WJEC GCSE METHODS IN MATHEMATICS

MATHS



EXAM QUESTION PACK

UNIT 1 FOUNDATION TIER 4363 PAPERS

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Surname	Centre Number	Candidate Number
Other Names		0

GCSE LINKED PAIR PILOT

4363/01

S16-4363-01

METHODS IN MATHEMATICS

UNIT 1: Methods (Non-Calculator)
FOUNDATION TIER

A.M. THURSDAY, 26 May 2016

1 hour 30 minutes

CALCULATORS ARE NOT TO BE USED FOR THIS PAPER

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Question	**Maximum Mark**	**Mark Awarded**
1.	**13**	
2.	**4**	
3.	**2**	
4.	**9**	
5.	**3**	
6.	**4**	
7.	**5**	
8.	**7**	
9.	**6**	
10.	**5**	
11.	**6**	
12.	**2**	
13.	**7**	
14.	**7**	
Total	**80**	

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INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

Take π as 3·14.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

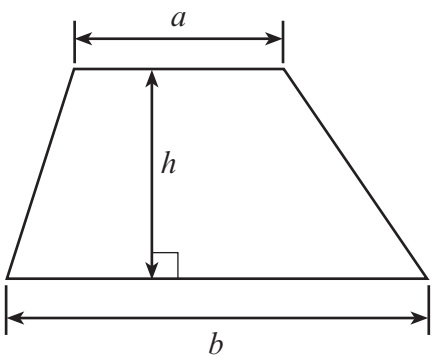
You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **8**.

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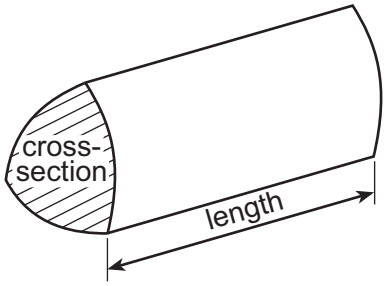
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Formula List

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



Volume of prism = area of cross-section × length



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1. *(a)* (i) Write, in figures, the number five thousand and three. [1]

.....

(ii) Write, in words, the number 35 201. [1]

.....

(b) (i) Work out the sum of 53 and 48. [1]

.....

.....

(ii) Work out the difference between 73 and 47. [1]

.....

.....

(iii) Write the answer when 9 is multiplied by 11. [1]

.....

(iv) Write the answer when 96 is divided by 8. [1]

.....

.....

(c) (i) Write 2463 correct to the nearest 10. [1]

.....

(ii) Write 35 703 correct to the nearest 1000. [1]

.....

(d) (i) Write **all** the factors of 20. [2]

.....

(ii) Write **two** multiples of 6. [1]

.....

(e) Write the next term in the following sequence and describe the rule for continuing the sequence. [2]

3, 11, 19, 27, ...

Rule: .....

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2. Complete the table below by

- drawing the quadrilaterals,
- selecting one **different** special property for each of them from the following list.

One has been done for you.

A: The diagonals meet at right angles.

B: All the sides are equal in length.

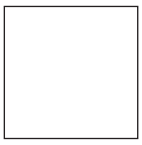
C: The sum of the interior angles is 400°.

D: Only one pair of sides are parallel.

E: The opposite angles are equal, but do not equal 90°.

F: All the sides are parallel.

G: The opposite sides have the same length. [4]

Quadrilateral	Drawing	Property
Square		**B**
Rectangle		
Trapezium		
Parallelogram		
Kite		

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3. A spinner has three colours: red, yellow and green.

The probability that the spinner lands on yellow is equal to the probability of landing on green.

Complete the table below. [2]

Colour	Red	Yellow	Green
Probability	0·4		

.....

.....

.....

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4. Calculate each of the following.

(a) 753 – 207 [1]

(b) 213 ÷ 3 [1]

(c) 417 × 23 [3]

(d) 7 × 0·6 [1]

(e) 0·4 × 0·1 [1]

(f) 27 – 4 × 5 [1]

(g) 30 ÷ (2 + 4) [1]

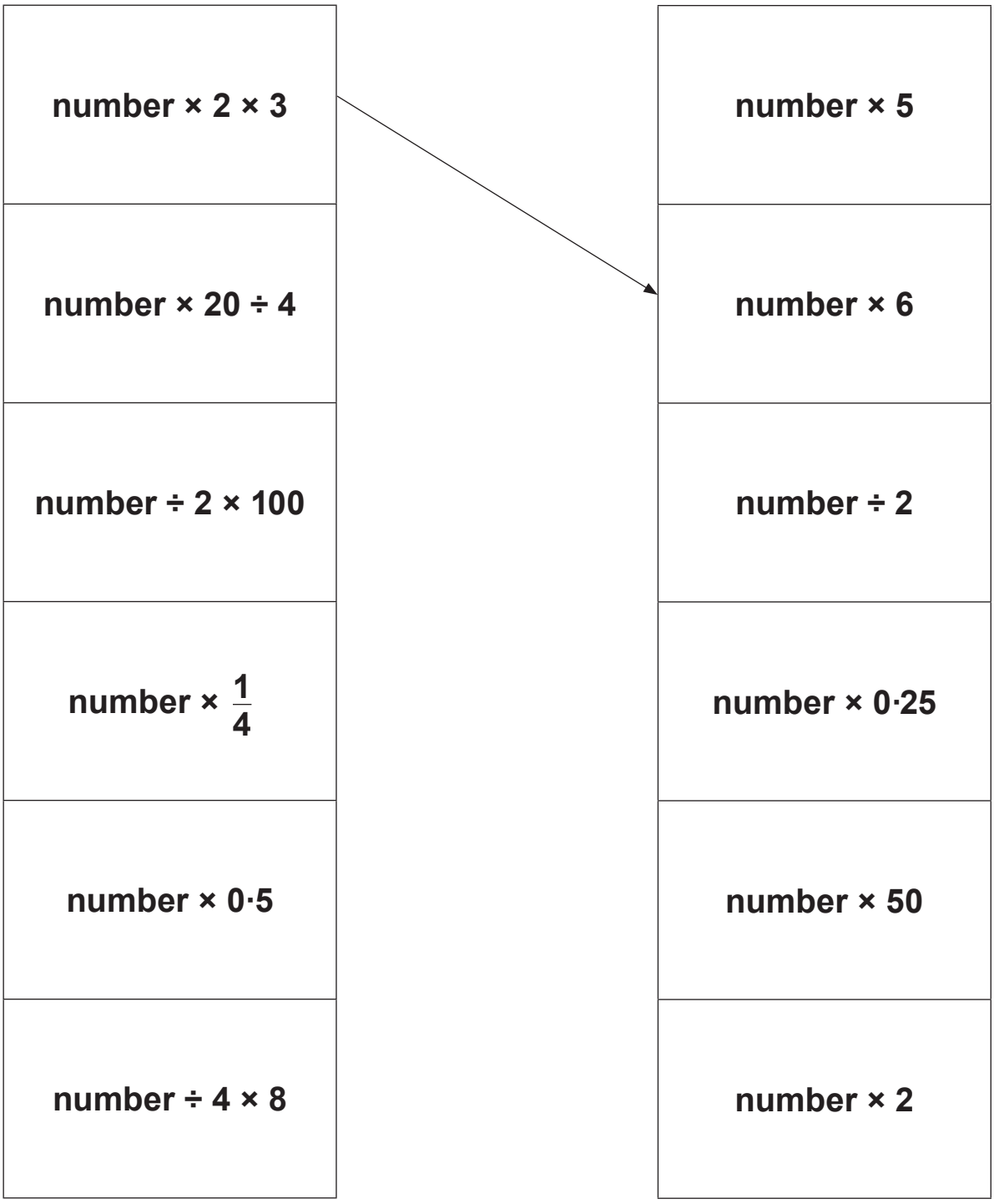
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5. Match each of the boxes on the left with a box on the right.

