marks)

6 (a) Work out 40% of 600

.....

(2)

(b) What percentage of this shape is shaded?



.....%

(1)

(c) Work out $\frac{2}{3}$ of 150

.....

(2)

(Total for Question 6 is 5 marks)

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7 Here are six temperatures.

$-2\,°C$ $-4\,°C$ $-13\,°C$ $7\,°C$ $4\,°C$ $-3\,°C$

(a) Work out the difference between $-2\,°C$ and $-4\,°C$.

.....°C

(1)

(b) Work out the difference between the lowest temperature and the highest temperature.

.....°C

(2)

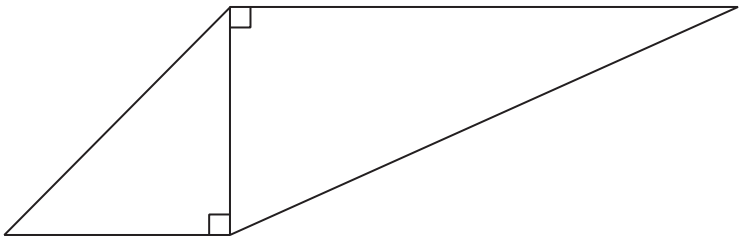
(c) What temperature is $10\,°C$ lower than $-3\,°C$?

.....°C

(1)

(Total for Question 7 is 4 marks)

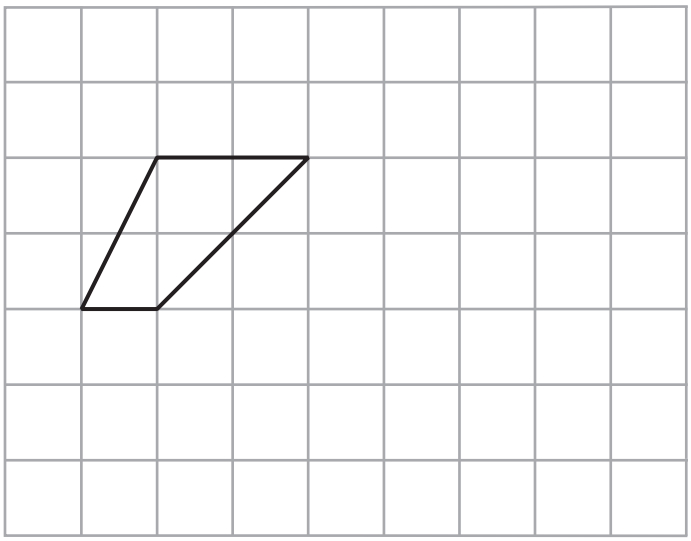
8 (a) The diagram shows two right-angled triangles.



On the diagram, mark with arrows (>>) a pair of parallel lines.

(1)

(b) On the grid below, show how the shape tessellates.
You should draw at least 6 shapes.



(2)

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A regular 5-sided polygon does **not** tessellate.

*(c) Explain why.

(3)

(Total for Question 8 is 6 marks)

9 (a) Use your calculator to work out $\sqrt{12.25} - 1.97$

.....

(2)

(b) Write a number in each box to make each calculation correct.

(i) $627 \div$ ☐ $= 6.27$

(ii) $0.54 \times$ ☐ $= 540$

(2)

48.7 + 16.95 is bigger than 48.3 + 16.81

(c) How much bigger?

.....

(2)

(Total for Question 9 is 6 marks)

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10 Debbie thinks of a number.
She divides the number by 5

Her answer is 14

(a) What number did Debbie think of?

.....

(1)

Lewis thinks of a number.

He multiplies the number by 3
He then subtracts 18

His answer is 63

(b) What number did Lewis think of?

.....

(2)

(Total for Question 10 is 3 marks)

11 Write these numbers in order of size.
Start with the smallest number.

70% $\frac{2}{3}$ 0.62 $\frac{13}{20}$ 0.6

.....

(Total for Question 11 is 2 marks)

***12**

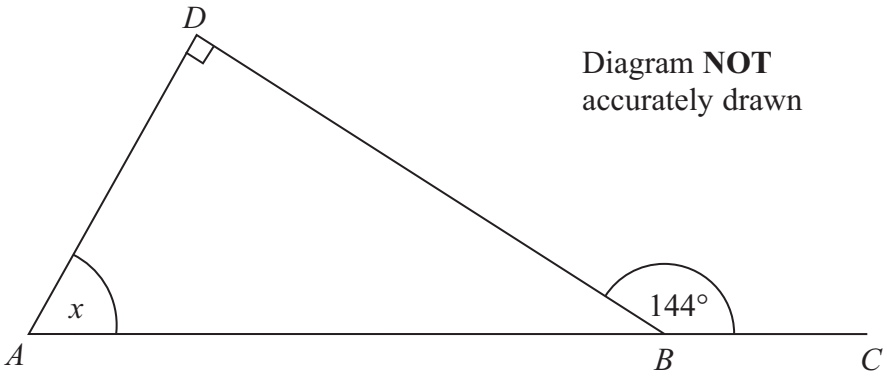


Diagram **NOT** accurately drawn

ABC is a straight line.

Angle *ADB* = 90°
Angle *DBC* = 144°

Work out the size of the angle marked *x*.
Give a reason for your answer.

(Total for Question 12 is 3 marks)

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13 There are 30 buttons in a box.
12 of the buttons are black.
The rest of the buttons are white.

(a) What fraction of the buttons in the box are black?

.....

(1)

(b) Write down the ratio of the number of black buttons to the number of white buttons.
Give your ratio in its simplest form.

.....

(2)

James takes some black buttons from the box.
The ratio of the number of black buttons in the box to the number of white buttons in the box is now 1 : 2

(c) How many black buttons did James take from the box?

.....

(3)

(Total for Question 13 is 6 marks)

14

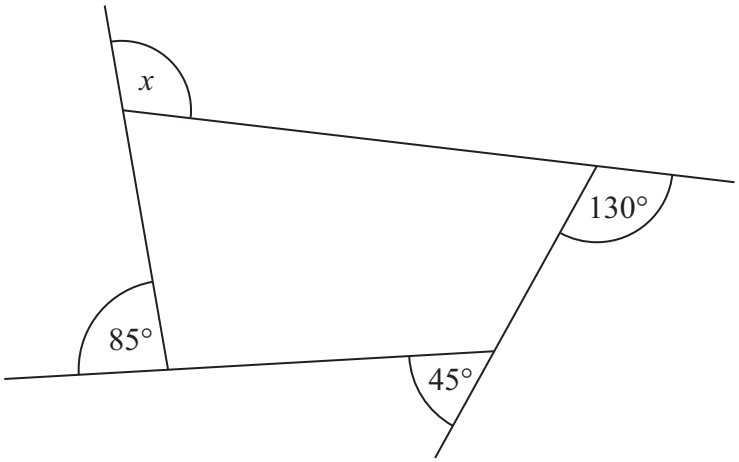


Diagram **NOT** accurately drawn

Work out the size of the angle marked x.

.....°

(Total for Question 14 is 2 marks)

15 Here are five fractions.

$$\frac{1}{2} \qquad \frac{1}{4} \qquad \frac{1}{6} \qquad \frac{1}{8} \qquad \frac{1}{10}$$

Which of these fractions can be written as a recurring decimal?
Explain your answer.

.....

.....

.....

.....

(Total for Question 15 is 2 marks)

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16 $v = r - 6$
$r = 4$

(a) Work out the value of v.

.....

(1)

$D = 3e + 4f$
$e = 2$
$f = 5$

(b) Work out the value of D.

.....

(2)

$y = 3(x - 2)$
$x = 8$

(c) Work out the value of y.

.....

(2)

(Total for Question 16 is 5 marks)

17 There are 200 counters in a bag.
The counters are blue or red or yellow.

$\frac{1}{4}$ of the counters are blue.

$\frac{2}{5}$ of the counters are red.

Work out the number of yellow counters in the bag.

.....

(Total for Question 17 is 4 marks)

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***18**

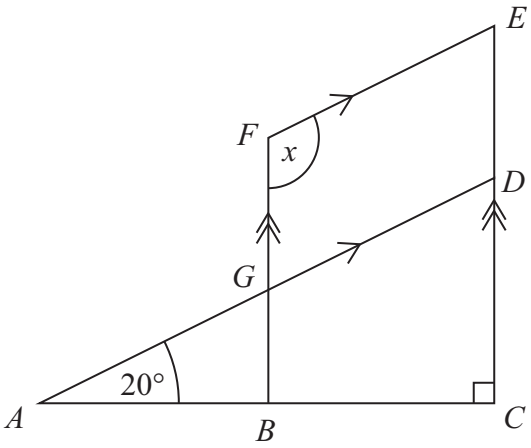


Diagram **NOT** accurately drawn

ABC is a straight line.
BGF is parallel to *CDE*.
AGD is parallel to *FE*.

Angle *CAD* = 20°
Angle *ACD* = 90°

Work out the size of the angle marked *x*.
Give reasons for your answer.

(Total for Question 18 is 4 marks)

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19 5 pencils cost £1.85

Work out the cost of 9 of these pencils.

£.....

(Total for Question 19 is 2 marks)

20 The diagram shows a cuboid.

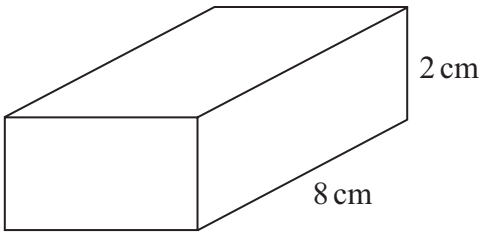


Diagram **NOT** accurately drawn

The cuboid has

a volume of 64 cm^3
a length of 8 cm
a height of 2 cm

(a) Work out the width of the cuboid.

.....cm

(2)

A solid cube has a surface area of 150 cm^2.

(b) Work out the volume of the cube.

..... cm^3

(3)

(Total for Question 20 is 5 marks)

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21 (a) Work out the value of $4x^3$ when $x = 2$

.....

(1)

(b) Make c the subject of the formula $a = b + 5c$

$c =$.....

(2)

(Total for Question 21 is 3 marks)

22 Express 84 as a percentage of 240

..... %

(Total for Question 22 is 2 marks)

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23 The diagram shows a shape made from a semi-circle and a rectangle.

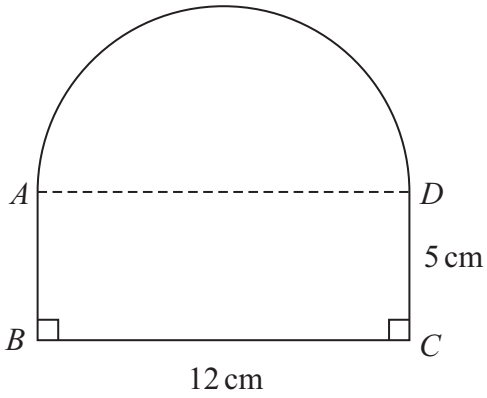


Diagram **NOT** accurately drawn

$BC = 12$ cm
$CD = 5$ cm

AD is the diameter of the semi-circle.

Work out the perimeter of the shape.
Give your answer correct to 1 decimal place.

.....cm

(Total for Question 23 is 4 marks)

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24 $-2 < n \leqslant 3$
n is an integer.

(a) Write down all the possible values of n.

.....

(2)

x is a number.
Another number is 9 greater than x.
Both numbers are whole numbers.

The total of the two numbers is less than 60

(b) Find the greatest possible value of x.

.....

(3)

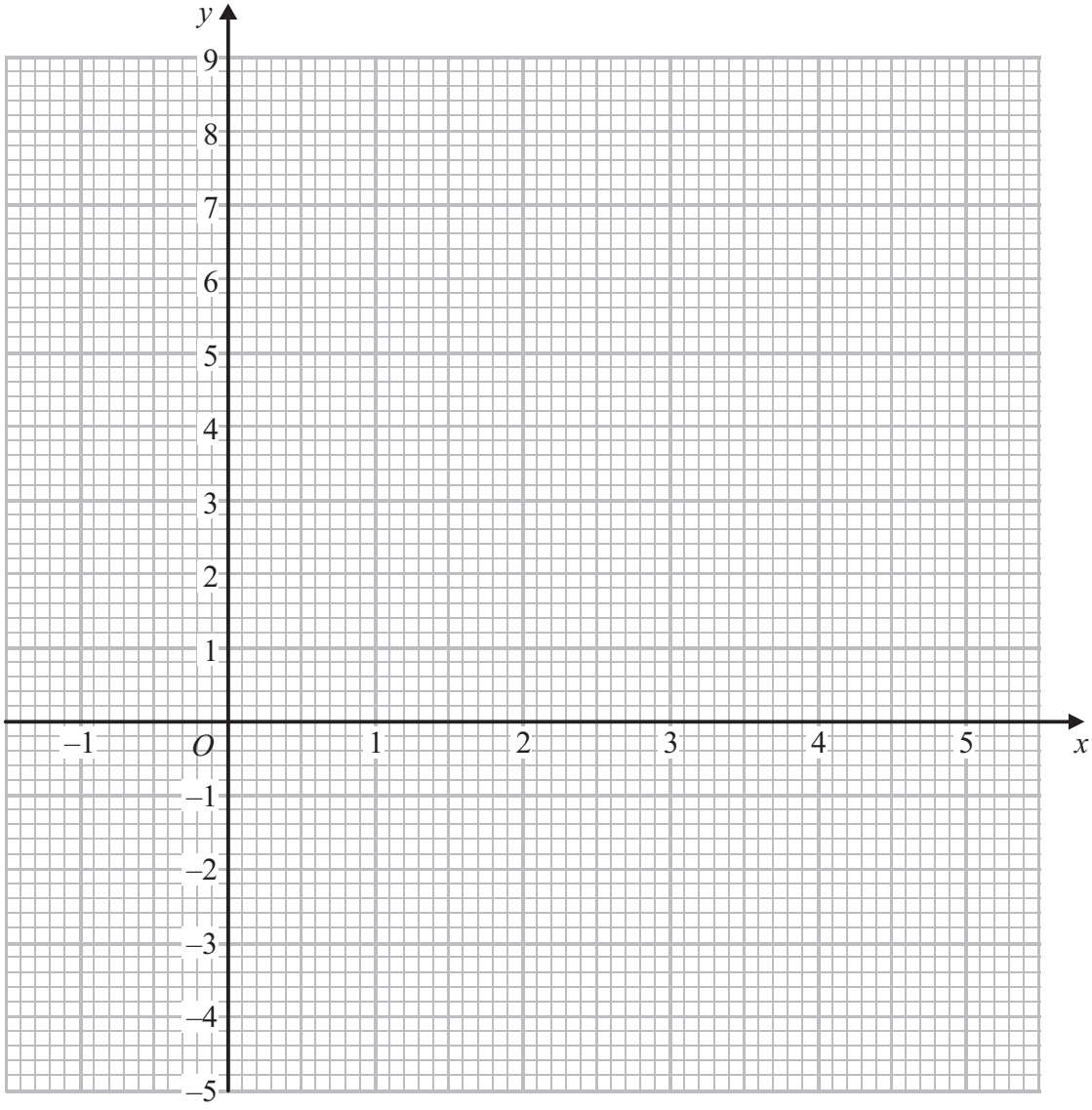
(Total for Question 24 is 5 marks)

25 (a) Complete the table of values for $y = x^2 - 3x - 2$

x	-1	0	1	2	3	4	5
y			-4		-2	2	

(2)

(b) On the grid, draw the graph of $y = x^2 - 3x - 2$ for values of x from -1 to 5



(2)

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(c) Use your graph to find estimates of the values of x for which $x^2 - 3x - 2 = 0$

.....

(2)

(Total for Question 25 is 6 marks)

26

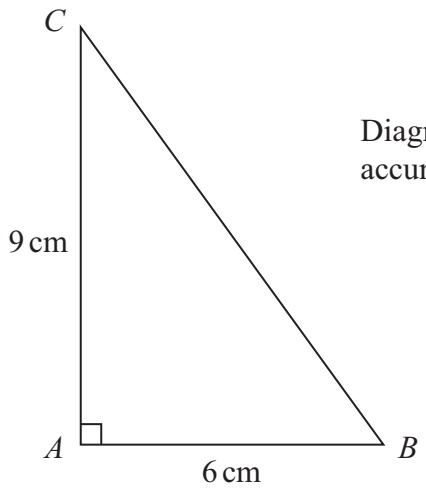


Diagram **NOT** accurately drawn

ABC is a right-angled triangle.
$AB = 6$ cm.
$AC = 9$ cm.

Work out the length of BC.
Give your answer correct to 3 significant figures.

.....cm

(Total for Question 26 is 3 marks)

TOTAL FOR PAPER IS 100 MARKS

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Mark Scheme (Results)

November 2012

GCSE Mathematics Linked Pair Pilot
Methods in Mathematics (2MM01)
Foundation (Calculator) Paper 2F

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NOTES ON MARKING PRINCIPLES

1 All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.

2 Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.

3 All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.

4 Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.