One has been done for you. [3]



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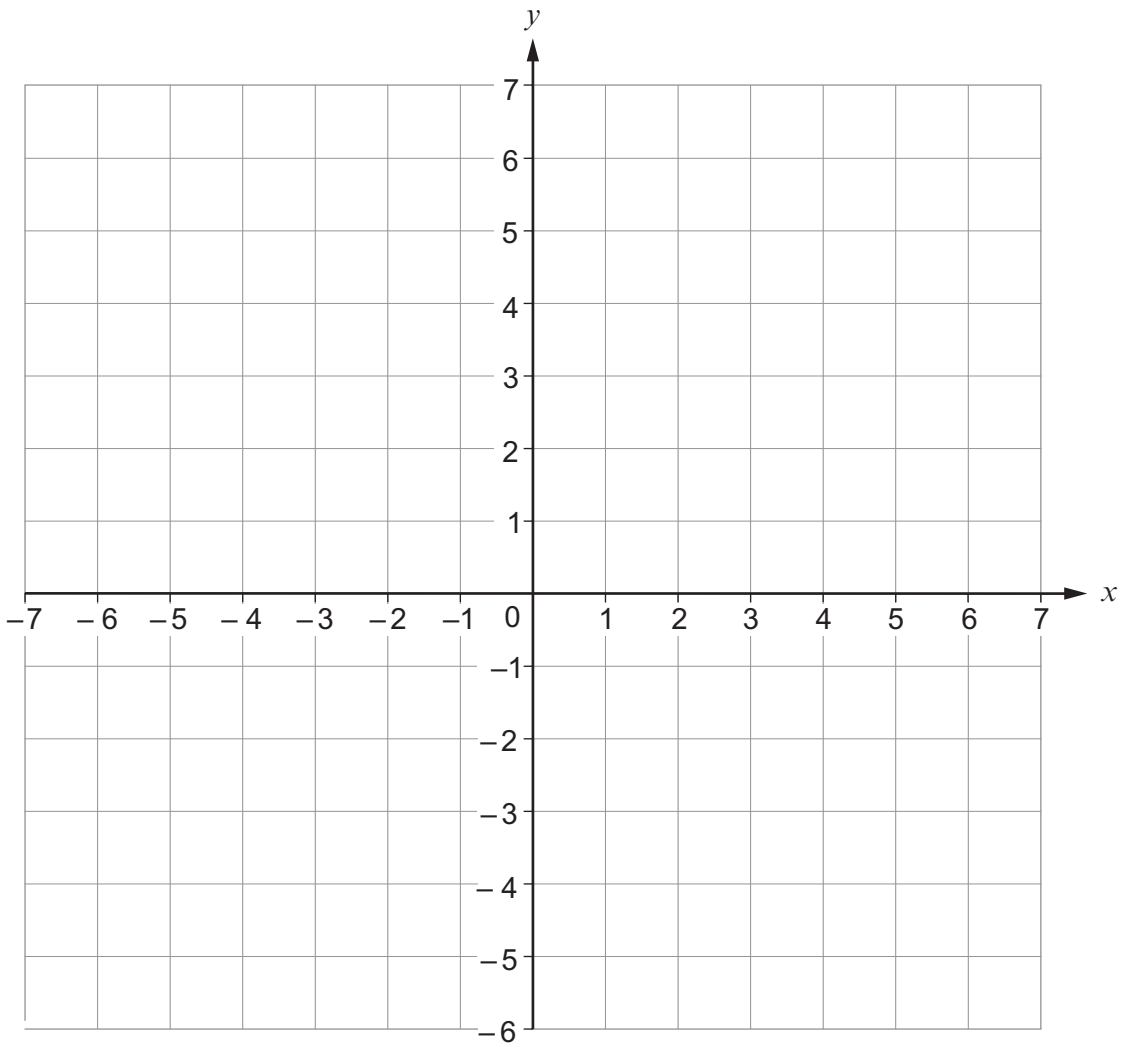
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6. *(a)* Plot the following points on the grid below. [3]

A (2, 1) **B** (–4, –2) **C** (–6, 2)



(b) The plotted points are three vertices (corners) of a rectangle.
Write down the coordinates of the fourth vertex (corner). [1]

(..... , ...)

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7. *(a)* Write $\frac{3}{4}$, $\frac{9}{10}$, and $\frac{5}{8}$ in **descending order**.
Show all your working. [3]

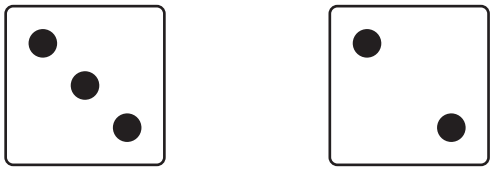
(b) Write 40p as a fraction of £2 in its simplest form. [2]

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8. *You will be assessed on the quality of your written communication in this question.*



Megan throws two fair six-sided dice.
The score is the **sum** of the 2 numbers shown on the dice.
In this example the score is 5, as 3 + 2 = 5.

By showing all the possible outcomes, find

- the probability of obtaining a total of 7,
- the probability of obtaining a total greater than 10,
- the probability of obtaining a total that is a square number.

You must show all your working. [7]

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9. *(a)* Calculate the size of angle x. [2]

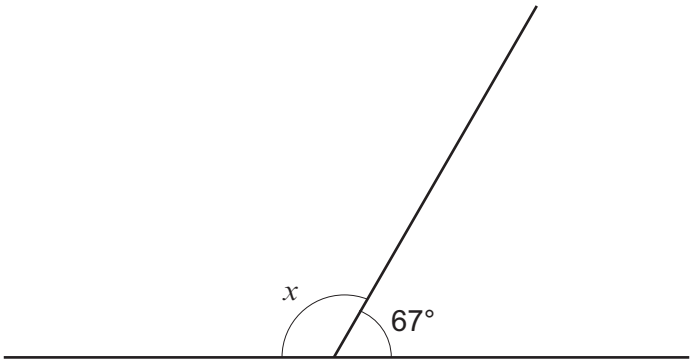


Diagram not drawn to scale

.....

.....

(b)

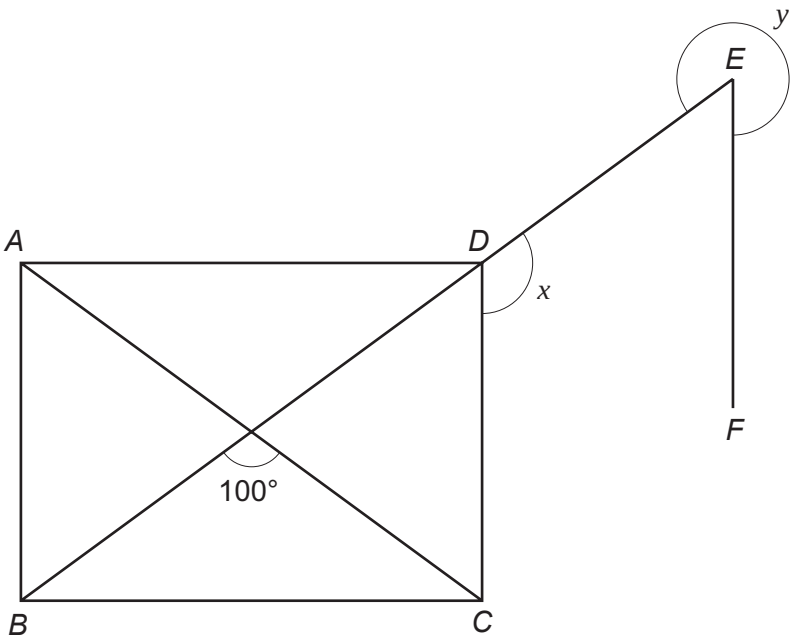


Diagram not drawn to scale

ABCD is a rectangle.
CD is parallel to *FE.*

Calculate the size of angles x and y. [4]
It may help to show your working on the diagram.

.....

.....

.....

x = ... ° y = ... °

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10. *(a)* Complete the following table. [3]

Fraction	Decimal	Recurring or terminating?
$\frac{1}{3}$	$0\cdot\dot{3}$	.....
$\frac{5}{8}$	.....	.....
$\frac{3}{11}$	.....	.....

.....

.....

.....

.....

.....

(b) A number is multiplied by 12 and then 56 is added before finally dividing by 100. This leads to an answer of 2. What is the original number? [2]

.....

.....

.....

.....

.....

Original number is .....

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11. *(a)* Simplify $x + 9x + 3x$. [1]

.....

(b) Simplify $20a + 5b - 25a + 2b$. [2]

.....

(c) Given that $d = -2$, $e = 3$ and $f = 5$, find the value of each of the following.

(i) d^3 [1]

.....

(ii) $e^2 + df$ [1]

.....

.....

(iii) $\frac{1}{f}(e - d)$ [1]

.....

.....

.....

.....

12. Calculate the larger amount when £440 is divided in the ratio 5 : 6. [2]

.....

.....

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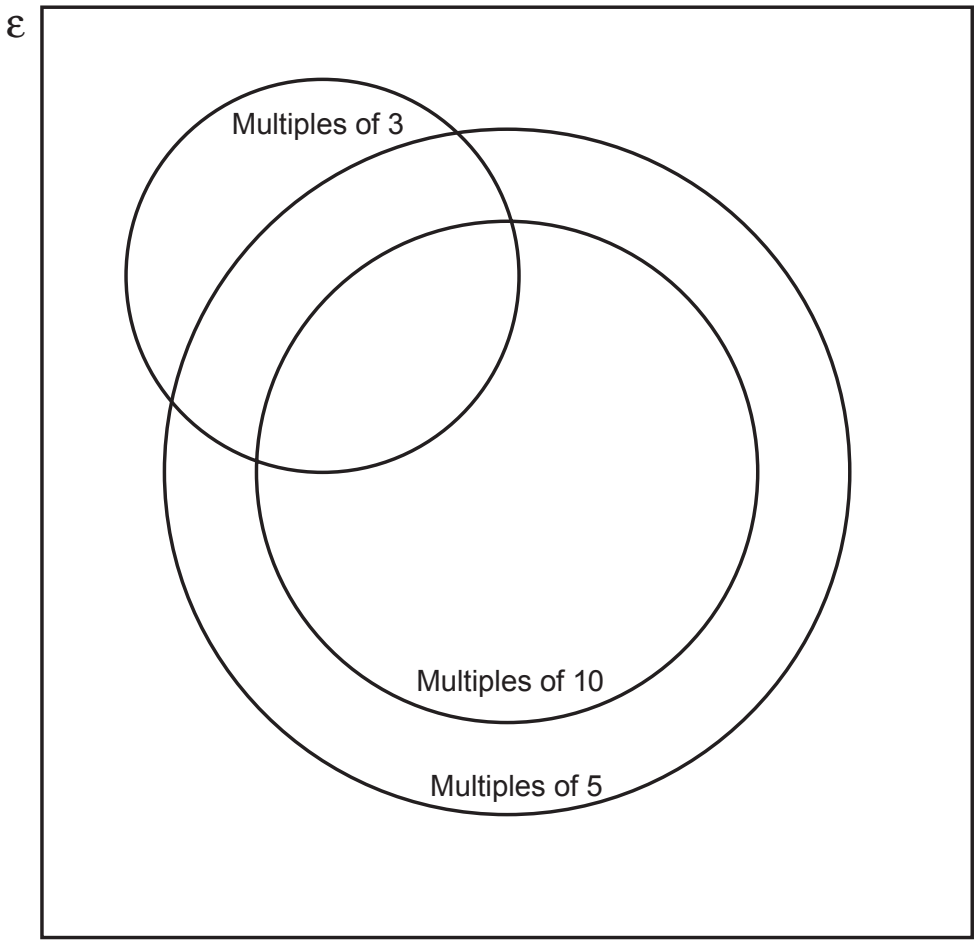
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13. *(a)* A Venn diagram is shown below.
Explain why the circle to represent multiples of 10 is drawn inside the circle to represent multiples of 5. [1]

.....

.....

.....



(b) (i) Place each of the six numbers 30, 32, 33, 35, 40, 45 in the correct position in the Venn diagram. [3]

(ii) A number is selected at random from the set {30, 32, 33, 35, 40, 45}.

Find the probability that the number selected is

a prime number, ...

a multiple of 10 that is also a multiple of 3, ...

neither a multiple of 3 nor 10. ..... [3]

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14. *(a)* Each **exterior** angle of a regular polygon is 18°.
How many sides does this regular polygon have? [2]

..... sides

(b) Three of the **interior** angles of a pentagon are 125°, 130° and 135°.
The other two angles are equal.
Find the size of the other two angles. [5]

END OF PAPER

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GCSE MARKING SCHEME

SUMMER 2016

GCSE MATHEMATICS LINKED PAIR METHODS
UNIT 1 FOUNDATION
4363-01

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INTRODUCTION

This marking scheme was used by WJEC for the 2016 examination. It was finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conference was held shortly after the paper was taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conference was to ensure that the marking scheme was interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conference, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about this marking scheme.

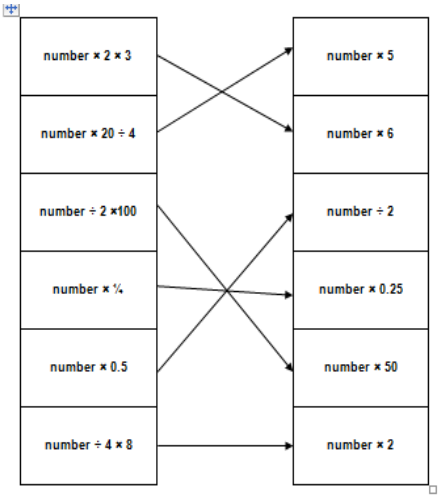
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METHODS IN MATHEMATICS
UNIT 1 (FOUNDATION TIER) SUMMER 2016

Methods in Mathematics Unit 1 Foundation Tier	Mark	Comments
1. (a)(i) 5003	B1	
(ii) Thirty five thousand two hundred and one	B1	
(b) (i) 101	B1	
(ii) 26	B1	
(iii) 99	B1	
(iv) 12	B1	
(c) (i) 2460	B1	
(ii) 36 000	B1	
(d) (i) 1, 2, 4, 5, 10, 20	B2	B1 for 6 correct factors and 1 incorrect value OR any 4 or 5 factors and no incorrect values.
(ii) Any two multiples of 6. Eg 6, 12, 18…	B1	
(e) 35	B1	
Add 8 (to the previous term)	B1	Accept plus 8, +8, n+8, 8n-5
	13	
2. Correct drawings and properties (GDEA)	B4	B1 for each correct drawing WITH correct property or B1 for each TWO correct drawings or B1 for each TWO correct properties
	4	
3. 0.3, 0.3	B2	B1 for sum of their probabilities = 0.6
	2	
4. (a) 546	B1	
(b) 71	B1	
(c) 417 23 x 8340 OR 9200 1251 230 9591 161 9591	M1 A1 A1	Any correct method for multiplying 417 by 23 For either 8340 or 1251 OR 9200 or 230 or 161, provided no place value error'. (Apply 'one error' in other methods) CAO Place value errors get M0 A0 A0
(d) 4.2	B1	
(e) 0.04	B1	
(f) 7	B1	
(g) 5	B1	
	9	

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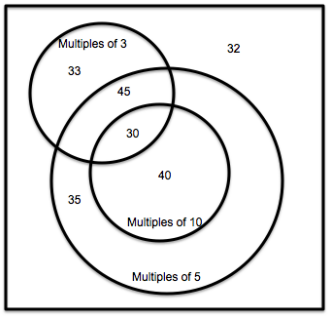
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Methods in Mathematics Unit 1 Foundation Tier	Mark	Comments
5.  	B3 3	Award B2 for three or four correct pairs Award B1 for two correct pairs
6.(a) All points plotted correctly (b) (0, 5)	B3 B1 4	B1 for each point plotted correctly Allow B1 if all three plotted reversely in (a) but still give an answer of (0,5) FT from their plotted points in (a) provided sides are not vertical and horizontal
7.(a) For 2 correct in a form which allows comparison For all 3 correct in forms which allow comparison 9/10, 3/4, 5/8 (b) 40/200 1/5	B1 B1 B1 M1 A1 5	
8. Showing all 36 possible totals Eg (2nd Dice) (1st Dice) + 1 2 3 4 5 6 1 2 3 **4** **5** **6** **7** 2 3 **4** **5** **6** **7** **8** 3 4 **5** **6** **7** **8** **9** 4 5 **6** **7** **8** **9** **10** 5 6 **7** **8** **9** **10** **11** 6 7 **8** **9** **10** **11** **12** • (P(Total=7)=) 6/36 • (P(Total>10)=) 3/36 • (P(Total=square number)=) 7/36	B2 <