5 Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

6 Mark schemes will indicate within the table where, and which strands of QWC, are being assessed. The strands are as follows:

i) *ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear*
Comprehension and meaning is clear by using correct notation and labeling conventions.

ii*) select and use a form and style of writing appropriate to purpose and to complex subject matter*
Reasoning, explanation or argument is correct and appropriately structured to convey mathematical reasoning.

iii) *organise information clearly and coherently, using specialist vocabulary when appropriate*.
The mathematical methods and processes used are coherently and clearly organised and the appropriate mathematical vocabulary used.

7 With working

If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.

If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.

If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.

If there is no answer on the answer line then check the working for an obvious answer.

Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.

If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.

8 Follow through marks

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.

Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

9 Ignoring subsequent work

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: e.g. incorrect canceling of a fraction that would otherwise be correct

It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect e.g. algebra.

Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

10 Probability

Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).

Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.

If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.

If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

11 Linear equations

Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded.

12 Parts of questions

Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

13 Range of answers

Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1)

Guidance on the use of codes within this mark scheme
M1 – method mark A1 – accuracy mark B1 – Working mark C1 – communication mark QWC – quality of written communication oe – or equivalent cao – correct answer only ft – follow through sc – special case dep – dependent (on a previous mark or conclusion) indep – independent isw – ignore subsequent working

5MM2F/01					
Question		**Working**	**Answer**	**Mark**	**Notes**
1	(a)		44.24	1	B1 cao
	(b)		26.01	1	B1 cao
	(c)		21.12	1	B1 cao
	(d)		13.02	1	B1 accept $\frac{651}{50}$
	(e)		–19.6	1	B1 cao
2			15 cm^3	3	M1 for 5 × 3 or answer of 11 A1 cao B1 (indep) for cm^3
3	(i)		Pentagon	2	B1 for pentagon or regular pentagon
	(ii)		Heptagon		B1 for heptagon or regular heptagon
4	(a)		25	1	B1 cao
	(b)		0.3	1	B1 cao
	(c)		$\frac{37}{100}$	1	B1 cao
	(d)		$\frac{7}{10}$	2	M1 for $\frac{70}{100}$ oe A1 cao

5MM2F/01					
Question		**Working**	**Answer**	**Mark**	**Notes**
5	(a)	$20 \times 1.6 =$	32	1	B1 cao
	(b)	$80 \div 1.6 =$	50	2	M1 for $80 \div 1.6$ A1 cao
6	(a)	$\frac{40}{100} \times 600 =$	240	2	M1 for $\frac{40}{100} \times 600$ or 4×60 oe A1 cao
	(b)		20	1	B1 cao
	(c)	$150 \div 3 \times 2 =$	100	2	M1 for $150 \div 3 \times 2$ or $150 \times 2 \div 3$ A1 cao
7	(a)		2	1	B1 for 2 or –2
	(b)		20	2	M1 for identifying –13 and 7 A1 for 20 or –20
	(c)		–13	1	B1 cao

5MM2F/01					
Question		**Working**	**Answer**	**Mark**	**Notes**
8*	(a)		Parallel lines marked	1	B1 for a clear indication that the two parallel lines have been selected
	(b)		Correct tessellation	2	B2 for at least 6 shapes (including initial shape) correctly tessellating (B1 for at least 4 shapes (including initial shape) correctly tessellating)
	(c)		108 and explanation	3	M1 for 360 ÷ 5 (= 72) or 3 × 180 (= 540) A1 for 108 C1 for explanation e.g. 108 is not a factor of 360 or 360 ÷ 108 is not a whole number or diagram drawn with sizes of angles shown and explanation of why they won't fit **SC** B1 for 3 pentagons drawn at a point with gap identified QWC: Explanation should be clear with working clearly presented
9	(a)	$\sqrt{12.25} = 3.5$ $3.5 - 1.97 =$	1.53	2	M1 for $3.5 - 1.97$ or $\frac{7}{2} - 1.97$ A1 cao
	(b)(i)		100	2	B1 for 100, accept 10^2
	(ii)		1000		B1 for 1000, accept 10^3
	(c)	$48.7 - 48.3 = 0.4$ $16.95 - 16.81 = 0.14$ $0.4 + 0.14 = 0.54$	0.54	2	M1 for $48.7 - 48.3$ or 0.4 seen **and** $16.95 - 16.81$ or 0.14 seen A1 cao Or M1 for $48.7 + 16.95 - (48.3 + 16.81)$ or 65.65 **and** 65.11 seen A1 cao

5MM2F/01					
Question		**Working**	**Answer**	**Mark**	**Notes**
10	(a)		70	1	B1 cao
	(b)	(63 + 18) ÷ 3 =	27	2	M1 for 63 + 18 or 81 seen or 63 + 18 ÷ 3 seen in working or $3x - 18 = 63$ or first step correct of a reversed flow chart. A1 cao
11			0.6 0.62 $\frac{13}{20}$ $\frac{2}{3}$ 70%	2	M1 for conversion to decimals or conversion to percentages or correct order with one error or correct order but largest first A1for correct order
12*		*DAB* = 144 – 90 (= 54) Or *ABD* = 180 – 144 (= 36) *DAB* = 180 – 36 – 90 =	54	3	M1 for 144 – 90 (i.e. a complete method) A1 cao C1 (dep onM1 earned) for exterior angle of triangle is equal to sum of interior opposite angles Or M1 for 180 – (180 – 144) – 90 (i.e. a complete method) A1 cao C1 (dep on M1 earned) for angles on a straight line add up to 180 **and** angles in a triangle add up to 180 QWC: Reasons written out clearly with correct geometrical language

5MM2F/01					
Question		**Working**	**Answer**	**Mark**	**Notes**
13	(a)		$\frac{12}{30}$	1	B1 for $\frac{12}{30}$ oe
	(b)	30 – 12 = 18 12 : 18 = 2 : 3	2 : 3	2	M1 for 12 : "30 – 12" oe e.g. 12 : 18 , 6 : 9 , 4 : 6 or 3 : 2 A1 cao
	(c)	18 ÷ 2 = 9 12 – 9 = 3	3	3	M1 for "(30 – 12)" ÷ 2 or 9 seen M1(dep) for 12 – "9" A1 cao
14		360 – (130 + 45 + 85) =	100	2	M1 for 360 – (130 + 45 + 85) or 180 – (360 – ("50" + "135" + "95")) A1 cao
15			$\frac{1}{6}$ and explanation	2	B1 for $\frac{1}{6}$ B1 (indep) for explanation e.g. 6 doesn't divide into 1 exactly or the other four fractions do not recur or states $\frac{1}{6}$ and links it with $0.1\dot{6}$
16	(a)	4 – 6 =	–2	1	B1 cao
	(b)	3 × 2 + 4 × 5 =	26	2	M1 for 3 × 2 + 4 × 5 A1 cao
	(c)	3 × (8 – 2) =	18	2	M1 for 3 × (8 – 2) or 3 × 8 – 3 × 2 or 3 × 6 A1 cao

5MM2F/01					
Question		**Working**	**Answer**	**Mark**	**Notes**
17		200 ÷ 4 = 50 200 ÷ 5 × 2 = 80 200 – 50 – 80 = Or $\frac{1}{4}+\frac{2}{5}=\frac{13}{20}$ $\frac{13}{20}\times 200 = 130$ 200 – 130 =	70	4	M1 for 200 ÷ 4 or 50 seen M1 for 200 ÷ 5 × 2 or 80 seen M1 (dep on one previous M1) for 200 – "50" – "80" A1 cao Or M1 for 0.25 + 0.4 = (0.65) M1 for 1 – 0.65 (= 0.35) or 200 × 0.65 (= 130) M1(dep on M1) for 200 × 0.35 or 200 – "130" A1 cao Or M1 for $\frac{1}{4}+\frac{2}{5}$ or $\frac{13}{20}$ oe M1 for "$\frac{13}{20}$" × 200 or 130 seen or 1 – "$\frac{13}{20}$" or $\frac{7}{20}$ oe seen M1 (dep on one previous M1) for 200 – "130" or 70 seen or "$\frac{7}{20}$"× 200 A1 cao

5MM2F/01					
Question		**Working**	**Answer**	**Mark**	**Notes**
18*			110 with reasons	4	M1 for 180 – 90 – 20 or an angle correctly identified as 70 (could be on the diagram) M1 for 180 – "70" oe (could be on the diagram) C2 for 110 and all reasons clearly given **e.g.** *ABG* = 90 (corresponding angles are equal) *AGB* = 180 – 90 – 20 = 70 (angles in a triangle add to 180) *BGD* = 180 – 70 = 110 (angles on a straight line add to 180) *x* = *BGD* = 110 (corresponding angles are equal) Or *ABG* = 90 (corresponding angles are equal) *AGB* = 180 – 90 – 20 = 70 (angles in a triangle add to 180) *FGD* = 70 (vertically opposite angles equal) *x* = 180 – 70 (allied angles or co-interior angles) add to 180 Or *ADC* = 180 – 90 – 20 = 70 (angles in a triangle add to 180) *FGD* = 70 (alternate angles are equal) *x* = 180 – 70 (allied angles or co-interior angles) add to 180 (C1 for one appropriate reason for candidates working) QWC: Reasons written out clearly with correct geometrical language used

5MM2F/01					
Question		**Working**	**Answer**	**Mark**	**Notes**
19		1.85 ÷ 5 × 9 =	3.33	2	M1 for 1.85 ÷ 5 or 1.85 × 9 or 0.37 or 16.65 or 333 seen A1 cao **NB** Working can be in £ or p
20	(a)	64 ÷ (8 × 2)	4	2	M1 for 64 ÷ (8 × 2) A1 cao
	(b)	150 ÷ 6 (=25) $\sqrt{25} = 5$ 5 × 5 × 5 =	125	3	M1for 150 ÷ 6 (=25) (area of 25 may be seen on one face of a cube or side lengths of 5 may be marked on a diagram) M1 for $\sqrt{"25"} \times \sqrt{"25"} \times \sqrt{"25"}$ A1 cao
21	(a)	4 × 2 × 2 × 2 = 32	32	1	B1 cao
	(b)	$a - b = 5c$ $\frac{a-b}{5} = c$	$\frac{a-b}{5}$	2	M1 for an intention to subtract b from both sides as a first step or to divide all items by 5 as a first step A1 for $\frac{a-b}{5}$ oe **SC** 1 for $a - b \div 5$
22		$\frac{84}{240} \times 100 =$	35	2	M1 for $\frac{84}{240} \times 100$ oe A1 cao
23		$\pi \times 12 \div 2 = 18.849…$ 18.849 + 12 + 5 + 5 =	40.8	4	M1 for $\pi \times 12$ or 37.6 – 37.7 seen M1 for $\pi \times 12 \div 2$ or for 18.8 – 18.9 seen for arc length, can be implied by answer in range 40.8 – 40.9 M1 (dep on M1earned) for "18.8" + 12 + 5 + 5 A1 ft or 40.8 – 40.9

5MM2F/01					
Question		**Working**	**Answer**	**Mark**	**Notes**
24	(a)		–1, 0, 1, 2, 3	2	B2 for all 5 values and no extras (ignore repeats) (B1 for 4 correct values and no extras or all 5 correct values and one incorrect value)
	(b)	$x + x + 9 < 60$ $2x < 51$ $x < 25.5$	25	3	M1 for $x + x + 9$ oe A2 cao (A1 for 25.5) Or M1 for 60 ÷ 2 (=30) and 9 ÷ 2 (=4.5) A2 cao (A1 for 25.5) Or M1 for 60 – 9 (=51) and "51" ÷ 2 (=25.5) A2 cao (A1 for 25.5) Or M1 for at least 2 trials with correct totals A2 cao (A1 for correct trial of 25 and 26)

5MM2F/01					
Question		**Working**	**Answer**	**Mark**	**Notes**
25	(a)		2, –2, –4, 8	2	B2 for all correct (B1 for 2 or 3 correct)
	(b)		Correct graph	2	B2 for fully correct graph Or M1 ft for 6 or 7 of their points plotted correctly A1 for correct curve
	(c)		3.6, –0.6	2	B1ft graph for 3.6 ± 0.2 B1ft graph for –0.6 ± 0.2 **SC:** B1 ft for (3.6, 0), (–0.6, 0)
26		$6^2 + 9^2 = 117$ $\sqrt{117}$ =	10.8	3	M1 for $6^2 + 9^2$ M1 for $\sqrt{36 + 81}$ or $\sqrt{117}$ A1 for 10.8 – 10.82

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Edexcel GCSE

Methods in Mathematics

Unit 2: Methods 2

For Approved Pilot Centres ONLY

Foundation Tier

Thursday 21 June 2012 – Afternoon
Time: 1 hour 45 minutes

Paper Reference
5MM2F/01

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators may be used.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.



Information

- The total mark for this paper is 100
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed.

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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6/6/7/

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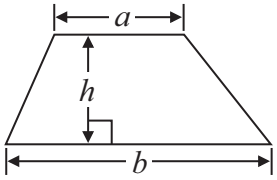
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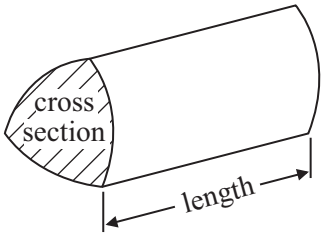
Formulae: Foundation Tier

You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.

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



Volume of prism = area of cross section × length



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Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1 (a) Work out 2.4 + 37 + 6

.....

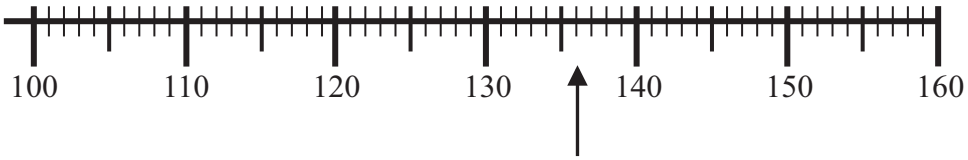
(1)

(b) What number do you need to add to 74.2 to make 100?

.....

(1)

The arrow points to a number.



(c) What is the difference between this number and 150?

.....

(2)

(Total for Question 1 is 4 marks)

2 Calculate

(i) 6.4^2

.....

(ii) $2.5 \times (8 - 3.6)$

.....

(iii) $\sqrt{10\,201}$

.....

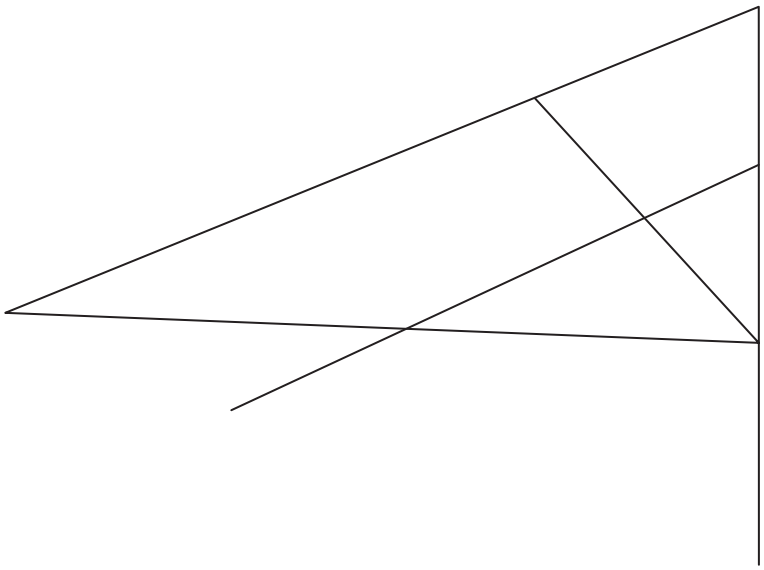
(iv) $\dfrac{8.4}{2.5}$

.....

(Total for Question 2 is 4 marks)

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3



There is a pair of parallel lines in this diagram.

(a) Mark the pair of parallel lines with arrows (>>).

(1)

(b) On the diagram, mark with letter A, two angles of the same size.

(1)

(Total for Question 3 is 2 marks)

4 Write in the numbers missing from the empty boxes.

(i)

47	+	42	=	.....

(ii)

178	–	.....	=	67

(iii)

18	×	.....	+	5	=	59

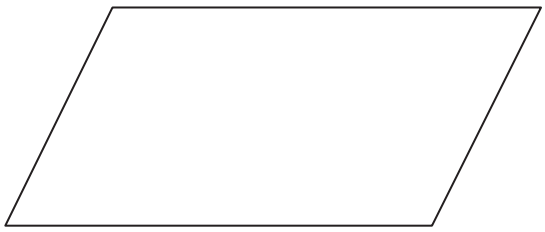
(iv)

125	–	57	=	.....	+	54

(Total for Question 4 is 4 marks)

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5 Here is a parallelogram.