Methods in Mathematics Unit 1 Foundation Tier	Mark	Comments
Look for: Eg Two way table or ordered pairs or organised list of possibilities with clear labelling or a tree diagram QWC2: Candidates will be expected to • present relevant work clearly, with words explaining process or steps AND • make few if any mistakes in spelling, punctuation and grammar QWC1: Candidates will be expected to • present work clearly which is mostly relevant, with words explaining process or steps OR • make few if any mistakes in spelling, punctuation and grammar and include units in their final answer	QWC 2 7	QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. QWC1 Presents material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar OR evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar. QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar.
9.(a) 180-67 113(˚) (b) Sight of a correct 80(˚) OR reference to an appropriate isosceles triangle Sight of correct 50(˚) OR correct 40(˚) x= 130(˚) y= 310(˚)	M1 A1 B1 B1 B1 B1 6	This 80˚ could refer to the angle adjacent to the 100˚ OR the sum of the base angles B and C in the relevant isosceles triangle OR vertical line parallel to CD through the centre of the rectangle (at the angle 100^o) (working towards the 50^o) Angles may be seen on the diagram. Gaining this B1, also gains 1st B1 FT 'their *x*' + 180(˚)
10(a) 0.625 .. 0.2727… or 0.27 Recurring, Terminating, Recurring (b)Method that '… × 12 + 56 = 200, or … × 12 + 56 = 2 100 Number is 12	B1 B1 B1 M1 A1 5	FT provided at least 1 of the decimals is correct i.e. at least B1 previously awarded OR 2×100, then 'their 200' – 56, then 'their 144' ÷ 12, or trial & improvement with correct operations in the correct order CAO
11. (a) 13*x* (b) -5*a*+7*b* (c)(i) -8 (ii) -1 (iii) 1	B1 B2 B1 B1 B1 6	Must be in an expression B1 for either -5*a* or 7*b*
12. 440 × 6 ÷ 11 (£)240	M1 A1 2	Allow with sight of the smaller share

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Methods in Mathematics Unit 1 Foundation Tier	Mark	Comments
13(a) Reason, e.g. 'all multiples of 10 are multiples of 5', 'multiples of 10 are also multiples of 5', 'not all multiples of 5 are multiples of 10', 'multiples of 10 is a subset of multiples of 5'	E1	Do not accept 'some multiples of 10 are also multiples of 5'
(b)(i) 6 numbers placed correctly  	B3	B2 for 4 or 5 numbers uniquely placed correctly, the other 2 or 1 number(s) respectively omitted or incorrectly placed or repeated, OR B1 for 2 or 3 numbers placed correctly, the other 4 or 3 numbers respectively omitted or incorrectly placed or repeated *Penalise extra numbers included -1 throughout*
(ii) 0 1/6 2/6 (= 1/3)	 B1 B1 B1 7	*In (b)(ii) ignore incorrect cancelling.* FT their Venn diagram CAO
14(a) 360 ÷ 18 20 (sides)	M1 A1	Or equivalent **complete** method
(b) (Total of interior angles) 3×180(°)	M1	or 5 × (180(°) - 360(°) ÷ 5) alternative full method
540(°)	A1	
125(°) + 130(°) + 135(°) + …. + …. = sum of interior angles of a polygon	M1	FT 'their 540' provided > 390
(540(°) – 390(°))÷ 2 or 150(°)/2	m1	Rearranged form or manipulated correctly to this stage of working
(Each interior angle is) 75(°)	A1	*Alternative:* *(Exterior angles are)* *180(°) – 125(°),180(°) – 130(°) & 180(°) – 135(°)* *M1* *(Each remaining exterior angle) FT from M1* *360(°) – 55(°) - 50(°) – 45(°)* *M1* *÷ 2* *m1* *(depends on at least M1 previously awarded)* *(Each exterior angle is)* *105(°)* *CAO* *A1* *(Each interior angle is)* *75(°)* *A1* *FT 180 – 'their 105' provided M1, M1 and m1 awarded*
	7	

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Surname	Centre Number	Candidate Number
Other Names		0

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METHODS IN MATHEMATICS

UNIT 1: Methods (Non-Calculator)
FOUNDATION TIER

A.M. MONDAY, 11 January 2016

1 hour 30 minutes

CALCULATORS ARE NOT TO BE USED FOR THIS PAPER

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Question	**Maximum Mark**	**Mark Awarded**
1.	**10**	
2.	**8**	
3.	**3**	
4.	**5**	
5.	**8**	
6.	**5**	
7.	**3**	
8.	**5**	
9.	**5**	
10.	**10**	
11.	**7**	
12.	**3**	
13.	**8**	
Total	**80**	

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ADDITIONAL MATERIALS

A ruler, a protractor and a pair of compasses may be required.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

Take π as 3·14.

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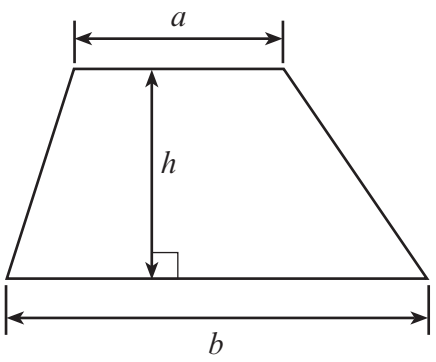
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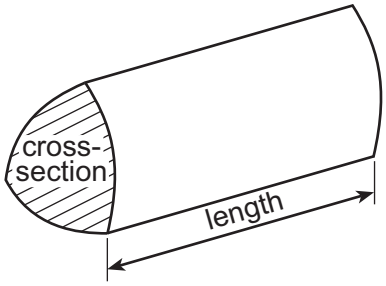
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Formula List

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



Volume of prism = area of cross-section × length



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1. *(a)* (i) Write down, in figures, the number fifteen thousand two hundred and five. [1]

.....

(ii) Write down, in words, the number 475 000. [1]

.....

.....

(b) (i) Write down the sum of 49 and 61. [1]

.....

.....

.....

(ii) Write down the answer when 7 is multiplied by 6. [1]

.....

(c) (i) Write 1329 correct to the nearest 100. [1]

.....

(ii) Write 53 505 correct to the nearest 1000. [1]

.....

(d) Write down all the factors of 15. [2]

.....

(e) Circle the numbers that are divisible by **both** 2 **and** 3. [2]

9 **10** **11** **12** **13** **14**

15 **16** **17** **18** **19**

20 **21** **22** **23**

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10

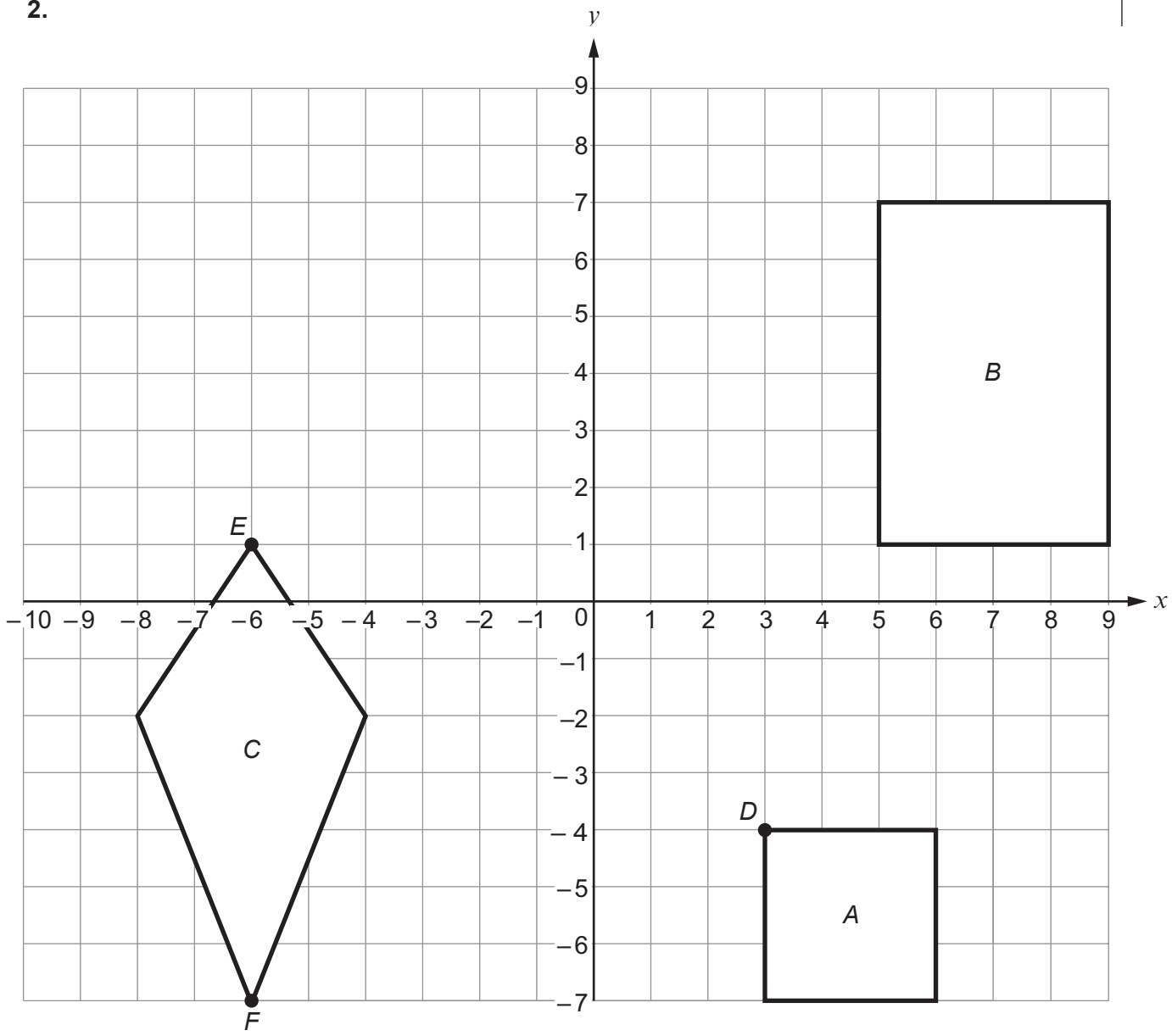
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2.



(a) Write down the special name given to each of the shapes shown above. [3]

SHAPE	*A*	*B*	*C*
SPECIAL NAME			

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(b) Write down the coordinates of the following vertices. [3]

D (..... , ...) *E* (..... , ...) *F* (..... , ...)

(c) (i) Shape *A* could be changed into a trapezium by changing the coordinates of one of the vertices. Give an example of this. [1]

Changing coordinates (..... , ...) to (..... , ...)

(ii) Shape *C* could be changed into a rhombus by changing the coordinates of one of the vertices. Give an example of this. [1]

Changing coordinates (..... , ...) to (..... , ...)

8

3. Choose one term from the list below to describe the chance of each of the following events happening.

impossible **unlikely** **even chance** **likely** **certain**

(a) Obtaining a black counter when one counter is taken at random from a bag containing 98 black and 2 yellow counters. [1]

.....

(b) Obtaining a number less than or equal to 3 when a fair dice numbered 1 to 6 is rolled once. [1]

.....

(c) It will snow in Aberystwyth on August 1st 2016. [1]

.....

3

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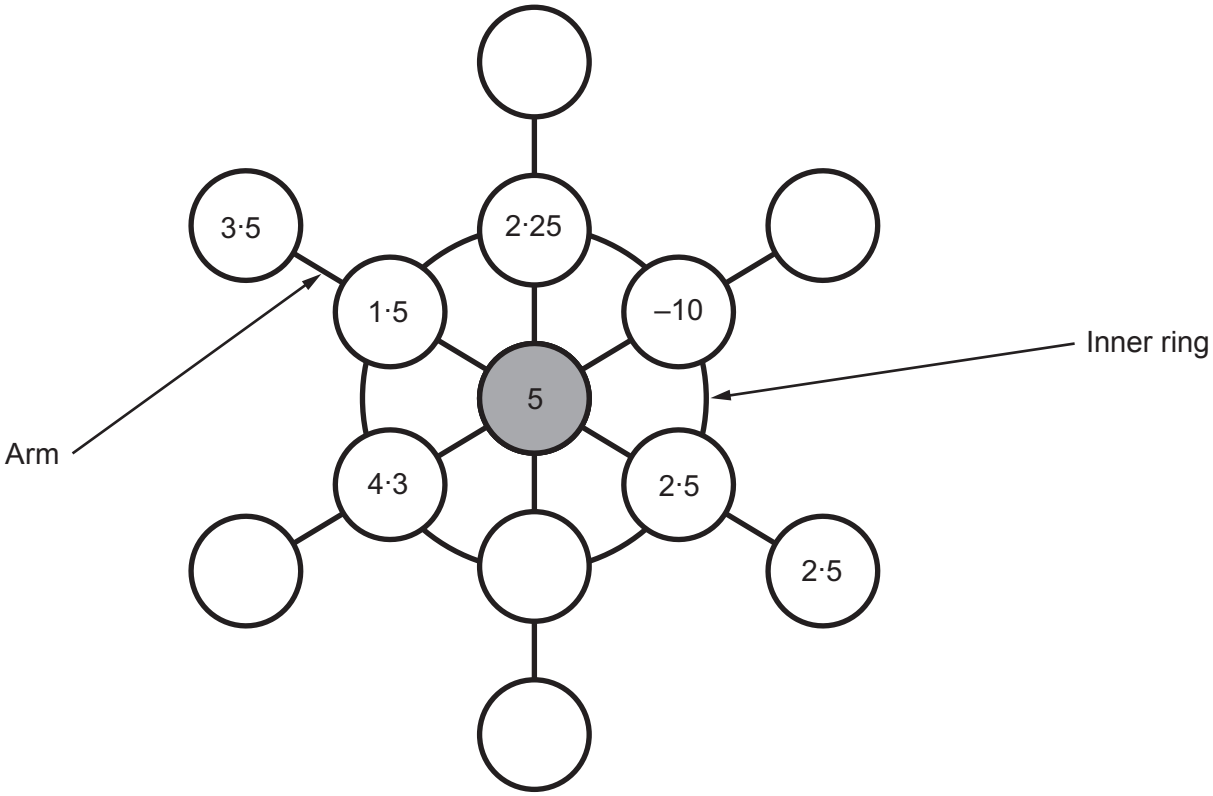
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4. The two circles on each **arm** from the centre circle add up to 5.
All the six circles in the **inner ring** add up to 0.
Two arms have been completed.

Fill in the blanks. [5]



5

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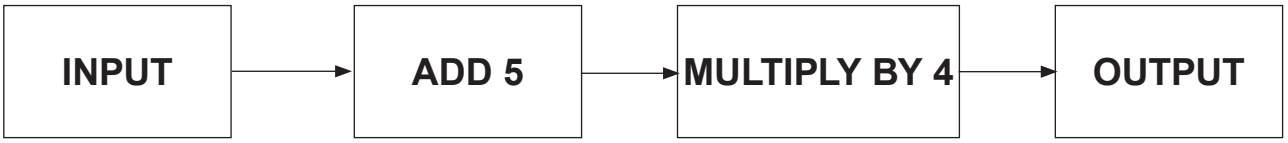
5. *(a)* Write down the next term in the following sequence and describe a rule for continuing the sequence. [2]

4, 11, 18, 25, ...