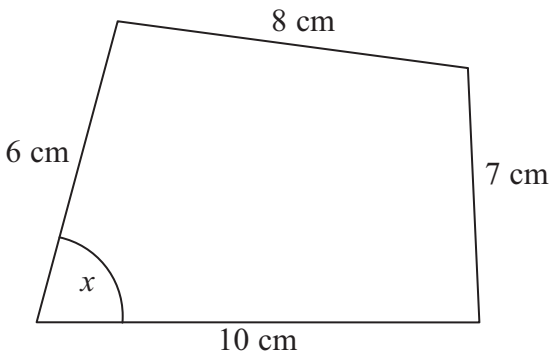


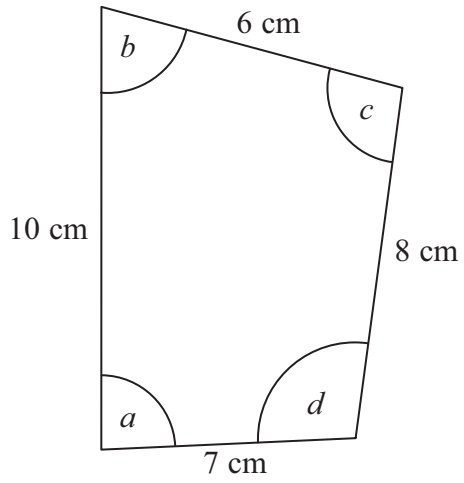
(a) Draw one straight line on the parallelogram to split the parallelogram into two congruent parts.

(1)

Here are two quadrilaterals.

Diagrams **NOT** accurately drawn





These quadrilaterals are congruent.

One of the angles, a or b or c or d is equal to the angle x.

(b) Which angle?

.....

(1)

(Total for Question 5 is 2 marks)

6 Jim thinks of a number.
He multiplies the number by 4
He then subtracts 6

The answer is 30

What number did Jim think of?

.....

(Total for Question 6 is 2 marks)

7 (a) Change 27% to a fraction.

.....

(1)

(b) Change 42% to a fraction.
Give your fraction in its simplest form.

.....

(1)

(c) Write 73% as a decimal.

.....

(1)

(d) Write $\frac{7}{10}$ as a decimal.

.....

(1)

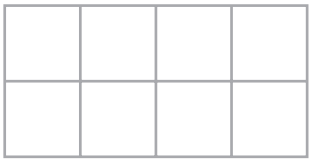
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(e) Write 0.453 as a fraction.

.....

(1)

(f)



Shade $\frac{3}{4}$ of this shape.

(1)

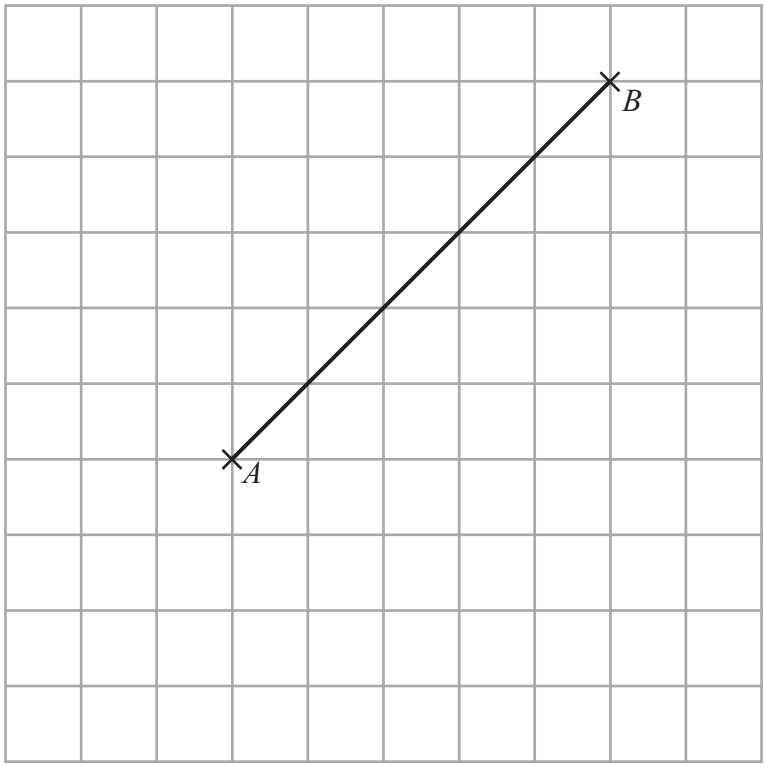
(g) Write down the reciprocal of 5

.....

(1)

(Total for Question 7 is 7 marks)

8



On the grid, draw a line that is both

parallel to the line AB
and the same length as the line AB.

(Total for Question 8 is 2 marks)

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9 Here is a rule for working out the area of a rhombus.

> Multiply the lengths of the diagonals together
>
> and then divide by 2

A rhombus has diagonals of length 10 cm and 7 cm.

(a) Use the rule to work out the area of the rhombus.

..... cm^2

(2)

A different rhombus has an area of 48 cm^2.
One of its diagonals has a length of 8 cm.

(b) Work out the length of the other diagonal.

..... cm

(3)

(Total for Question 9 is 5 marks)

10 Here are some fractions.

$$\frac{1}{10} \qquad \frac{1}{8} \qquad \frac{1}{5} \qquad \frac{1}{4} \qquad \frac{1}{3}$$

One of these fractions is equal to a recurring decimal.

(a) Which fraction?

.....

(1)

(b) Write these numbers in order of size.
Start with the smallest number.

$$\frac{3}{4} \qquad 70\% \qquad 0.73 \qquad 7\%$$

.....

(2)

(c) Work out 17% of 300

.....

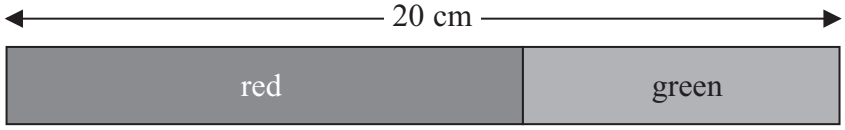
(2)

(Total for Question 10 is 5 marks)

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***11** Here is a rectangle.

Diagram **NOT** accurately drawn



The rectangle has a length of 20 cm.

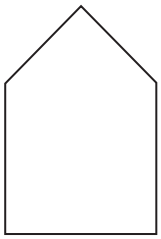
$\frac{3}{5}$ of the rectangle is red.

The rest of the rectangle is green.

Work out the length of the green part of the rectangle.

(Total for Question 11 is 3 marks)

12

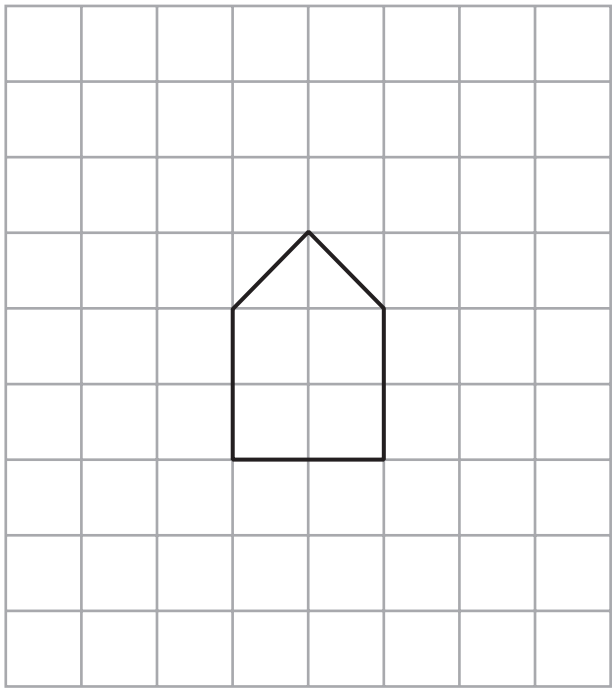


(a) Write down the mathematical name of this polygon.

.....

(1)

(b) On the grid show how the polygon will tessellate.
You should draw at least 7 polygons.

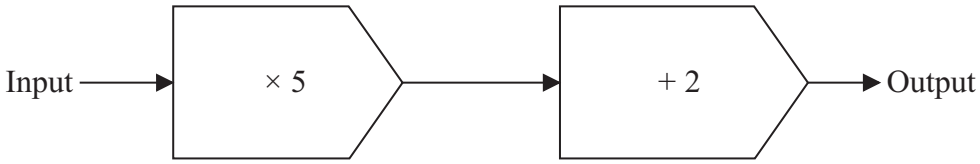


(2)

(Total for Question 12 is 3 marks)

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13 This diagram shows a mathematical rule.

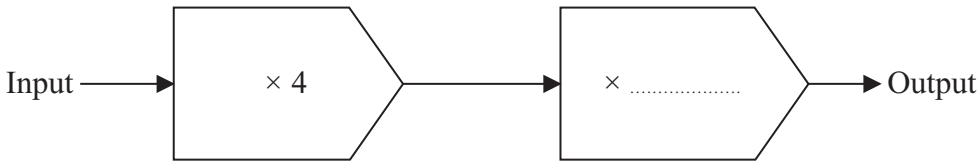


(a) Complete the table.

Input	Output
1	7
2	12
3	17
4	.....
.....	37

(2)

This diagram shows a different mathematical rule.



For this rule the output is always equal to the input.

(b) Complete the diagram.

(1)

(Total for Question 13 is 3 marks)

***14** Here is a solid cuboid.

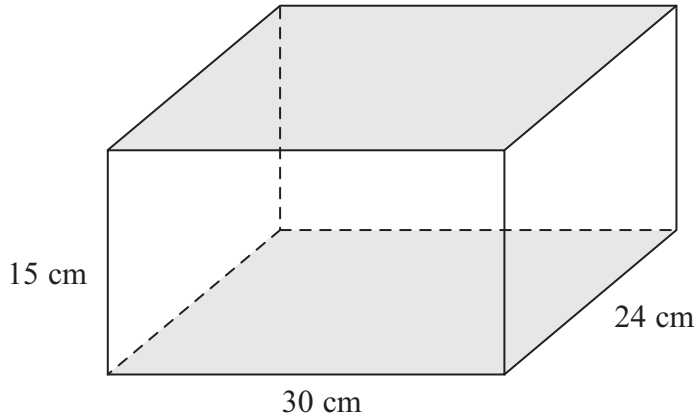


Diagram **NOT** accurately drawn

The top face and the bottom face of the cuboid are shaded.
The other faces of the cuboid are **not** shaded.

Anil says

'The total area shaded is greater than the total area **not** shaded.'

Is Anil right?

(Total for Question 14 is 4 marks)

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15 Here are two boxes.



There are x marbles in box A.
There are 4 more marbles in box B than in box A.

The total number of marbles in the two boxes is T.

(a) Write a formula, in terms of x, for the total number of marbles, T, in the two boxes.

.....

(3)

$x = 13$

(b) Work out the value of T.

.....

(2)

(Total for Question 15 is 5 marks)

16 2 pens cost £1.98

Work out the total cost of 7 of these pens.

£ .....

(Total for Question 16 is 3 marks)

17 There are only red beads and blue beads in a box.

There are 16 red beads in the box.
The total number of beads in the box is 40

(a) Write down the ratio of the number of red beads to the number of blue beads.
Give your answer in its simplest form.

.....

(3)

(b) Find the fraction of the total number of beads in the box that are red.

.....

(1)

(Total for Question 17 is 4 marks)

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***18** Here is a shape.

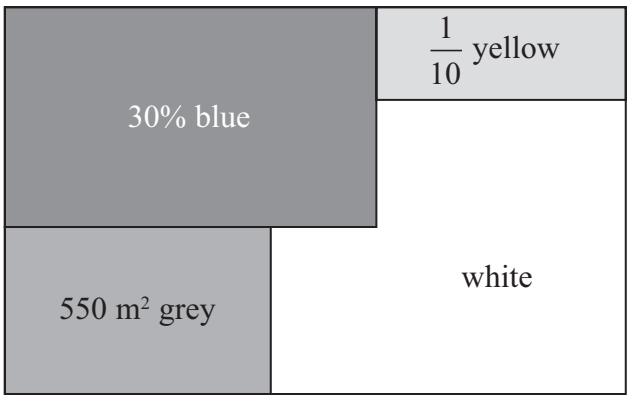


Diagram **NOT** accurately drawn

The total area of the shape is 1640 m^2.

30% of the shape is blue.

$\frac{1}{10}$ of the shape is yellow.

550 m^2 of the shape is grey.

The rest of the shape is white.

Is the white area more than 400 m^2?

(Total for Question 18 is 5 marks)

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19 $y = 3p + 4q$

$p = 5.2$

$q = 4.8$

(a) Work out the value of y.

.....

(2)

$y = 3p + 4q$

$p = 7.2$

$y = 32$

(b) Work out the value of q.

.....

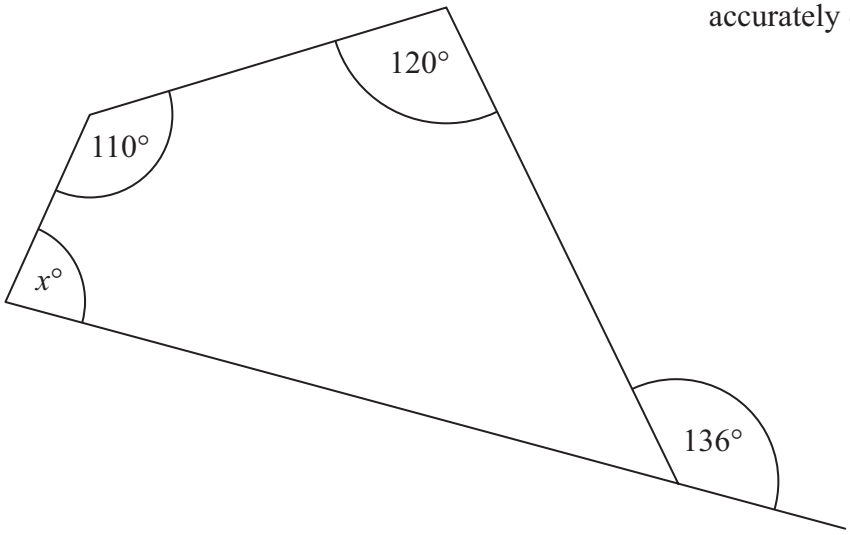
(2)

(Total for Question 19 is 4 marks)

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***20** Here is a quadrilateral.

Diagram **NOT** accurately drawn

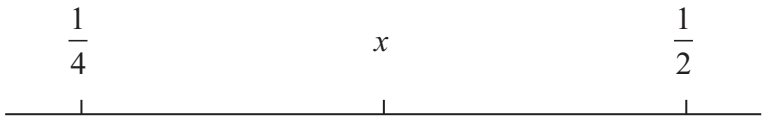


Work out the value of x.

Give reasons for your answer.

(Total for Question 20 is 5 marks)

21



x is halfway between $\frac{1}{4}$ and $\frac{1}{2}$

Work out the value of x.

.....

(Total for Question 21 is 3 marks)

22 A circle has a diameter of 10 cm.

Work out the circumference of the circle.
Give your answer correct to 3 significant figures.

..... cm

(Total for Question 22 is 2 marks)

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23 Alf and Betty share some money in the ratio 3 : 5

Work out the percentage of the money that Alf gets.

..... %

(Total for Question 23 is 2 marks)

24 x is an integer.

$-3 \leqslant x < 2$

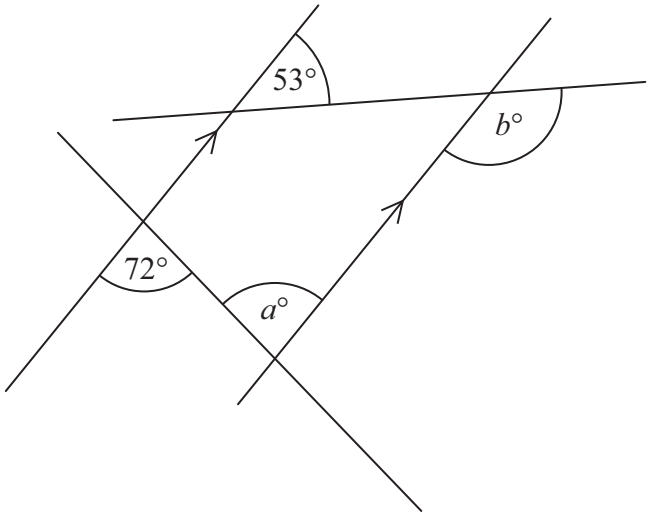
Write down all the possible values of x.

.....

(Total for Question 24 is 2 marks)

25

Diagram **NOT** accurately drawn



(a) (i) Find the value of a.

.....

(ii) Give a reason for your answer.

.....

(2)

(b) Work out the value of b.

.....