Rule: .....

.....

(b) The diagram below shows a number machine.



Using the number machine, calculate:

(i) the **OUTPUT** when the **INPUT** is 2 [1]

.....

(ii) the **OUTPUT** when the **INPUT** is –3 [1]

.....

(iii) the **INPUT** when the **OUTPUT** is 44. [1]

.....

(c) Use the following clues to find the missing number. [3]

- The number is between 5 and 40.
- It is not an odd number.
- It is a multiple of 3.
- It is a square number.

.....

.....

.....

.....

Missing Number is .....

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8

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6. *You will be assessed on the quality of your written communication in this question.*

Geraint, Sian and Mari receive the same amount of pocket money as each other each week. They all start saving some money towards buying the same model of laptop computer.

- Geraint saves $\frac{3}{10}$ of his pocket money each week.
- Sian saves $\frac{2}{5}$ of her pocket money each week.
- Mari saves $\frac{1}{4}$ of her pocket money each week.

Who will be the first to buy the laptop computer?
You must show all your working. [5]

5

7. Sara wants to buy a ring to wear for a special occasion.



There is a choice of 3 metals and 3 gems for Sara to choose from.

- Metals: She has a choice of gold, platinum or titanium.
- Gems: She has a choice of diamond, sapphire or emerald.

Write down all the possible combinations for the ring that is made using one metal and one gem. [3]

3

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8. Using the two instructions given, fill in the blanks in the grid below. [5]

	Each column must add up to 0 ↓			
1	**–1**	***a***	**–*a***	**Each row must add up to 0** ←
5			**3*a***	
	2	**2*a* – 6**	**4**	
2*a* – 6	**4**			

.....

.....

.....

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9.

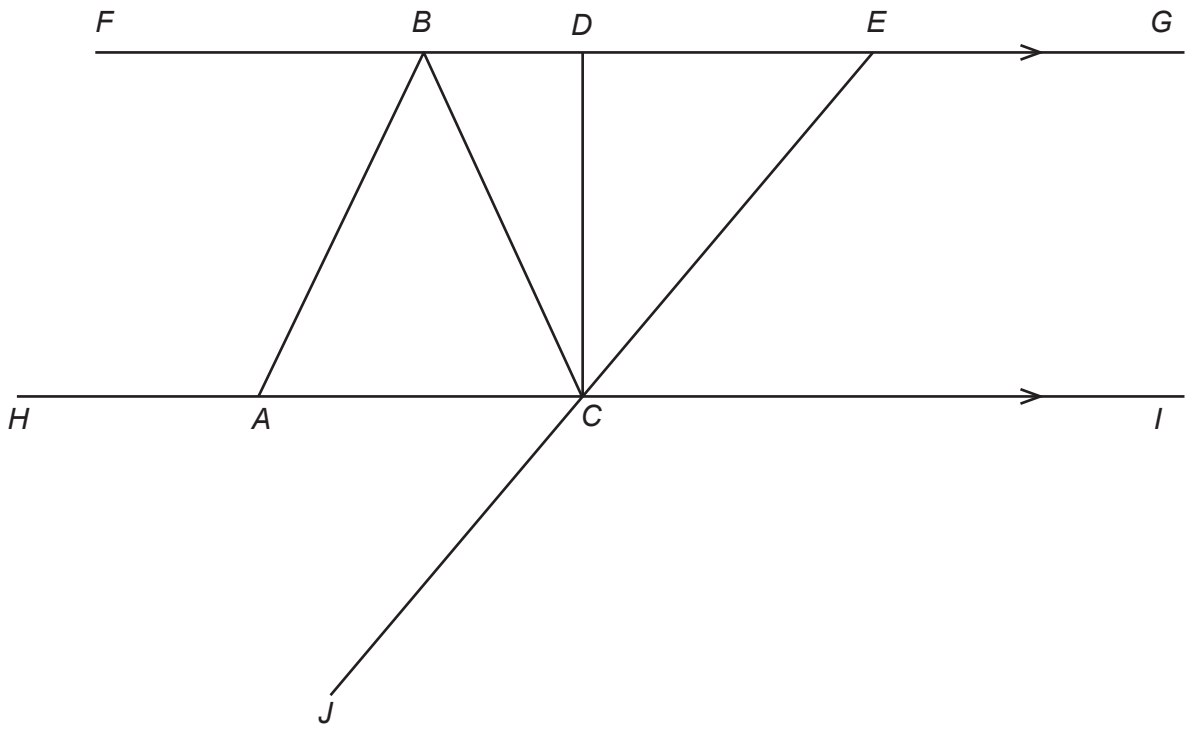


Diagram not drawn to scale

Triangle *ABC* is an equilateral triangle.
Triangle *CDE* is an isosceles triangle.

The line *FG* is perpendicular to the line *CD*.
The line *FG* is parallel to the line *HI*.

Find the size of $B\hat{C}E$. [5]

.....

.....

.....

.....

.....

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10. *(a)* Simplify $21a - 6b + 14a - 9b$. [2]

.....

.....

(b) Find the value of $6x + 2y$ when $x = 7$ and $y = -10$. [2]

.....

.....

(c) Given that $a = 2, b = -1$ and $c = -6$, find the value of $\frac{4a - 3c}{b^2 + 1}$. [2]

.....

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(d) Expand $x(3x + 7)$. [2]

.....

(e) Factorise $20a - 5ab$. [2]

.....

10

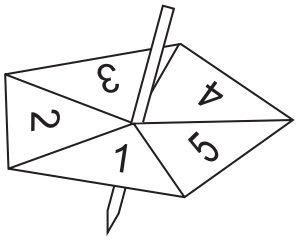
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11. A spinner is labelled with the numbers 1, 2, 3, 4 and 5.



After 100 spins, the outcomes were recorded.
The table shows some of the results.

Number	1	2	3	4	5
Frequency	44	.....	22	10	.....

(a) The frequencies of the numbers 2 and 5 are in the ratio 1 : 2.
Complete the table above. [3]

.....

.....

.....

.....

.....

.....

(b) Write the best estimate of the probability of each of the following:

(i) the number 3 occurring, [1]

.....

.....

(ii) a number greater than 1 occurring. [2]

.....

.....

.....

(c) Would you consider this to be a fair spinner?
You must give a reason for your answer. [1]

.....

.....

.....

7

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12. Use **estimation** to complete the table below. [3]

Number	Accuracy required	Rounded number
35^2	Correct to the nearest 100	1200
3^4	Correct to the nearest 10	80
$\sqrt{122}$	Correct to 2 significant figures	.....
$\sqrt{(80{\cdot}805 + 63{\cdot}23)}$	Correct to 1 significant figure	.....
25^2	Correct to the nearest 100	.....

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13. *(a)* Write each of 450 and 270 as products of prime factors using index notation. [4]

(b) Hence write down the lowest common multiple and the highest common factor of 450 and 270.
You must evaluate your answers. [4]

Lowest common multiple:

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Highest common factor:

.....

.....

.....

.....

.....

.....

8

END OF PAPER

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Surname	Centre Number	Candidate Number
Other Names		0

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S15-4363-01

METHODS IN MATHEMATICS

UNIT 1: Methods (Non-Calculator)
FOUNDATION TIER

A.M. THURSDAY, 21 May 2015

1 hour 30 minutes

CALCULATORS ARE NOT TO BE USED FOR THIS PAPER

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**10**	
2.	**3**	
3.	**4**	
4.	**7**	
5.	**5**	
6.	**8**	
7.	**5**	
8.	**4**	
9.	**3**	
10.	**11**	
11.	**6**	
12.	**4**	
13.	**5**	
14.	**5**	
Total	**80**	

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INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

Take π as 3·14.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

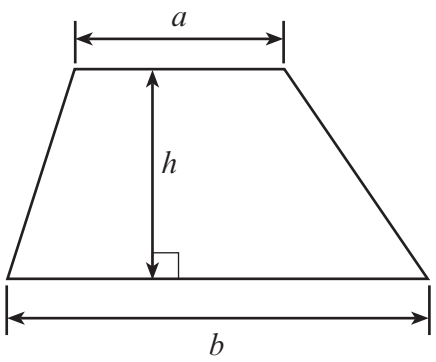
You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **6**.

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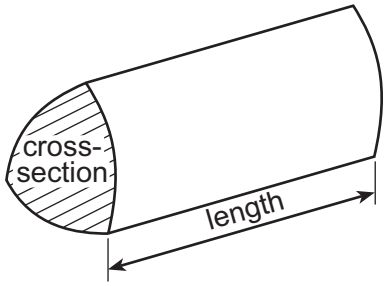
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Formula List

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



Volume of prism = area of cross-section × length



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1. *(a)* (i) Write down, in figures, the number fifty thousand and fourteen. [1]

.....

(ii) Write down, in words, the number 630 000. [1]

.....

(b)

22 26 27 32 36 37

42 46 47 52 54

Using only the numbers above, write down

(i) the sum of 19 and 27, [1]

.....

(ii) the difference between 100 and 74, [1]

.....

(iii) the answer when 6 is multiplied by 7, [1]

.....

(iv) the answer when 94 is divided by 2, [1]

.....

(v) a factor of 72, [1]

.....

(vi) a multiple of 8. [1]

.....

(c) (i) Write 314 correct to the nearest 10. [1]

.....

(ii) Write 2611 correct to the nearest 1000. [1]

.....

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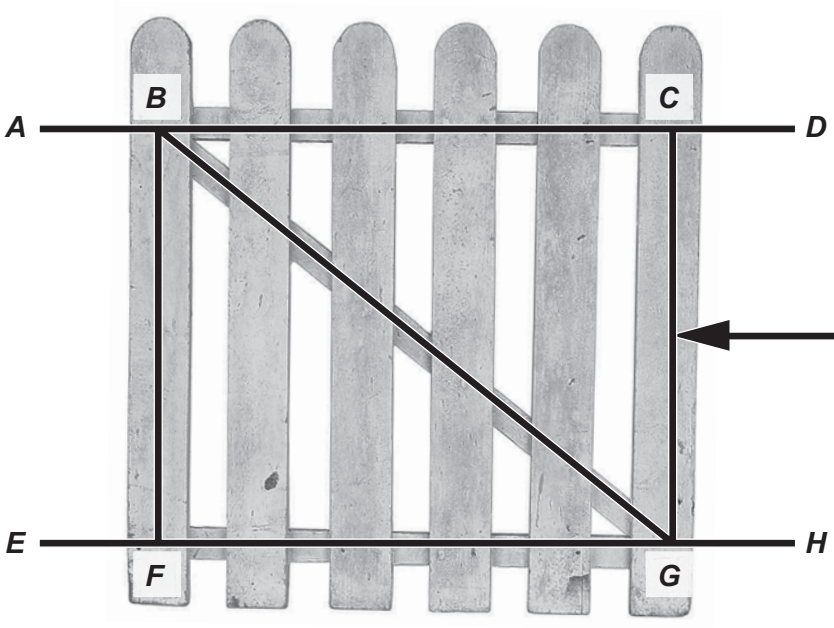
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Turn over.

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2.



(a) Use a pair of letters, as above, to describe a line which is **horizontal**. [1]

The line ..... is horizontal.

(b) Use a pair of letters, as above, to describe two lines which are **parallel** to each other. [1]

The line ..... is parallel to the line ..... .

(c) Use a pair of letters, as above, to describe two lines which are **perpendicular** to each other. [1]

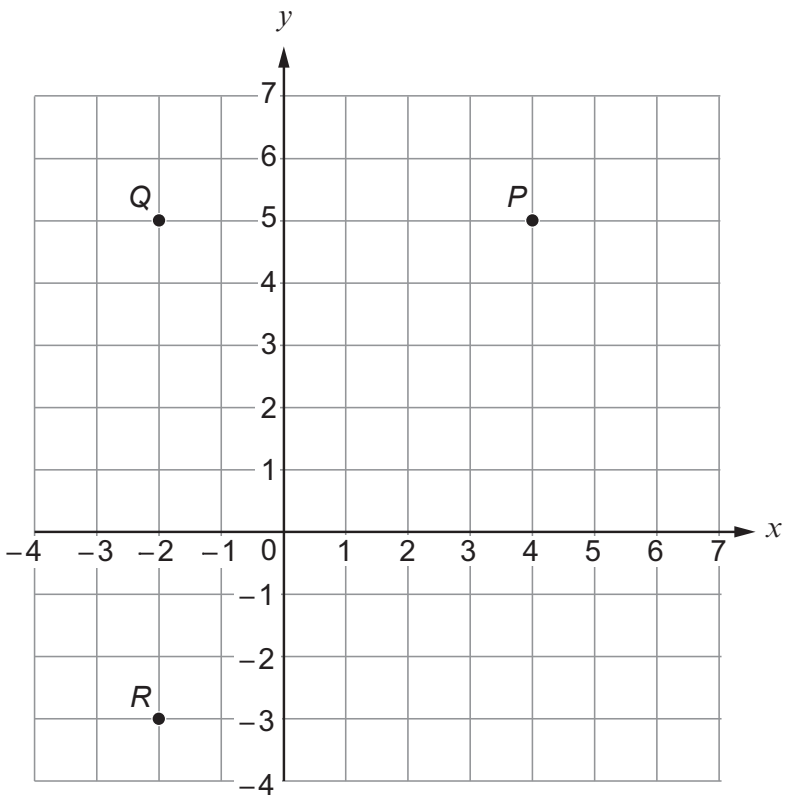
The line ..... is perpendicular to the line ..... .

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3. *(a)* Write down the coordinates of the points *P*, *Q* and *R* shown in the grid below. [3]



The coordinates of *P* are (....., ...).

The coordinates of *Q* are (....., ...).

The coordinates of *R* are (....., ...).

(b) *P*, *Q*, *R* and *S* are the vertices of a rectangle.
Plot the 4th vertex of the rectangle on the grid above and label it as the point *S*. [1]

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4. *(a)* Fill in the blanks to match each event to its chance of happening.
The first one is done for you. [4]

Obtaining a *BLUE* counter when selecting one counter at random from a bag containing 20 blue counters	**CERTAIN**
Obtaining a number less than ..... when rolling a fair dice numbered 1 to 6	**LIKELY**
Obtaining a number greater than or equal to ..... when rolling a fair dice numbered 1 to 6	**EVEN CHANCE**
Obtaining a ..... counter when selecting one counter at random from a bag containing 50 red and 5 yellow counters	**UNLIKELY**
Choosing the number ..... from five cards numbered 1 to 5	**IMPOSSIBLE**

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(b) There are 50 members in a tennis club.
Some of these members have visited the Wimbledon Championship and some have not.
This information is displayed in the following table.

	Male	**Female**	**Total**
Visited Wimbledon Championship	24	5	**29**
Have not visited Wimbledon Championship	6	15	**21**
Total	**30**	**20**	**50**

What is the probability that a member chosen at random

(i) is male? [1]

.....

(ii) has visited the Wimbledon Championship? [1]

.....