(2)

(Total for Question 25 is 4 marks)

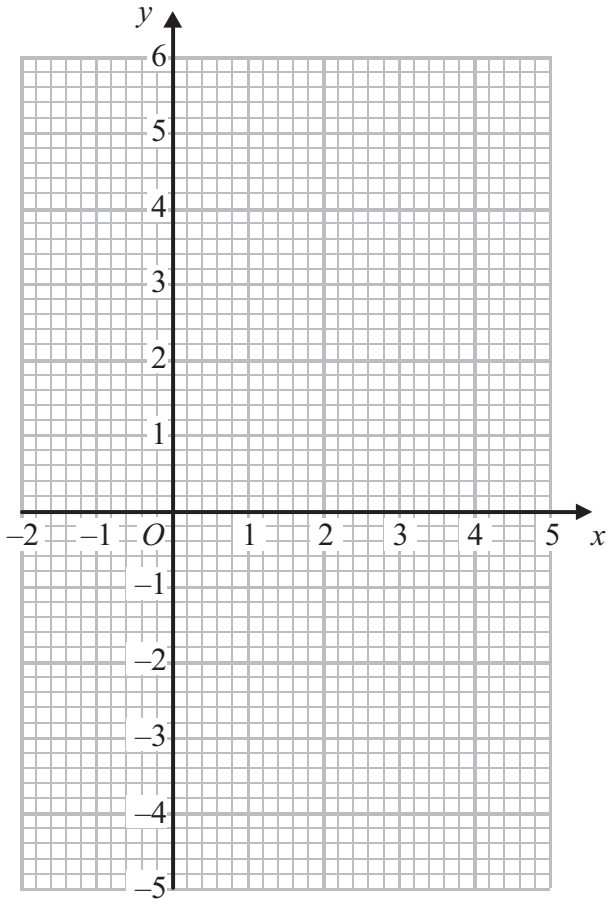
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26 (a) Complete the table of values for $y = x^2 - 3x + 1$

x	–1	0	1	2	3	4
y		1			1	5

(2)

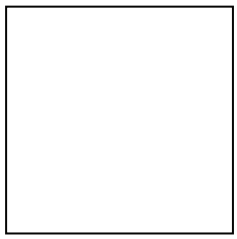
(b) Draw the graph of $y = x^2 - 3x + 1$ for values of x from –1 to 4



(2)

(Total for Question 26 is 4 marks)

27



8.4 cm

Diagram **NOT** accurately drawn

A square has sides of length 8.4 cm.

Work out the length of a diagonal of the square.
Give your answer correct to 3 significant figures.

..... cm

(Total for Question 27 is 3 marks)

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28 Here is a regular hexagon.

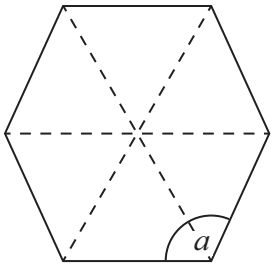


Diagram **NOT** accurately drawn

(a) Write down the size of the interior angle, marked a.

.....°

(1)

(b)

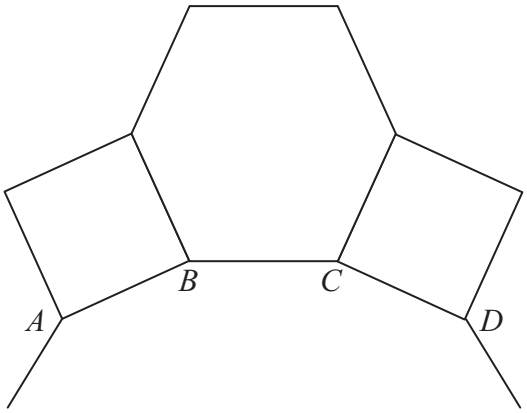


Diagram **NOT** accurately drawn

The diagram shows two squares and a regular hexagon.

AB, BC and CD are 3 sides of a regular polygon with n sides.

Work out the value of n.

.....

(3)

(Total for Question 28 is 4 marks)

TOTAL FOR PAPER IS 100 MARKS

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Mark Scheme (Results)
June 2012

Methods in Mathematics (GCSE)
Unit 2: Methods 5MM2F_01

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NOTES ON MARKING PRINCIPLES

1 All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.

2 Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.

3 All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.

4 Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.

5 Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

6 Mark schemes will indicate within the table where, and which strands of QWC, are being assessed. The strands are as follows:

i) *ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear*
Comprehension and meaning is clear by using correct notation and labeling conventions.

ii*) select and use a form and style of writing appropriate to purpose and to complex subject matter*
Reasoning, explanation or argument is correct and appropriately structured to convey mathematical reasoning.

iii) *organise information clearly and coherently, using specialist vocabulary when appropriate*.
The mathematical methods and processes used are coherently and clearly organised and the appropriate mathematical vocabulary used.

7 With working

If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.

If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.

If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.

If there is no answer on the answer line then check the working for an obvious answer.

Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.

If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.

8 Follow through marks

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.

Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

9 Ignoring subsequent work

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: e.g. incorrect canceling of a fraction that would otherwise be correct

It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect e.g. algebra.

Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

10 Probability

Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).

Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.

If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.

If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

11 Linear equations

Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded.

12 Parts of questions

Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

13 Range of answers

Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1)

Guidance on the use of codes within this mark scheme
M1 – method mark A1 – accuracy mark B1 – Working mark C1 – communication mark QWC – quality of written communication oe – or equivalent cao – correct answer only ft – follow through sc – special case dep – dependent (on a previous mark or conclusion) indep – independent isw – ignore subsequent working

.

5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
1	(a)		45.4	1	B1 45.4 cao
	(b)		25.8	1	B1 25.8 cao
	(c)	150 - 136	±14	2	M1 150 – 136 or 14+136 or counting on or counting back A1
2	(i)		40.96	4	B1 cao
	(ii)		11		B1 cao
	(iii)		101		B1 cao
	(iv)		3.36		B1 cao
3	(a)		Marked	1	B1 for parallel lines marked
	(b)		Marked	1	B1 for equal angles marked
4	(i)		89	4	B1cao
	(ii)		111		B1 cao
	(iii)		3		B1 cao
	(iv)		14		B1 cao
5	(a)		Correct drawing	1	B1 any st line that cuts opposite sides or any diagonal or the vertical line that passes through the intersection point of the two diagonals
	(b)		*b*	1	B1 cao

5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
6		30 + 6 = 36, 36 ÷4	9	2	M1 +6 or ÷4 or correct understanding of reverse process by means of number machines or one trial with total seen A1 9 cao
7	(a)		$\frac{27}{100}$	1	B1 $\frac{27}{100}$ oe
	(b)		$\frac{21}{50}$	1	B1 $\frac{21}{50}$ cao
	(c)		0.73	1	B1 0.73, .73, 0.730 oe
	(d)		0.7	1	B1 0.7, .7, 0.70 oe
	(e)		$\frac{453}{1000}$	1	B1cao
	(f)		6 squares	1	B1 for 6 full squares shaded oe
	(g)		0.2 or $\frac{1}{5}$	1	B1 0.2, $\frac{1}{5}$ oe
8			Correct line	2	B1 line drawn parallel to *AB* B1 line the same length as *AB*

5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
9	(a)	10 ×7 = 70; 70÷2	35	2	M1 10 ×7 ÷ 2 oe A1 35 cao
	(b)	48 × 2 = 96; 96÷8	12	3	M1 48 × 2 or 96 or 48÷8 or 6 or 8÷2 M1 (dep) '96'÷8 or '6' × 2 or 48÷4 A1 12 cao
10	(a)		$\frac{1}{3}$ or 0.333(..) or $0.\dot{3}$	1	B1
	(b)	75% 70% 73% 7% Alternative method 0.75 0.7 0.73 0.07	7%. 70%, 0.73, $\frac{3}{4}$ oe	2	M1 Correct method to convert one of these values into an equivalent form eg $\frac{3}{4}$ is 3÷4×100 or 3÷4(=0.75) A1 cao Sc B1 (If no method mark awarded) One incorrect and the other three then correct
	(c)	$300 \div 100 \times 17$ 10% is 30, 5% is 15, 1%is 3 30+15+3+3	51	2	M1 $300 \div 100 \times 17$ oe or complete method to find 17% A1 cao

5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
11		$\frac{3}{5}\times 20 = 12$, $20 - 12$ Or $1-\frac{3}{5}=\frac{2}{5}$, $\frac{2}{5}\times 20 = 8$ OR Diagram used Red 3 parts, Green 2 parts $20 \div 5 = 4$ $2 \times 4 = 8$	8	3	M1 $\frac{3}{5}\times 20$ or 12 or 0.6x20 or 60÷100x20 oe M1 20 – '12' C1 Dep on M1 for a clear statement that green is 8(cm) OR M1 $1-\frac{3}{5}$ or $\frac{2}{5}$ or 1-0.6 or 0.4 or 100-60 or 40 M1 '$\frac{2}{5}$'× 20 oe or 0.4x20 or complete method for 40% of 20 C1 Dep on M1 for a clear statement that green is 8(cm) OR M1 5 equal sections shown on diagram M1 each section shown as 4 either in working or on diagram C1 Dep on M1 for a clear statement that green is 8(cm) OR M1 20 ÷ 5 M1 4 × 2 C1 Dep on M1 for a clear statement that green is 8(cm)

5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
12	(a)		Pentagon	1	B1 cao
	(b)		Correct tessellation	2	B2 fully correct at least 7 shapes including the one given (B1 at least 4 shapes tessellating including the one given)
13	(a)		22, 7	2	B1 22 cao B1 7 cao
	(b)		0.25 or $\frac{1}{4}$	1	B1 0.25 or $\frac{1}{4}$ oe
14		Shaded 30 × 24 = 720 720 × 2 = 1440 Unshaded 30 ×15 = 450 450 × 2 = 900 24 × 15 = 360 360 × 2 = 720 1620 Or TSA = 30 ×24 × 2+ 30 × 15 × 2 + 24 × 15 × 2 = 3060 Shaded 30 ×24 × 2 = 1440	No + calculation	4	M1 correct method for area of any one face eg 30 ×24 M1 correct method for either total unshaded or total shaded A1 1440 and 1620 C1 correct conclusion dep on at least M1 Or M1 correct method for area of any one face eg 30 ×24 M1 correct method for either total unshaded or total shaded or total surface area A1 3060 and 1620 or 1440 C1 correct conclusion dep on at least M1

5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
15	(a)	A: x B: $x + 4$ $x + x + 4$	$T = 2x + 4$	3	B3 for $T = 2x + 4$ oe (B2 for $2x + 4$ oe or for $T = 2x + b$ where $b \neq 0$ **or** $T = ax + 4$ where a not equal to 0 (B1 for $x + 4$ or for $T =$ any expression)
	(b)	$2 \times 13 + 4$ Or $13 + 17$	30	2	M1 ft from their formula in the form $ax + b$ when a and $b \neq 0$ A1 ft Or M1 $13 + 13 + 4$ A1
16		$1.98 \div 2 = 0.99$ 0.99×7	6.93	3	M1 $1.98 \div 2$ or 1.98×7 or 1.98×3 oe M1 '0.99' × 7 or '13.86' ÷ 2 or '1.98 x 3' +'0.99' A1 cao
17	(i)	16:24	2:3	3	M1 $40 - 16$ or 24 M1 16 : '(40-16)' oe A1 2:3 cao (SC B2 for 3:2)
	(ii)	$\frac{16}{40} = \frac{2}{5}$	$\frac{2}{5}$	1	B1 $\frac{2}{5}$ oe

5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
18		$1640 \times \frac{30}{100} = 492$ 1640 ÷10 = 164 492+164 + 550 = 1206 1640 – 1206 = 434 Or $1640 \times \frac{40}{100}$ = 656, 656 + 550 = 1206 1640 – 1206 = 434	Yes	5	M1 for attempting to find the area of one section (blue or yellow) M1 for attempting to find the area of the second section (yellow or blue) or award M2 for attempt to find the combined area of blue and yellow) M1 for attempting to find the total area of three sections **or** four sections using white as 400 **or** subtracting the 3 sections from 1640 A1 1206 or 434 or1606 C1 dep on at least M1 for correct conclusion based upon their calculations relating their white area to 400 or "1206" to 1240 or "1606" to 1640
19	(a)	3 × 5.2 + 4 × 4.8 15.6 +19.2	34.8	2	M1 3 × 5.2 (= 15.6) or 4 × 4.8 (=19.2) or '3 × 5.2 + 4 × 4.8' A1 34.8 cao
	(b)	$3p = 21.6$, 32 – 21.6 = 10.4 Or $q = \frac{y - 3p}{4} = \frac{32 - 3 \times 7.2}{4}$	2.6	2	M1 32 – 21.6 or 10.4 in working A1 cao Or M1 $4q=y-3p$ or better A1 cao

5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
20		180 – 136 = 44 360 – 44 – 120 – 110 =	86°	5	M1 180 – 136 = 44 M1 360 – 120 –'44'– 110 A1 cao C1 sum of angles on a st line is 180° , no contradictions C1 sum of angles in a quadrilateral is 360°, no contradictions
21		$\frac{1}{2}\left(\frac{1}{2}+\frac{1}{4}\right)=\frac{1}{2}\times\frac{2+1}{4}=\frac{3}{8}$ Or $\frac{1}{2}-\frac{1}{4}=\frac{2-1}{4}=\frac{1}{4}$ $\frac{1}{4}+\frac{1}{4}\div 2=\frac{1}{4}+\frac{1}{8}=\frac{3}{8}$	0.375 or $\frac{3}{8}$ oe	3	M1 $\frac{1}{2}+\frac{1}{4}$ oe or 0.5 + 0.25 or 50 + 25 M1 $\frac{1}{2}$ '$(\frac{1}{2}+\frac{1}{4})$'oe or '0.75'÷2 or '75'÷ 2 A1 $\frac{3}{8}$ oe Or M1 $\frac{1}{2}-\frac{1}{4}$ oe or 0.5-0.25 or 50-25 M1 $\frac{1}{4}$ +' $\frac{1}{4}$,÷2 or 0.25+'(0.25'÷2) or 25% + '(50-25)'÷2%oe with percentage sign A1 $\frac{3}{8}$ oe OR M1 change both fractions to 8ths M1 '(4+2)' ÷2 or '$(\frac{4}{8}+\frac{2}{8})$'÷2 A1 $\frac{3}{8}$ oe SC B1 for (37 + 38)/2 or 37.5

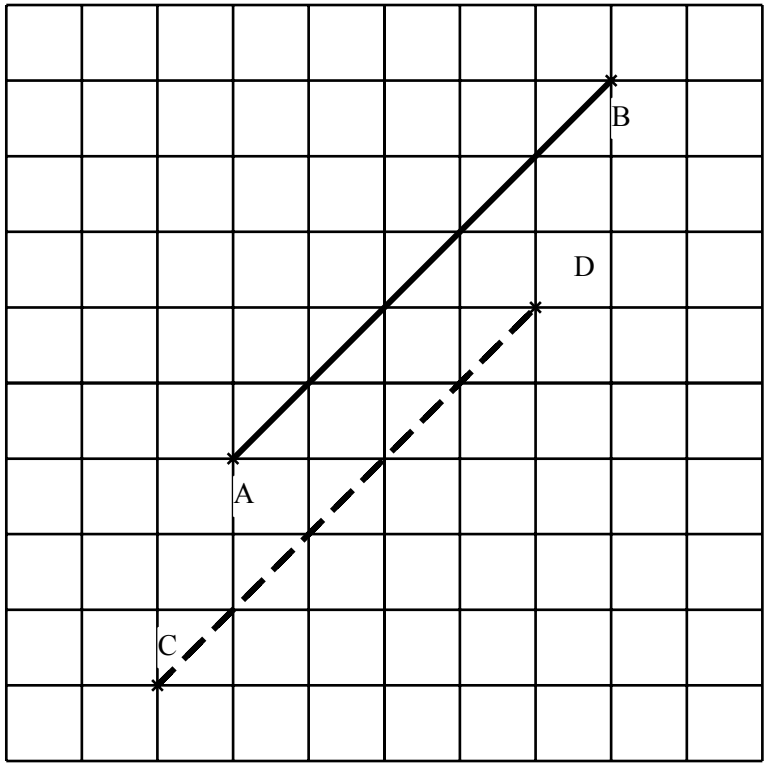
5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
22		C = $\pi \times 10$	31.4 cm	2	M1 for $\pi \times 10$ or $2 \times \pi \times 5$ A1 for 31.4 – 31.42
23		3 + 5 = 8 100 ÷8 = 12.5 12.5 × 3 = 37.5 Or $\frac{3}{8} \times 100$	37.5%	2	M1 3 + 5 = 8 and 100 ÷8 or 30 + 50 = 80 and 100 ÷ 80 × 30 A1 cao Or M1 $\frac{3}{8} \times 100$ or $\frac{30}{80} \times 100$ oe A1 cao SCB1 62.5%
24			−3,−2, −1 , 0, 1	2	B2 −3,−2, −1 ,0,1 (B1 condone one error or omission e.g .−2, −1 ,0,1 or −3,−2, −1 ,0, 1, 2)
25	(a)(i) (ii) (b)	 $180^o - 53^o$	72^o Alternate angles 127^o	2 2	B1 for 72^o B1 for alternate angles M1 $180^o - 53^o$ A1 cao OR M1 180 – (360 – "72" – (180–72) – (180 – 53)) A1 cao

5MM2F_01

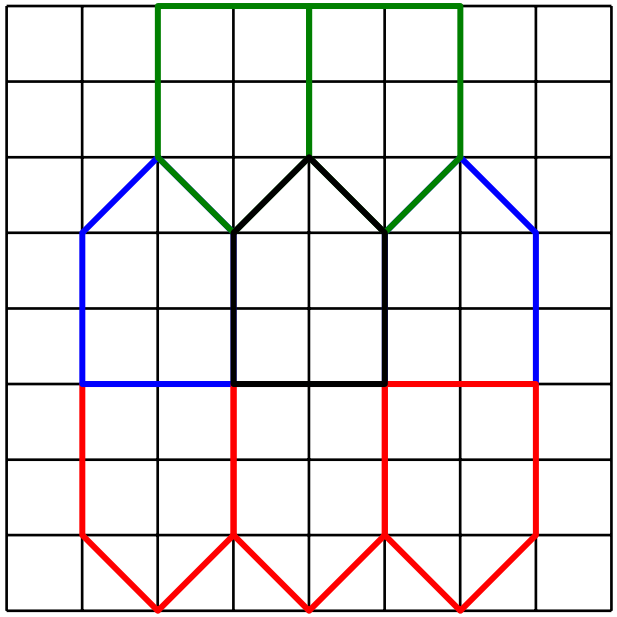
Question		Working	Answer	Mark	Notes
26	(a)		5, -1, -1	2	B2 all 3 correct (B1 any 1 correct)
	(b)	x: -1, 0, 1, 2, 3, 4 y: **5**, 1, **-1**, **-1**, 1, 5	Correct graph	2	B1 ft 5 or 6 points plotted correctly B1 cao for the correct curve
27		$8.4^2 + 8.4^2$ $\sqrt{70.56 + 70.56} = \sqrt{141.12}$	11.9cm	3	M1 $8.4^2 + 8.4^2$ oe M1 $\sqrt{70.56 + 70.56}$ or $\sqrt{141.12}$ A1 11.85 – 11.9
28	(a)		120^o	1	B1 cao
	(b)	90 + 120 = 210 360 – 210 = 150 Ext angle = 30 No of sides = 360 ÷30 = 12	12	3	M1 360 – (‘120’+ 90) (=150) M1 (dep on M1) for ext angle = 180 – “150” A1 cao

Q08

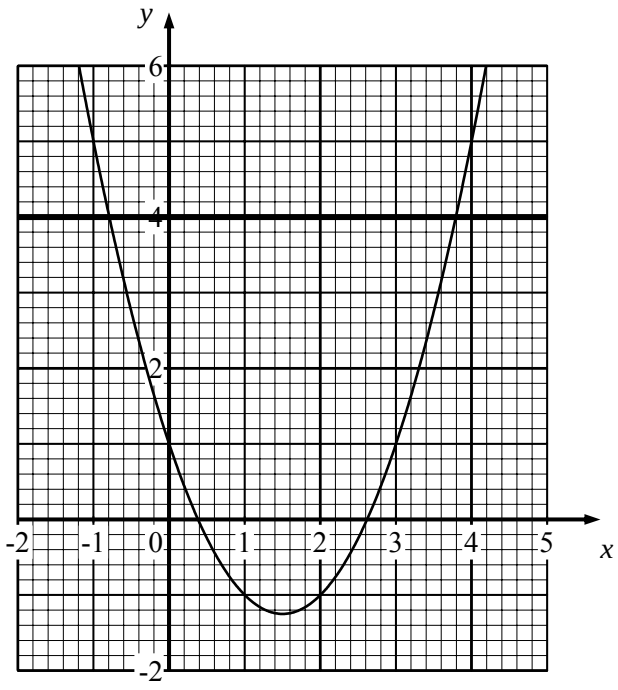
.



Q11



28.



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Edexcel GCSE

Centre Number	Candidate Number

Methods in Mathematics

Unit 2: Methods 2

For Approved Pilot Centres ONLY

Foundation Tier

Thursday 17 November 2011 – Morning
Time: 1 hour 45 minutes

Paper Reference
5MM2F/01

You must have: Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators may be used.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.



Information

- The total mark for this paper is 100
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed.

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

P40604A

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6/6/6

P 4 0 6 0 4 A 0 1 2 4

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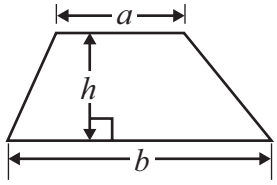
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GCSE Mathematics 2MM01

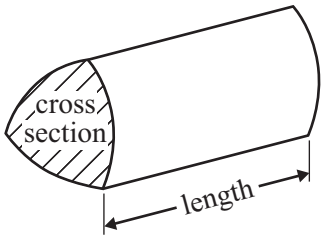
Formulae: Foundation Tier

You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.

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



Volume of prism = area of cross section × length



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Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1 (a) Work out $52.3 - 27.06$

.....

(1)

(b) Work out $127.8 \div 2.4$

.....

(1)

(c) Work out $2 \times (2.5 + 3.7)$

.....

(1)

(d) Work out $5.9 + 3.17^2$

.....

(1)

(Total for Question 1 is 4 marks)

2 Here is a solid prism made from centimetre cubes.

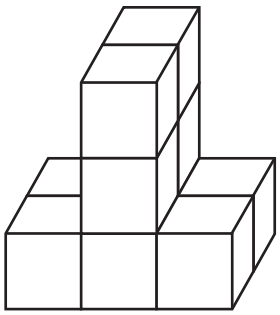


Diagram **NOT** accurately drawn

Find the volume of the prism.

..... cm^3

(Total for Question 2 is 1 mark)

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3 (a) Write 0.81 as a percentage.

..... %

(1)

(b) Write 0.7 as a fraction.

.....

(1)

(c) Work out 50% of 24

.....

(1)

(d) Work out $\frac{1}{4}$ of 40

.....

(1)

(e) Write $\frac{2}{9}$ as a decimal.

.....

(1)

(f) Write the ratio 6 : 10 in its simplest form.

..... : .....

(1)

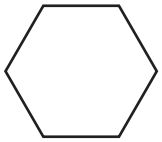
*(g) Which is bigger $\frac{4}{5}$ or 75%?

Give a reason for your answer.

(3)

(Total for Question 3 is 9 marks)

4 Here is a polygon.

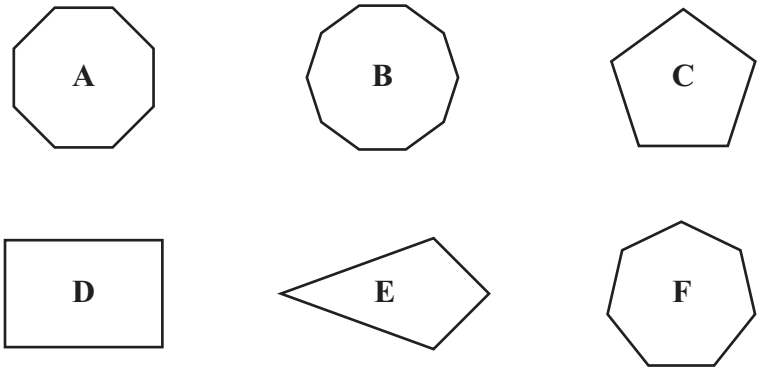


(a) Write down the special name of this polygon.

.....

(1)

Here are some more polygons.



(b) (i) Write down the letter of the shape which is an octagon.

.....

(ii) Write down the letter of the shape which is a heptagon.

.....

(2)

(Total for Question 4 is 3 marks)

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5 Here is a list of temperatures.

−2°C 4°C −7°C 15°C 0°C −5°C 3°C

(a) From the list,

(i) write down the highest temperature,

..... °C

(ii) write down the lowest temperature.

..... °C

(2)

(b) Increase −7°C by 9°C.

..... °C

(1)

(c) Work out the difference between −5°C and −2°C.

..... °C

(1)

(Total for Question 5 is 4 marks)

***6** Which is bigger

15% of 240 or $\frac{1}{8}$ of 320?

(Total for Question 6 is 4 marks)

7 Here is a trapezium.



(a) On the trapezium, mark with arrows (>>) the pair of parallel lines.

(1)

Here are two shapes.

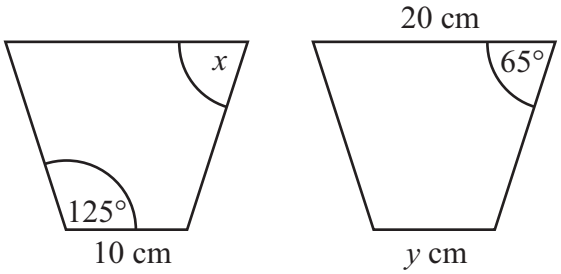


Diagram **NOT** accurately drawn

The shapes are congruent.

(b) (i) Write down the size of the angle marked x.

.....°

(ii) Write down the value of y.

.....

(2)

(Total for Question 7 is 3 marks)

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8 (a) Work out

(i) 2.5^3

.....

(ii) $\sqrt{7.84}$

.....

(iii) $\sqrt[3]{1.331}$

.....

(3)

(b) Find the number that should be written in each empty box.

(i) $3.5 \times$ ..... $= 3500$

(ii) $7.8 \div$ ..... $= 0.078$

(iii) $1 \div$ ..... $= 5$

(3)

(c) Work out $\dfrac{-3.5 \times 2.8}{-1.4}$

.....

(2)

(Total for Question 8 is 8 marks)

9 Here is a quadrilateral.

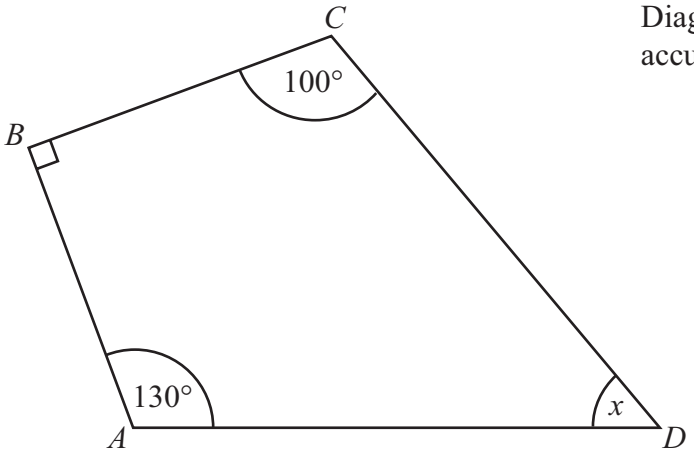


Diagram **NOT** accurately drawn

(i) Find the size of the angle marked x.

.....°

(ii) Give a reason for your answer.

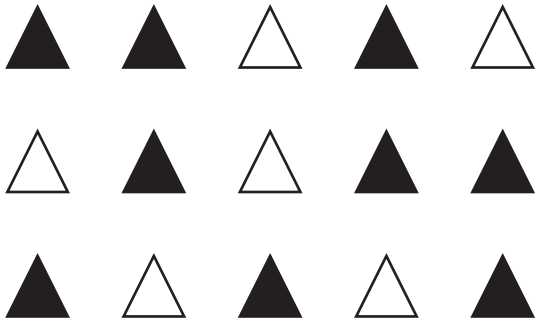
.....

.....

(Total for Question 9 is 3 marks)

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10 Here are some triangles.



(a) What fraction of these triangles are shaded?
Give your fraction in its simplest form.

.....

(2)

Tony takes some of these triangles.
He takes shaded triangles and unshaded triangles in the ratio 2 : 1

(b) Work out the greatest number of unshaded triangles he could take.

.....

(2)

(Total for Question 10 is 4 marks)

11 (a) Work out the output for this number machine.



.....

(2)

(b) Work out the input for this number machine.



.....

(2)

(c) The input for this number machine is m.

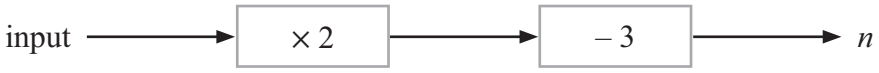


Find an expression, in terms of m, for the output.

.....

(2)

(d) The output for this number machine is n.



Find an expression, in terms of n, for the input.

.....

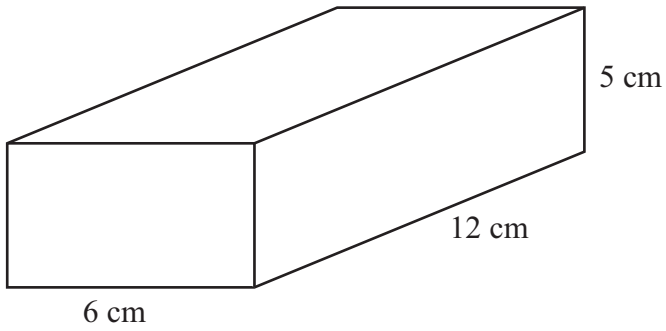
(2)

(Total for Question 11 is 8 marks)

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12 Here is a cuboid.

Diagram **NOT** accurately drawn



Work out the total surface area of the cuboid.

.....

(Total for Question 12 is 4 marks)

13 (a) Here is a list of fractions.

$\frac{1}{2}$	$\frac{1}{5}$	$\frac{1}{10}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{8}$

(i) From the list, write down the smallest fraction.

.....

(ii) From the list, write down **two** fractions bigger than $\frac{1}{5}$

.....

(2)

(b) Is $\frac{1}{3}$ half way between $\frac{1}{2}$ and $\frac{1}{4}$? .....

You must show your working.

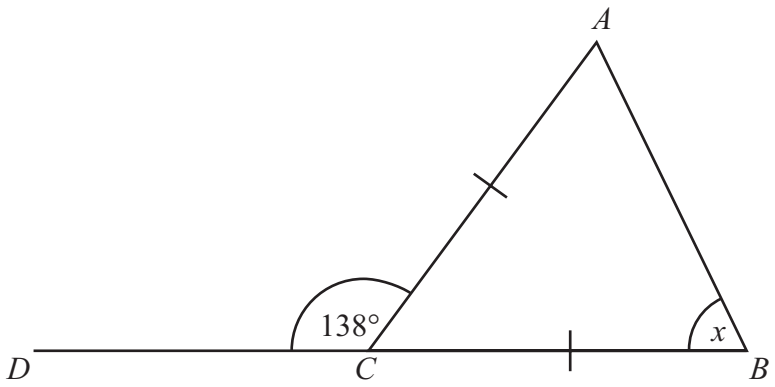
(2)

(Total for Question 13 is 4 marks)

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14

Diagram **NOT** accurately drawn



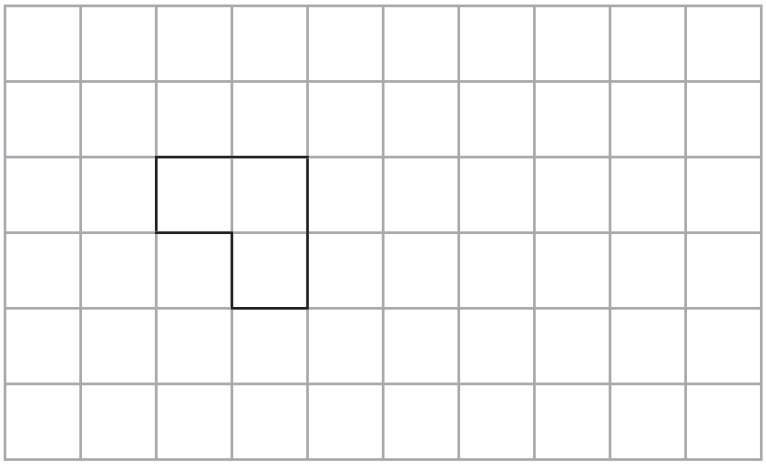
DCB is a straight line.
AC = *CB*.
Angle *ACD* = 138°.

Work out the size of the angle marked *x*.
Give reasons for your answer.

.....°

(Total for Question 14 is 3 marks)

15 On the grid, show how the shape tessellates.
You must draw at least 6 shapes.



(Total for Question 15 is 2 marks)

16

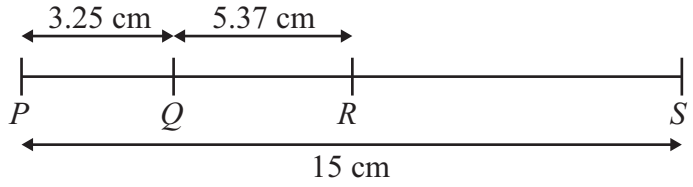


Diagram **NOT** accurately drawn

P, Q, R and S are points on a straight line.
$PQ = 3.25$ cm.
$QR = 5.37$ cm.
$PS = 15$ cm.

(a) Work out the length of RS.

..... cm

(2)

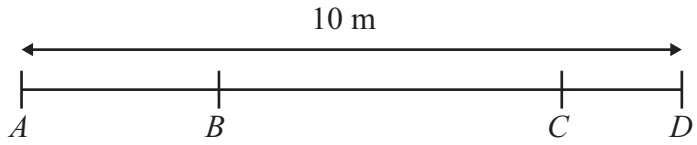


Diagram **NOT** accurately drawn

A, B, C and D are points on a straight line.
$AD = 10$ m.
$AC = 8.5$ m.
$BD = 7.8$ m.

(b) Work out the length of BC.

..... m

(2)

(Total for Question 16 is 4 marks)

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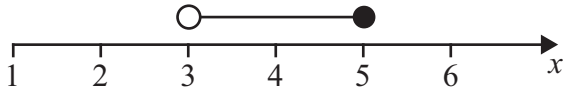
17 n is an integer and $-3 \leqslant n < 2$

(a) Write down all the possible values of n.

.....

(2)

Here is a number line.



(b) Write down the inequality shown on the number line.

.....

(2)

(c) Solve $4x + 3 \leqslant 18$

.....

(2)

(Total for Question 17 is 6 marks)

18 The diagram shows a solid prism.

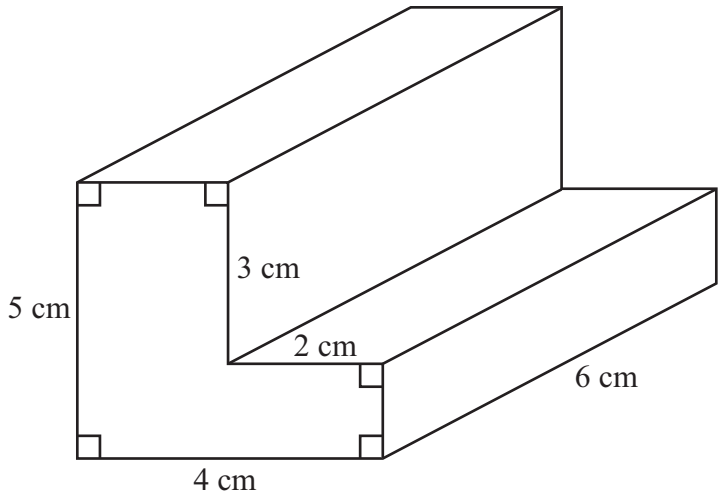


Diagram **NOT** accurately drawn

Work out the volume of the prism.

..... cm^3

(Total for Question 18 is 4 marks)

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19 $A = 5b + 7$

(a) Work out the value of A when $b = 8$

.....

(2)

$v = u + 10t$

$u = 5$
$t = 2.5$

(b) Work out the value of v.

.....

(2)

(c) Make t the subject of the formula $v = u + 10t$

$t =$ .....

(3)

(Total for Question 19 is 7 marks)

20 (a) Work out the size of an exterior angle of a regular pentagon.

.....°

(2)

(b) Work out the size of an interior angle of a regular pentagon.

.....°

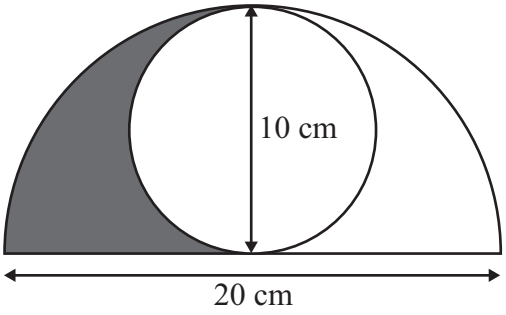
(2)

(Total for Question 20 is 4 marks)

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21 The diagram shows a circle inside a semicircle.

Diagram **NOT** accurately drawn



The circle has a diameter of 10 cm.
The semicircle has a diameter of 20 cm.

Work out the area shaded.
Give your answer correct to 1 decimal place.

..... cm^2

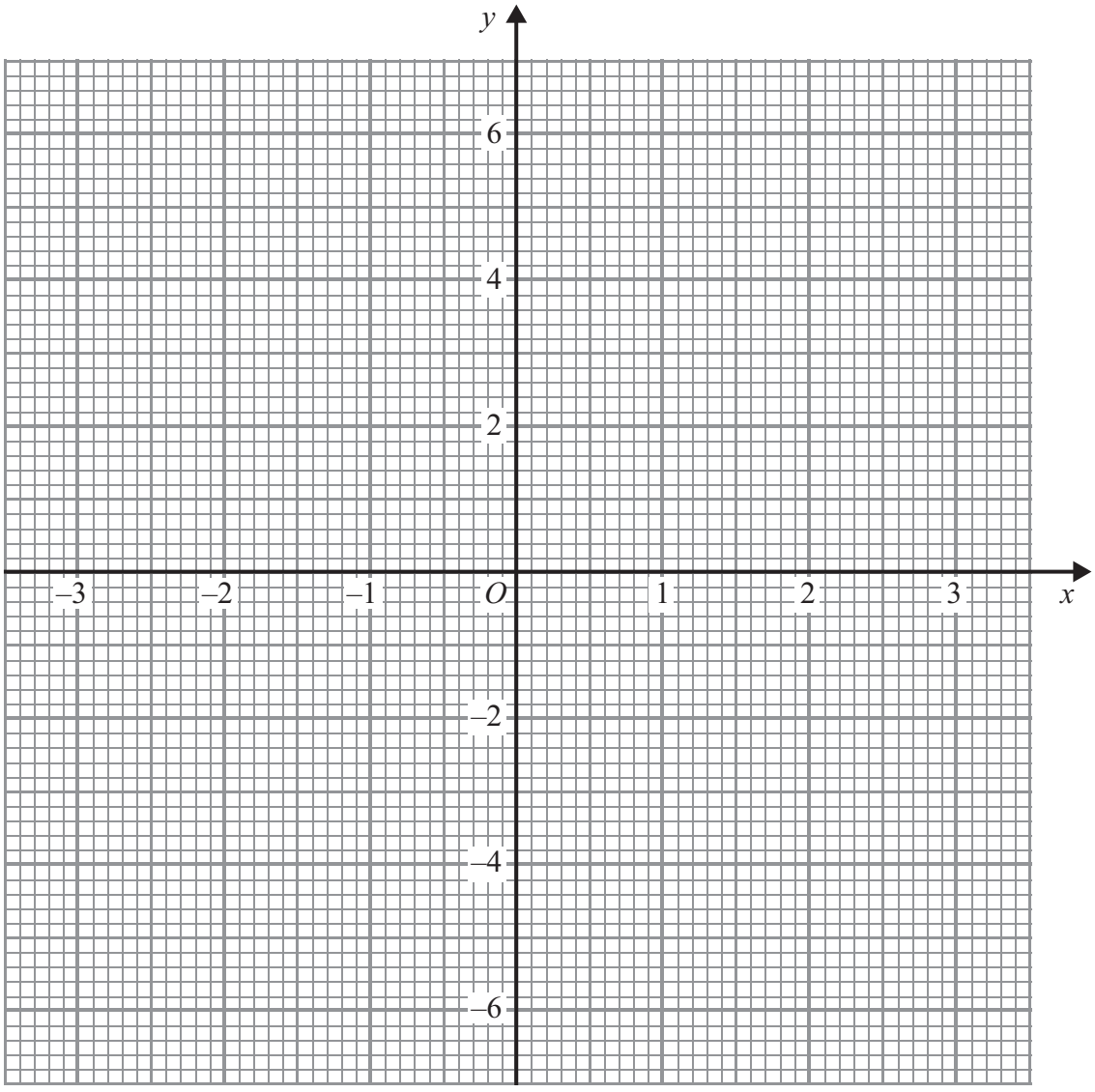
(Total for Question 21 is 5 marks)

22 (a) Complete the table of values for $y = x^2 - 3$

x	−3	−2	−1	0	1	2	3
y	6		−2		−2	1	

(2)

(b) On the grid, draw the graph of $y = x^2 - 3$ for values of x from –3 to 3



(2)

(c) Use the graph to find estimates of the values of x when $x^2 - 3 = 0$

.....

(2)

(Total for Question 22 is 6 marks)

TOTAL FOR PAPER IS 100 MARKS

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Mark Scheme (Results)

November 2011

GCSE Mathematics (5MM2F)
Paper 01

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NOTES ON MARKING PRINCIPLES

1 All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.

2 Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.

3 All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.

4 Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.

5 Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

6 Mark schemes will indicate within the table where, and which strands of QWC, are being assessed. The strands are as follows:

i) *ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear*
Comprehension and meaning is clear by using correct notation and labeling conventions.

ii*) select and use a form and style of writing appropriate to purpose and to complex subject matter*
Reasoning, explanation or argument is correct and appropriately structured to convey mathematical reasoning.

iii) *organise information clearly and coherently, using specialist vocabulary when appropriate*.
The mathematical methods and processes used are coherently and clearly organised and the appropriate mathematical vocabulary used.

7 With working

If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.

If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.

If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.

If there is no answer on the answer line then check the working for an obvious answer.

Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.

If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.

8 Follow through marks

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.

Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

9 Ignoring subsequent work

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: e.g. incorrect canceling of a fraction that would otherwise be correct

It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect e.g. algebra.

Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

10 Probability

Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).

Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.

If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.

If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

11 Linear equations

Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded.

12 Parts of questions

Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

13 Range of answers

Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1)

Guidance on the use of codes within this mark scheme
M1 – method mark A1 – accuracy mark B1 – Working mark C1 – communication mark QWC – quality of written communication oe – or equivalent cao – correct answer only ft – follow through sc – special case dep – dependent (on a previous mark or conclusion) indep – independent isw – ignore subsequent working

5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
1	(a)		25.24	1	B1 accept $\frac{631}{25}$
	(b)		53.25	1	B1 accept $\frac{651}{5}$
	(c)		12.4	1	B1 accept $\frac{62}{5}$
	(d)		15.9489	1	B1 cao
2			10	1	B1 cao
3	(a)		81	1	B1 cao
	(b)		$\frac{7}{10}$	1	B1 for $\frac{7}{10}$ oe
	(c)		12	1	B1 cao
	(d)		10	1	B1 cao
	(e)		$0.\dot{2}$	1	B1 for $0.\dot{2}$ or 0.222(2...)
	(f)		3 : 5	1	B1 cao

5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
3	(g)	$\frac{4}{5} = 0.8 = 80\%$ $(= \frac{16}{20})$ $75\% = 0.75 = \frac{3}{4}$ $(= \frac{15}{20})$	$\frac{4}{5}$ bigger	3	M1 for 0.8 **or** $\frac{80}{100}$ **or** 80% **or** 0.75 **or** $\frac{75}{100}$ **or** $\frac{3}{4}$ oe **or** clear attempt to turn 80% and $\frac{3}{4}$ into fractions with a common denominator A1 for 80% and 75% **or** 0.8 and 0.75 **or** $\frac{16}{20}$ and $\frac{15}{20}$ **or** Correct 2 fractions equivalent to 80% and $\frac{3}{4}$ with common denominator C1 (dep on M1) for $\frac{4}{5}$ is bigger oe
4	(a)		Hexagon	1	B1 for hexagon
	(b)(i)		A	2	B1 cao
	(ii)		F		B1 cao
5	(a)(i)		15	2	B1 cao
	(ii)		-7		B1 cao
	(b)		2	1	B1 cao
	(c)		3 or -3	1	B1 cao

5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
6		$\frac{15}{100} \times 240 = 36$ $\frac{1}{8} \times 320 = 40$ $\frac{1}{8} \times 320$ is bigger	$\frac{1}{8} \times 320$	4	M1 for $\frac{15}{100} \times 240 (=36)$ oe or $\frac{1}{8} \times 320 (=40)$oe M1 for $\frac{15}{100} \times 240 (=36)$ oe and $\frac{1}{8} \times 320 (=40)$oe A1 for 36 and 40 C1 ft (dep on one M1) for '$\frac{1}{8} \times 320$'
7	(a)		Parallel lines marked	1	B1 cao
	(b)(i)		65	2	B1 cao
	(ii)		10		B1 cao
8	(a)(i)		15.625	3	B1 cao
	(ii)		2.8		B1 cao
	(iii)		1.1		B1 cao
	(b)(i)		1000	3	B1 cao
	(ii)		100		B1 cao
	(iii)		0.2		B1 for 0.2 or $\frac{1}{5}$
	(c)	$\frac{-9.8}{-1.4}$	7	2	M1 for $\frac{-9.8}{-1.4}$ or 2.5×2.8 or -3.5×-2 (condone errors in sign) A1 for 7 oe (SC B1 for –7)

5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
9	(i)	360 – (130 + 90 + 100)	40	3	M1 for 360 – '130 + 90 + 100' or 360 – 100 – 130 – 90 A1 cao
	(ii)		Reason		C1 for **angles** in a **quadrilateral** sum to **360**^{o}
10	(a)	$\frac{9}{15}$	$\frac{3}{5}$	2	M1 for $\frac{9}{15}$ or $\frac{a}{15}$ or $\frac{9}{b}$ A1 cao
	(b)		4	2	M1 for a process to reduce by 2 shaded triangles and 1 unshaded triangle or 2 × a and 1 × a where a = 2, 3, 4 or 5 A1 cao
11	(a)	5 × 2 – 3	7	2	M1 for 5 × 2 **or** 5 – 2 **or** 5 × 2 – 3 A1 cao
	(b)	(17 + 3) ÷ 2	10	2	M1 for 17 + 3 **or** (17 ± 3) ÷ 2 or $\frac{17}{2}$ ± 3 A1 cao
	(c)	2 × m – 3	2m – 3	2	M1 for 2×m **or** m – 3 **or** b×m −3 A1 for 2m – 3 oe NB If additional variable is introduced as subject then ignore. If 2m – 3 = k where k is a number then ignore k

5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
11	(d)	$(n + 3) \div 2$	$\frac{n+3}{2}$	2	M1 for $n + 3$ **or** $\frac{n \pm 3}{2}$ oe **or** $n + 3 \div 2$ **or** $\frac{n}{2} \pm 3$ or for a reverse flow chart with at least one correct inverse process identified A1 for $\frac{n+3}{2}$ oe NB If additional variable is introduced as subject then ignore. If $\frac{n+3}{2} = k$ where k is a number then ignore k
12		$2\times(6\times5) + 2\times(5\times12) + 2\times(6\times12)$ $=60 + 120 + 144$ $= 324$	324 cm^2	4	M1 for $5\times6(=30)$ **or** $12\times5(=60)$ **or** $6\times12(=72)$ M1 for adding the areas of 5 or 6 faces, at least 4 of which must be correct A1 cao C1 (indep) for cm^2
13	(a)(i) (ii)		$\frac{1}{10}$ Any two of $\frac{1}{2}$ or $\frac{1}{3}$ or $\frac{1}{4}$	2	B1 cao B1 for any two from $\frac{1}{2}$ or $\frac{1}{3}$ or $\frac{1}{4}$ (B0 if $\frac{1}{8}$ or $\frac{1}{10}$ is included)

5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
13	(b)	$\frac{1}{2} = 0.5,\ \frac{1}{4} = 0.25,\ \frac{1}{3} = 0.3...$ $\frac{(0.5+0.25)}{2} = 0.375 \neq 0.3...$ OR $\frac{1}{2} + \frac{1}{4} = \frac{3}{4},\ \frac{3}{4} \div 2 = \frac{3}{8} \neq \frac{1}{3}$ OR $\frac{(50\% + 75\%)}{2}$ =37.5% ≠33.3...% OR $\frac{1}{2} - \frac{1}{4} = \frac{1}{4},\ \frac{1}{4} \div 2 = \frac{1}{8},\ \frac{1}{2} + \frac{1}{8}$ $= \frac{3}{8} \neq \frac{1}{3}$ Or $\frac{1}{2} = \frac{6}{12},\ \frac{1}{4} = \frac{3}{12},\ \frac{1}{3} = \frac{4}{12}$; 4 is not midway between 6 and 3 demonstrated	No + reason	2	M1 for an attempt to add two fractions/decimals/percentages (equivalent to $\frac{1}{2}$ and $\frac{1}{4}$) and divide by 2 **or** 0.375 **or** $\frac{3}{8}$ **or** 37.5% A1 for No with 0.33… and 0.375 **or** 33.33..% and 37.5% **or** $\frac{1}{3}$ and $\frac{3}{8}$

5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
14		$\frac{138}{2}$ OR 180 – 138 = 42 $2x = 18 - 42$ $x = 138 \div 2$	69	3	M1 for $\frac{138}{2}$ or $\frac{(180-'42')}{2}$ A1 cao C1 for **exterior** angle **equals sum** of interior **opposite** angles. **OR** **Angles** or a straight **line** add to **180**°, **angles** in a **triangle** add to **180**°
15			Tessellation	2	B2 for at least 5 correctly tessellating shapes added with no gaps (B1 for 3 or 4 correctly tessellating shapes added with no gaps)
16	(a)	15 – (3.25 + 5.37)	6.38	2	M1 for 15 – 3.25 – 5.37 **or** (15 – 5.37) –3.25 **or** 15 – (5.37+3.25) **or** (10 – 8.5) + (10 – 7.8) **or** 1.5 + 2.2 **or** 3.7 A1 cao
	(b)	*CD* = 10 – 8.5 = 1.5 *AB* = 10 – 7.8 = 2.2 *BC* = 10 – (1.5 + 2.2) OR *BC* = 8.5 + 7.5 – 10 OR *BC* = 7.8 – (10–8.5)	6.3	2	M1 for 10 – ('10 – 8.5') – ('10 – 7.8') or ('8.5 + 7.8') – 10 or 7.8 – ('10 – 8.5') A1 cao

5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
17	(a)		$-3, -2, -1, 0, 1$	2	B2 for all 5 correct values and no extras; ignore repeats, any order (-1 for each omission or additional value)
	(b)		$3 < x \leq 5$	2	B2 for $3 < x \leq 5$ **or** just >3 **and** ≤ 5 (B1 for $3 < x$ **or** $x \leq 5$ **or** $5 \geq x$ **or** >3 **or** ≤ 5 **or** $3 \leq x < 5$) NB: Accept the use of any letter other than x throughout and ignore any attempts to list integer values
	(c)	$4x \leq 18 - 3$ $x \leq \frac{15}{4}$	$x \leq \frac{15}{4}$	2	M1 for intention to subtract 3 from both sides or divide each term by 4 **or** $(x =) \frac{15}{4}$ oe A1 for $x \leq \frac{15}{4}$ oe
18		Area of cross-section $5\times2 + 2\times2 = 14$ or $5\times4 - 3\times2 = 14$ Volume of prism = $14\times6 = 84$ **or** $5 \times 2 \times 6 + 2 \times 2 \times 6$ $=60 + 24$ $=84$ **or** $5 \times 4 \times 6 - 3 \times 2 \times 6$ $= 120 - 36 = 84$	84	4	M1 for splitting cross-section into at least two rectangles **or** completing the enclosing rectangle M1 (dep) for a complete area, correct product for at least one rectangle M1 (dep) for 'area' × 6 A1 cao **or** M1 for splitting prism into at least two cuboids or completing the enclosing cuboid M1 (dep) for correct product for volume of at least one cuboid M1 (dep) for complete volume of prism (at least one product must be correct) A1 cao

5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
19	(a)	$5\times8 + 7$	47	2	M1 for $5\times8 + 5$ A1 cao
	(b)	$5 + 10\times2.5$	30	2	M1 for $5 + 10\times2.5$ A1 cao
	(c)	$v = u + 10t$ $v - u = 10t$	$t = \frac{v-u}{10}$	3	M1 for clear attempt to subtract u from both sides of the equation **or** $-u$ in a reverse flow diagram M1 for clear attempt to divide all 3 terms by 10 **or** $\div 10$ in a reverse flow diagram A1 for $t = \frac{v-u}{10}$ **or** $t = (v-u) \div 10$ SC : B2 for $t = v - u \div 10$
20	(a)	$\frac{360}{5}$	72	2	M1 for a complete correct method to find exterior angle eg $\frac{360}{5}$ A1 cao
	(b)	$180 - 72$	108	2	M1 ft for $180 -$ '72' **or** $((5-2)\times180)\div5$ A1cao SC : If no marks scored in (a) or (b) then award 1 mark in (a) for sight of $\frac{360}{5}$ seen anywhere

5MM2H_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
21		$\frac{\frac{1}{2}\times\pi\times10^2-\pi\times5^2}{2}=12.5\pi$	39.3	5	M1 for $\pi\times5^2$ (=78.5(39…)) **or** $\pi\times10^2$ (=314(.159…)) **or** 100π **or** 25π M1 for $\frac{1}{2}\times\pi\times10^2$ (=157(.07…)) **or** 50π M1 (dep on at least one of the previous Ms) for $\frac{1}{2}\times\pi\times10^2-\pi\times5^2$ M1 (dep on previous M) for $(\frac{1}{2}\times\pi\times10^2-\pi\times5^2)\div2$ or $\frac{\text{'157.07...'}-\text{'78.53....'}}{2}$ or 25π/2 A1 for answer in range 39.2 – 39.3 **or** M1 for $\pi\times5^2$ (=78.5(39…)) **or** $\pi\times10^2$ (=314(.159…)) **or** 100π **or** 25π M1 for $\frac{1}{4}\times\pi\times10^2$ (=78.5(398…)) **or** 25π M1 for $\frac{1}{2}\times\pi\times5^2$ (=39.2(69…)) **or** 12.5π M1(dep on 2 previous Ms) for '78.5' – '39.2' A1 for answer in range 39.2 – 39.3

5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
22	(a)		1, –3, 6	2	B2 for all 3 correct (B1 for 1 or 2 correct)
	(b)		Graph	2	B2 for a fully correct graph **or** B1 ft for all their points plotted correctly ±2mm B1 for a smooth curve drawn through their points provided B1 awarded in (a)
	(c)		1.7, −1.7	2	B1 for –1.6 to –1.8 or ft from their graph B1 for 1.6 to 1.8 or ft from their graph

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Methods in Mathematics

Unit 2: Methods 2

For Approved Pilot Centres ONLY

Foundation Tier

Tuesday 21 June 2011 – Morning
Time: 1 hour 45 minutes

Paper Reference
5MM2F/01

You must have:
Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser, calculator. Tracing paper may be used.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*
- **Calculators may be used.**
- If your calculator does not have a π button, take the value of π to be 3.142 unless the question instructs otherwise.



Information

- The total mark for this paper is 100
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed
  – *you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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6/6/6/6/6

P 3 8 9 5 7 B 0 1 2 0

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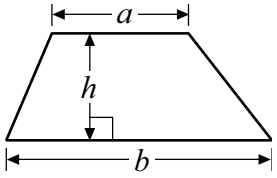
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GCSE Mathematics 2MM01

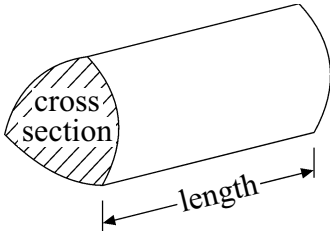
Formulae: Foundation Tier

You must not write on this formulae page.
Anything you write on this formulae page will gain NO credit.

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



Volume of prism = area of cross section × length



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P 3 8 9 5 7 B 0 2 2 0

Answer ALL questions.

Write your answers in the spaces provided.

You must write down all stages in your working.

1 Work out

(a) 45.06 – 17.9

.....

(1)

(b) 7.8^2

.....

(1)

(c) –17 × –4

.....

(1)

(d) 3.4 + 5 × 2.7

.....

(1)

(e) $(9.7 + 2.6)^2$

.....

(1)

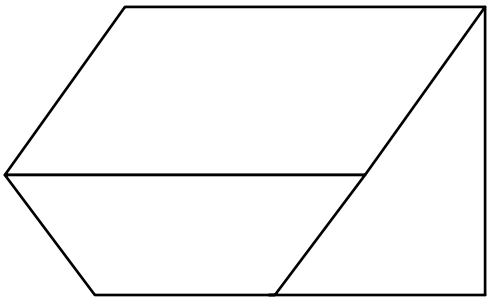
(Total for Question 1 is 5 marks)

2 Write 20 out of 60 as a fraction.
Give your fraction in its simplest form.

.....

(Total for Question 2 is 2 marks)

3 The diagram shows a parallelogram, a trapezium and a triangle.



Mark, with arrows (>>), a pair of parallel lines.

(Total for Question 3 is 1 mark)

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4 (a) Write these numbers in order of size.
Start with the smallest number.

0.72 0.27 0.2 0.07 0.7

.....

(1)

(b) Write these fractions in order of size.
Start with the smallest fraction.

$\frac{1}{2}$ $\frac{5}{6}$ $\frac{1}{3}$ $\frac{7}{12}$ $\frac{3}{4}$

.....

(2)

(c) Write these numbers in order of size.
Start with the smallest number.

$\frac{1}{2}$ 30% 0.65 $\frac{3}{5}$ 0.4

.....

(2)

(Total for Question 4 is 5 marks)

*5

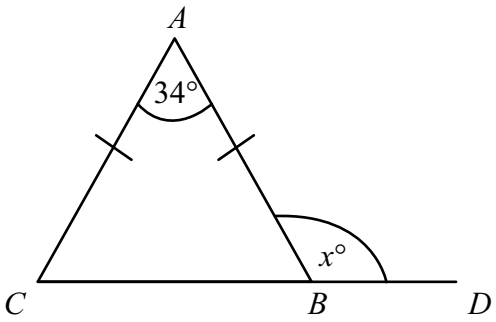


Diagram **NOT** accurately drawn

CBD is a straight line.
AB = *AC*.
Angle *A* = 34°.

Work out the value of *x*.
Give reasons for your answer.

(Total for Question 5 is 4 marks)

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6 (a) Work out the difference between –13°C and –24°C.

..... °C

(1)

(b) Work out the difference between –18°C and 15°C.

..... °C

(1)

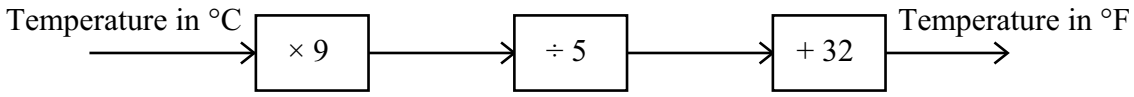
The maximum temperature on Mars is 36°C.
The minimum temperature on Mars is 159°C lower than its maximum temperature.

(c) Work out the minimum temperature on Mars.

..... °C

(2)

You can use this rule to change temperatures in °C to temperatures in °F.



(d) Change 35°C to °F.

..... °F

(3)

(e) Change 68°F to °C.

..... °C

(3)

(Total for Question 6 is 10 marks)

7 (a) Write $\frac{1}{4}$ as a decimal.

.....

(1)

(b) Write 0.27 as a fraction.

.....

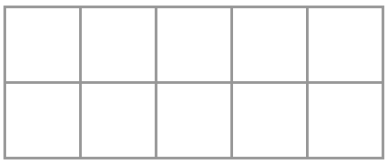
(1)

(c) Write 35% as a fraction in its simplest form.

.....

(2)

(d) Shade 40% of this shape.



(2)

(e) Work out 10% of 560

.....

(1)

(Total for Question 7 is 7 marks)

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8 A box contains 4 yellow and 12 green counters.

(a) Write down the ratio of the number of yellow counters to the number of green counters.
Give your ratio in its simplest form.

.....

(2)

A bag contains only red counters and blue counters in the ratio 2 : 3

(b) What fraction of the counters in the bag are red?

.....

(2)

(Total for Question 8 is 4 marks)

9 Here is a hexagon.

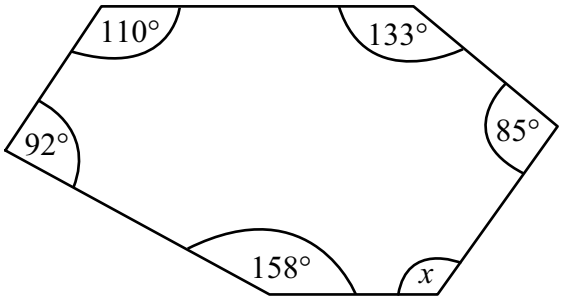


Diagram **NOT** accurately drawn

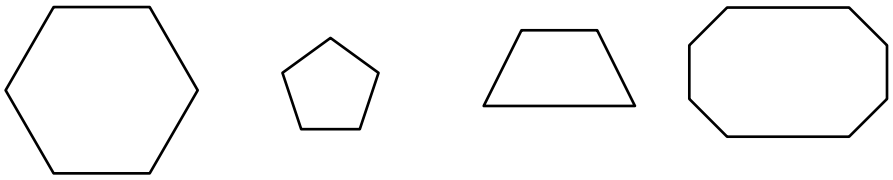
The angles of a hexagon add up to 720°.

Work out the size of the angle marked x.

..... °

(Total for Question 9 is 2 marks)

10 Here are four shapes.



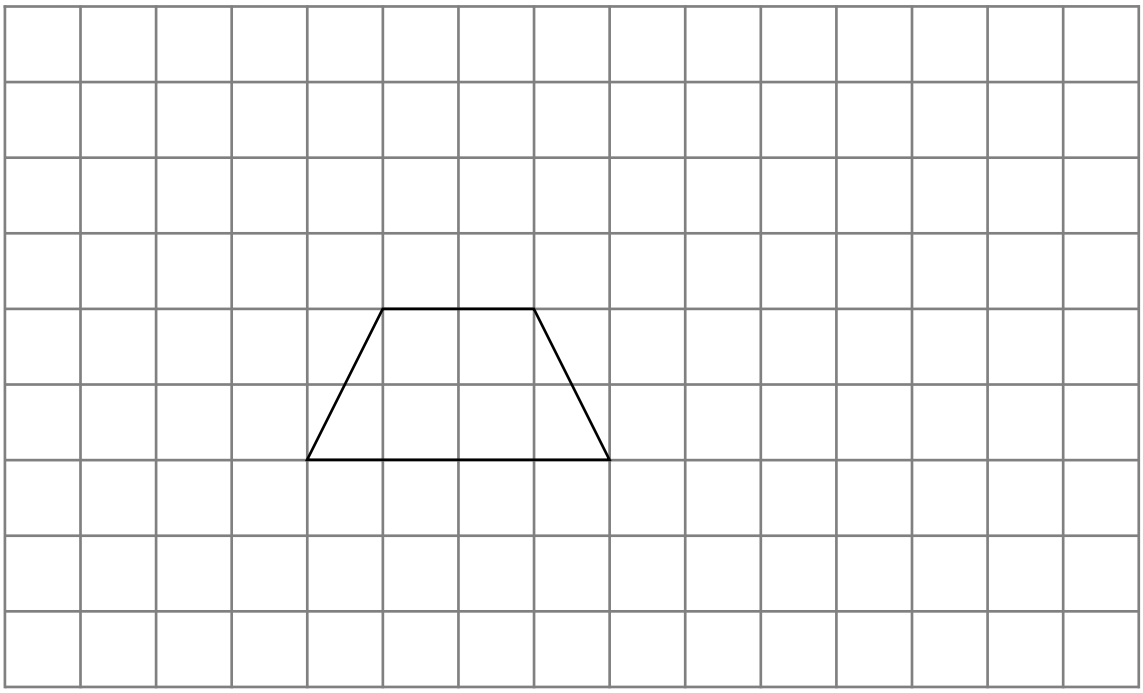
A **B** **C** **D**

(a) Write down the letter of the shape that is an octagon.

.....

(1)

(b) On the grid, show how the shape tessellates.
You must draw at least 6 shapes.



(2)

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*(c) Explain why a regular 9 sided polygon will **not** tessellate.

(3)

(Total for Question 10 is 6 marks)

11. (a) Work out $\frac{3}{7}$ of 1204

.....

(2)

3 kg of apples cost £2.58

(b) Work out the cost of 5 kg of these apples.

£ .....

(2)

(Total for Question 11 is 4 marks)

12 (a) (i) Use your calculator to work out the value of 3π.
Write down all the figures on your calculator display.

.....

(ii) Write your answer to part (i) correct to 1 decimal place.

.....

(2)

(b) Use your calculator to work out $14.5^2 + \sqrt{6400}$
Give your answer as a decimal.
Write down all the figures on your calculator display.

.....

(2)

(Total for Question 12 is 4 marks)

---

13 (a) Leo thinks of a number.
He adds 4 to his number.
His answer is 16

What number did Leo first think of?

.....

(1)

(b) Kaz thinks of a number.
She divides her number by 7
She then adds 17
Her answer is 29

What number did Kaz first think of?

.....

(2)

(Total for Question 13 is 3 marks)

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14 $A = 23 - c$

$c = 15$

(a) Work out the value of A.

.....

(1)

$M = 3n + p$

$n = 7$
$p = 5$

(b) Work out the value of M.

.....

(2)

$K = 3h^2 - j$

$h = -6$
$j = 8$

(c) Work out the value of K.

.....

(2)

(Total for Question 14 is 5 marks)

15 Make g the subject of the formula $d = 3g + 2f$

.....

(Total for Question 15 is 2 marks)

16 Here is a cuboid.

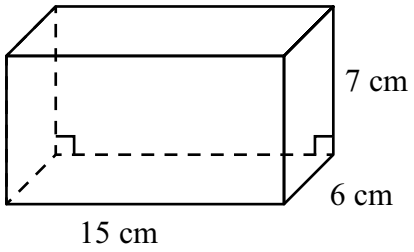


Diagram **NOT** accurately drawn

Work out the volume of the cuboid.

.....

(Total for Question 16 is 3 marks)

17 Andy has some counters.

15% of the counters are red.

$\frac{2}{5}$ of the counters are blue.

The rest of the counters are yellow.

There are 27 yellow counters.

How many blue counters are there?

.....

(Total for Question 17 is 5 marks)

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***18**

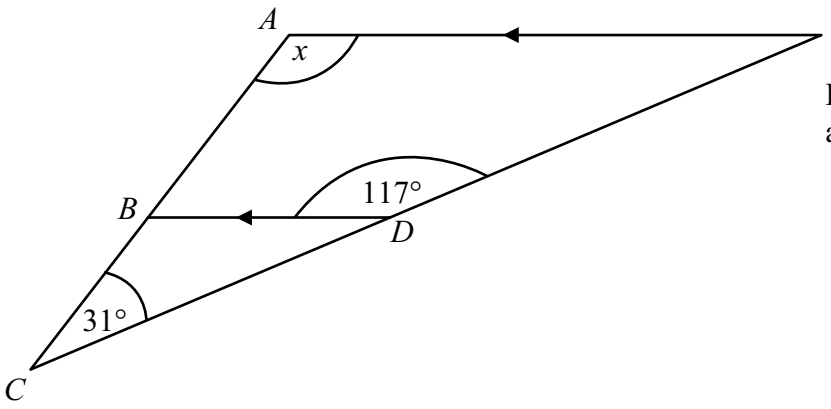


Diagram **NOT** accurately drawn

AE is parallel to *BD*.
ABC and *CDE* are straight lines.

Work out the size of the angle marked *x*.
You must give reasons for your answer.

(Total for Question 18 is 5 marks)

19 The diagram shows a solid prism.

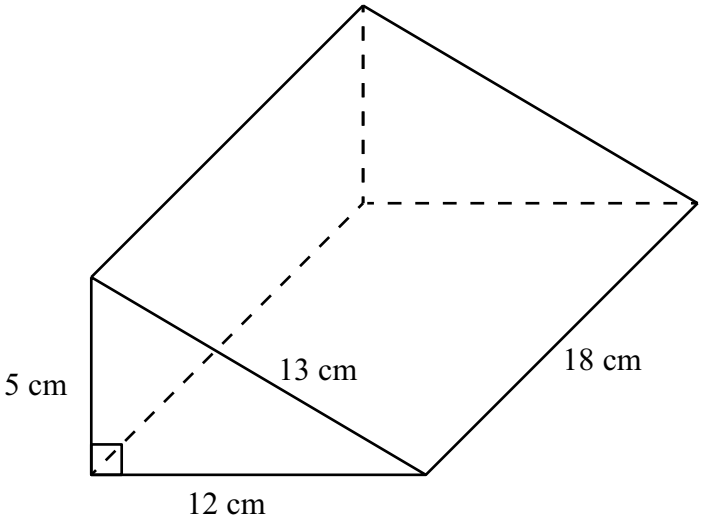


Diagram **NOT** accurately drawn

Work out the total surface area of the prism.

..... cm^2

(Total for Question 19 is 3 marks)

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20 The formula for the circumference of a circle is $C = \pi d$.

Work out the circumference of a circle of radius 4.7 cm.
Give your answer correct to 1 decimal place.

..... cm

(Total for Question 20 is 3 marks)

21 (a) Work out 15% of £600

£ .....

(2)

(b) Decrease £150 by 12%.

£ .....

(2)

(Total for Question 21 is 4 marks)

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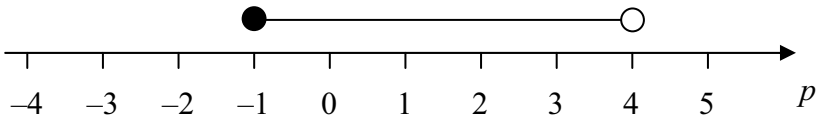
22 n is an integer and $-2 < n \leqslant 3$

(a) Write down all the possible values of n.

.....

(2)

Here is a number line.



(b) Write down the inequality shown on the number line.

.....

(2)

(Total for Question 22 is 4 marks)

23 The width of a rectangle is a whole number of centimetres.
The length of the rectangle is 9 cm longer than its width.

The perimeter of the rectangle is less than 200 cm.

Find the greatest possible width of the rectangle.

..... cm

(Total for Question 23 is 4 marks)

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24

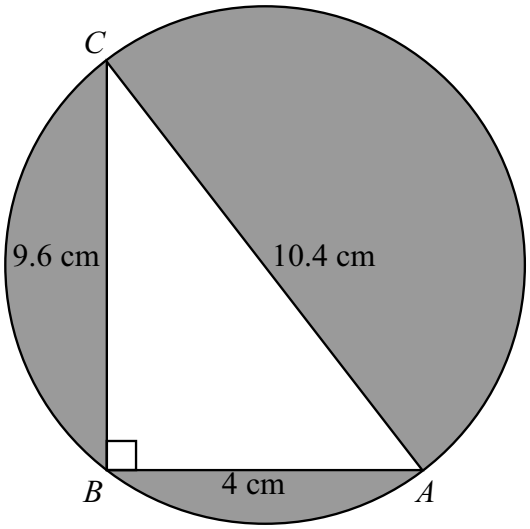


Diagram **NOT** accurately drawn

AC is a diameter of the circle.
ABC is a right-angled triangle.

Work out the area shaded.
Give your answer correct to 1 decimal place.

..... cm^2

(Total for Question 24 is 5 marks)

TOTAL FOR PAPER IS 100 MARKS

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Mark Scheme (Results)

June 2011

Methods in Mathematics (GCSE)
Unit 2: Methods 5MM2F_01

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NOTES ON MARKING PRINCIPLES

1 All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.

2 Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.

3 All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.

4 Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.

5 Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

6 Mark schemes will indicate within the table where, and which strands of QWC, are being assessed. The strands are as follows:

i) *ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear*
Comprehension and meaning is clear by using correct notation and labeling conventions.

ii*) select and use a form and style of writing appropriate to purpose and to complex subject matter*
Reasoning, explanation or argument is correct and appropriately structured to convey mathematical reasoning.

iii) *organise information clearly and coherently, using specialist vocabulary when appropriate*.
The mathematical methods and processes used are coherently and clearly organised and the appropriate mathematical vocabulary used.

7 With working

If there is a wrong answer indicated on the answer line always check the working in the body of the script (and on any diagrams), and award any marks appropriate from the mark scheme.

If working is crossed out and still legible, then it should be given any appropriate marks, as long as it has not been replaced by alternative work.

If it is clear from the working that the "correct" answer has been obtained from incorrect working, award 0 marks. Send the response to review, and discuss each of these situations with your Team Leader.

If there is no answer on the answer line then check the working for an obvious answer.

Any case of suspected misread loses A (and B) marks on that part, but can gain the M marks. Discuss each of these situations with your Team Leader.

If there is a choice of methods shown, then no marks should be awarded, unless the answer on the answer line makes clear the method that has been used.

8 Follow through marks

Follow through marks which involve a single stage calculation can be awarded without working since you can check the answer yourself, but if ambiguous do not award.

Follow through marks which involve more than one stage of calculation can only be awarded on sight of the relevant working, even if it appears obvious that there is only one way you could get the answer given.

9 Ignoring subsequent work

It is appropriate to ignore subsequent work when the additional work does not change the answer in a way that is inappropriate for the question: e.g. incorrect canceling of a fraction that would otherwise be correct

It is not appropriate to ignore subsequent work when the additional work essentially makes the answer incorrect e.g. algebra.

Transcription errors occur when candidates present a correct answer in working, and write it incorrectly on the answer line; mark the correct answer.

10 Probability

Probability answers must be given a fractions, percentages or decimals. If a candidate gives a decimal equivalent to a probability, this should be written to at least 2 decimal places (unless tenths).

Incorrect notation should lose the accuracy marks, but be awarded any implied method marks.

If a probability answer is given on the answer line using both incorrect and correct notation, award the marks.

If a probability fraction is given then cancelled incorrectly, ignore the incorrectly cancelled answer.

11 Linear equations

Full marks can be gained if the solution alone is given on the answer line, or otherwise unambiguously indicated in working (without contradiction elsewhere). Where the correct solution only is shown substituted, but not identified as the solution, the accuracy mark is lost but any method marks can be awarded.

12 Parts of questions

Unless allowed by the mark scheme, the marks allocated to one part of the question CANNOT be awarded in another.

13 Range of answers

Unless otherwise stated, when an answer is given as a range (e.g 3.5 – 4.2) then this is inclusive of the end points (e.g 3.5, 4.2) and includes all numbers within the range (e.g 4, 4.1)

Guidance on the use of codes within this mark scheme
M1 – method mark A1 – accuracy mark B1 – Working mark C1 – communication mark QWC – quality of written communication oe – or equivalent cao – correct answer only ft – follow through sc – special case dep – dependent (on a previous mark or conclusion) indep – independent isw – ignore subsequent working

5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
1	(a)		27.16	1	B1 cao
	(b)		60.84	1	B1 cao
	(c)		68	1	B1 cao
	(d)		16.9	1	B1 cao
	(e)		151.29	1	B1 cao
2			$\frac{1}{3}$	2	M1 $\frac{20}{60}$ oe or 0.333… or clear attempt to convert 20 out of 60 into a fraction or decimal A1 cao
3			One pair of parallel lines marked on diagram	1	B1 cao
4	(a)		0.07, 0.2, 0.27, 0.7,0.72	1	B1 cao
	(b)		$\frac{1}{3}, \frac{1}{2}, \frac{7}{12}, \frac{3}{4}, \frac{5}{6}$	2	M1 attempt to convert at least 3 fractions to decimals or to fractions with common denominator A1 cao SC : B1 for 4 fractions in the correct position SC : B1 for all fractions in reverse order
	(c)		30%, 0.4, $\frac{1}{2}, \frac{3}{5}$, 0.65	2	M1 for attempt to convert all to a common form (decimals or percentages or fractions) A1 for numbers in correct order SC : B1 for 4 numbers in the correct position SC : B1 for all numbers in reverse order

5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
5		(180 – 34)÷2 (= 73) 180 – "73"	107	4	M1 for (180 – 34)÷2 (= 73) M1 for 73 + 34 A1 for *x* identified as 107° C1 for the **exterior angle** of a triangle is **equal** to the sum of the **interior opposite angles** **Alternative scheme** M1 for (180 – 34)÷2 (= 73) M1 for 180 – "73" A1 for *x* identified as 107° C1 for **Angles** on a **straight line** add up to **180° and Angles** in a **triangle** add up to **180°**
6	(a)		11	1	B1 for 9 or -9
	(b)		33	1	B1 for 33 or -33
	(c)	36 - 159	-123	2	M1 for 36 - 159 A1 cao
	(d)	35 × 9 ÷ 5 + 32	95	3	M1 for 35 × 9 or 315 or 35÷5 or 7 M1 for "315"÷5 or "7"×9 A1 cao
	(e)	(68 – 32)×5÷9	20	3	M1 for sight of one operation reversed or attempt to reverse their equation from (d) M1 for fully correct method possible ft from their equation in (d) A1 cao

5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
7	(a)		0.25	1	B1 cao
	(b)		$\frac{27}{100}$	1	B1 cao
	(c)		$\frac{7}{20}$	2	M1 for $\frac{35}{100}$ oe A1 cao
	(d)		4 squares shaded	2	M1 for 4 seen or $\frac{4}{10}$ or 0.4 A1 for any 4 squares shaded
	(e)		56	1	B1 cao
8	(a)		1 : 3	2	M1 for 4 : 12 A1 cao SC : B1 for 3 : 1
	(b)		$\frac{2}{5}$ oe	2	B2 for $\frac{2}{5}$ oe (B1 for $\frac{a}{5}$, $a < 5$ or $\frac{2}{b}$, $b > 2$)
9			142	2	M1 for 720 – (110 + 92 + 158 + 85 + 133) or 720 – 578 A1 for 142 cao

5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
10	(a)		D	1	B1 cao
	(b)		Correct tessellation	2	B2 for 5 additional shapes tessellating correctly (B1 for 3 or 4 shapes tessellating correctly)
	*(c)		Correct reasoning	3	M1 for 360 ÷ 9 = 40 **or** 7 × 180 A1 for 140 C1 for reason eg. 140 is not a factor of 360
11	(a)	1204 ÷ 7 × 3	516	2	M1 for 1204 ÷ 7 × 3 oe A1 cao
	(b)	2.58 ÷ 3 × 5	£4.30	2	M1 for 2.58 ÷ 3 × 5 **or** 258 ÷ 3 × 5 oe or 2.58 ÷ 3 (=0.86) **or** 258 ÷ 3 (=86) A1 for 4.30 or 4.3
12	(a)(i)		9.424777…	2	B1 for 9.42477(7961…) **or** 9.426
	(ii)		9.4		B1 ft
	(b)		290.25	2	M1 for 210.25 or $\frac{841}{4}$ **or** 80 or $\frac{1161}{4}$ A1 cao
13	(a)		12	1	B1 cao
	(b)		84	2	M1 for 29 – 17 **or** 12 **or** correct flow chart reversed **or** $\frac{x}{7}+17=29$ A1 cao

5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
14	(a)		8	1	B1 cao
	(b)	$3 \times 7 + 5$	26	2	M1 for $3 \times 7 + 5$ A1 cao
	(c)	$3 \times (-6)^2 - 8$	100	2	M1 for $3 \times (-6)^2 - 8$ **or** $(-6)^2 = 36$ **or** 108 A1 cao
15		$d - 2f = 3g$ $(d - 2f) \div 3 = g$	$\frac{d - 2f}{3}$	2	M1 for attempting to subtract $2f$ from both sides **or** dividing all terms by 3 **or** $g = ad - 2f$, $a \neq 0$ **or** $g = \frac{1}{3}d + af$, $a \neq 0$ A1 cao
16		$15 \times 6 \times 7$	630 cm^3	3	M1 for $15 \times 6 \times 7$ A1 cao B1 for cm^3

5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
17		$^2/_5 = 40\%$ 40% + 15% = 55% 27 is 45% or $^9/_{20}$ 27 ÷ 9 × 8	24	5	M1 for 40% **or** 2÷5×100 oe M1 for "40%" + 15% (=55%) M1 for equating 100% – "55%" with 27 yellow counters M1 for 27 ÷ "45" × 40 oe A1 cao **or** M1 for $^{15}/_{100}$ oe M1 for correct attempt to find common denominator to add $^{15}/_{100}$ and $^2/_5$ (= $^{55}/_{100}$) M1 for equating 1 – "$^{55}/_{100}$" with 27 yellow counters M1 for 27 ÷ "45" × 100 oe A1 cao **or** M1 for 0.15 or 0.4 M1 (dep) for '0.15 + '0.4' (=0.55) M1 for equating 1 – '0.55' with 27 yellow counters M1 for 27 ÷ 0.45 A1 cao

5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
*18		*BDC* = 180 – 117 (=63) *CBD* = 180 – 63 – 31 OR *CBD* = 117 - 31	86	5	M1 for 180 – 117 (=63) M1 for 180 – '63' – 31 (=86) A1 for $x = 86^o$ [Note: For the award of A, it is NOT enough just to say, or show, that angle CBD = 86^o] C2 for all 3 reasons **angles** in a **triangle** add up to **180^o** **angles** on a **straight line** add up to **180^o** **corresponding angles** on parallel lines are equal (C1 for 1 or 2 reasons) OR M2 for 117 - 31 A1 for x = 86^o [Note: For the award of A, it is NOT enough just to say, or show, that angle CBD = 86^o] C2 for both reasons **External (exterior)angle** of a triangle equals sum of two **interior opposite angles** **corresponding angles** on parallel lines are equal (C1 for 1 reason)
19		13 × 18 + 12 × 18 + 5 × 18 + ½ × 5 × 12 × 2	600	3	M1 for 13 × 18 (=234)or 12 × 18 (=216) or 5 × 18 (=90) or ½ × 5 × 12 (=30) M1for attempt to add 4 or 5 areas , 3 of which must be correct A1 cao

5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
20		4.7×2 (= 9.4) $\pi \times 9.4$	29.5	3	M1 for 4.7×2 (= 9.4) M1 for $\pi \times$ "9.4" A1 for 29.5 – 29.55
21	(a)	$\frac{15}{100} \times 600$ or 0.15×600	90	2	M1 for $\frac{15}{100} \times 600$ or 0.15×600 oe A1 cao
	(b)	$\frac{88}{100} \times 150$ or 0.88×150 OR $150 - \frac{12}{100} \times 150$ or $150 - 0.12 \times 150$	132	2	M1 for $\frac{88}{100} \times 150$ or 0.88×150 or $150 - \frac{12}{100} \times 150$ or $150 - 0.12 \times 150$ oe A1 cao
22	(a)		-1, 0, 1, 2, 3	2	B2 for all 5 values and no others (B1 for 4 correct values and no others or all 5 correct values and one additional incorrect value)
	(b)		$-1 \leq p < 4$	2	B2 for $-1 \leq p < 4$ or just ≥ -1 **and** < 4) [B1 for $-1 \leq p$ or $p < 4$ or $p \geq -1$ oe or ≥ -1 or < 4 or $-1 < p \leq 4$] [Note: accept the use of any letter other than p throughout and ignore any attempt to list integer values]

5MM2F_01					
Question		**Working**	**Answer**	**Mark**	**Notes**
23		$2x + 2(x + 9) < 200$ $2x + 2x + 18 < 200$ $4x + 18 < 200$ $4x < 182$ $x < 45.5$ OR $200 \div 4 = 50$ $9 + 9 \div 4 = 4.5$ $50 – 4.5 = 45.5$ OR $200 – 18 = 182$ $182 \div 4 = 45.5$	45	4	B1 for $x + 9$ oe seen (it could just be on a diagram) **or** any rectangle with length 9 cm greater than width M1 for $2x + 2(x + 9)$ oe A1 for 45.5 B1 for answer of 45 OR M1 for $200 \div 4$ (=50) M1 for $(9 + 9) \div 4$ (=4.5) A1 for 45.5 B1 f answer of 45 OR M1 for $200 – 18$ (= 182) **or** 91, 91, 9, 9 seen M1 for $182 \div 4$ A1 for 45.5 B1 for answer of 45 SC : B3 for an answer of 45.5
24		$\pi \times (10.4 \div 2)^2 – 0.5 \times 9.6 \times 4$	65.7	5	M1 for $10.4 \div 2$ (=5.2) M1 for $\pi \times$"5.2"^{2} (=84.948....) M1 for $0.5 \times 9.6 \times 4$ (=19.2) M1(dep on at least one previous M1) for'84.948…' – '19.2' [ie their area of the circle – their area of the triangle] A1 for an answer in the range 65.7 – 65.8

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