(iii) is a female who has not visited the Wimbledon Championship? [1]

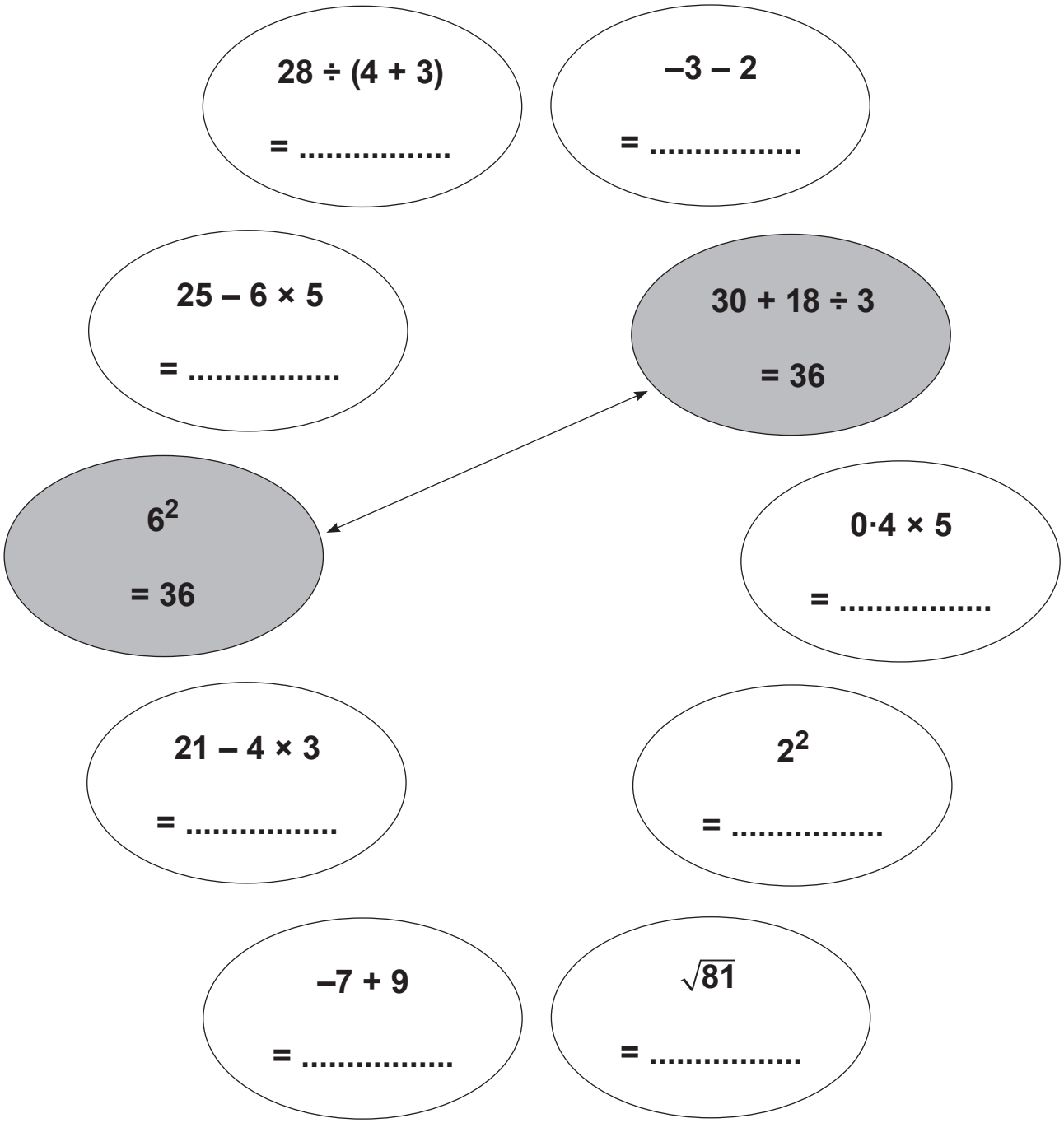
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5. Write down the answer to each calculation in the space provided.
Match the calculations that have the same answer.
One has been done for you. [5]



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6. *You will be assessed on the quality of your written communication in this question.*

Anthony, Blodwen and their two children go swimming every Saturday and Sunday for a whole year.
The family can go swimming at the Holystack Leisure Centre or the Beaucastle Leisure Centre, which are both local.
At each leisure centre it costs £3 for an adult and £2 for a child to go swimming.

The leisure centres have the following membership offers available.

HOLYSTACK LEISURE CENTRE
Yearly family membership
£800

(2 adults and 2 children)

BEAUCASTLE LEISURE CENTRE

MONTHLY FAMILY MEMBERSHIP
£100

(2 ADULTS AND 2 CHILDREN)

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The family want to pay as little as possible.
Should the family pay every Saturday and Sunday or choose one of the offers available at the leisure centres?
You must show all your workings, and give a reason for your answer. [8]

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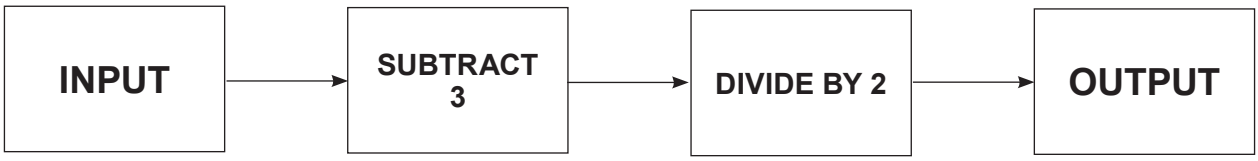
Examiner only

7. *(a)* Write down the next term in the following sequence and describe the rule for continuing the sequence. [2]

5, 11, 17, 23, ...

Rule: .....

(b) The diagram below shows a number machine.



Using the number machine, calculate

(i) the **OUTPUT** when the **INPUT** is 7 [1]

.....

(ii) the **OUTPUT** when the **INPUT** is **–**5 [1]

.....

(iii) the **INPUT** when the **OUTPUT** is 10. [1]

.....

8. *(a)* Evaluate $\frac{5}{10} + \frac{8}{10}$.

Write your answer as a mixed number. [2]

.....

(b) Write 15 seconds as a fraction of 1 minute in its simplest form. [2]

.....

.....

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9.

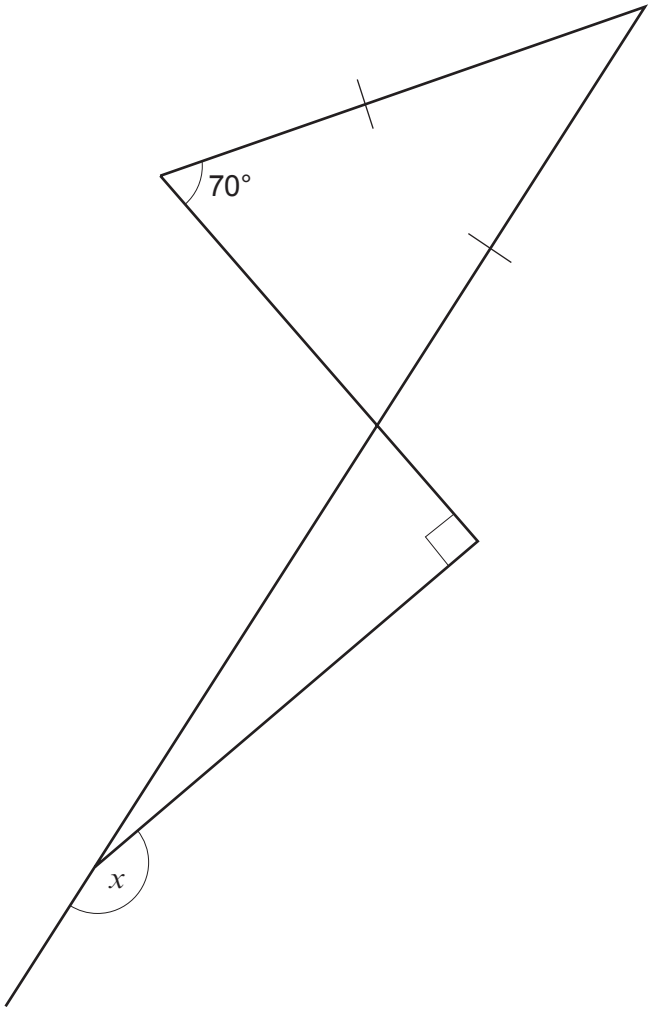


Diagram not drawn to scale

Find the size of angle x. [3]

.....

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Turn over.

Examiner only

10. *(a)* Simplify $5p + 3q + 10r - 8q$. [2]

.....

(b) Expand $x(x^2 + 7)$. [2]

.....

(c) Factorise $3x^2 + 27x$. [2]

.....

(d) **equation** **inequality** **formula** **expression**

Use one of the special names above to describe the following [2]

(i) $10x + 5 < 35$ .....

(ii) $9y + 1 = 19$. .....

(e) Use the following clues to find the missing number.

- The number is between 300 and 400.
- It is a multiple of 30 and 45. [3]

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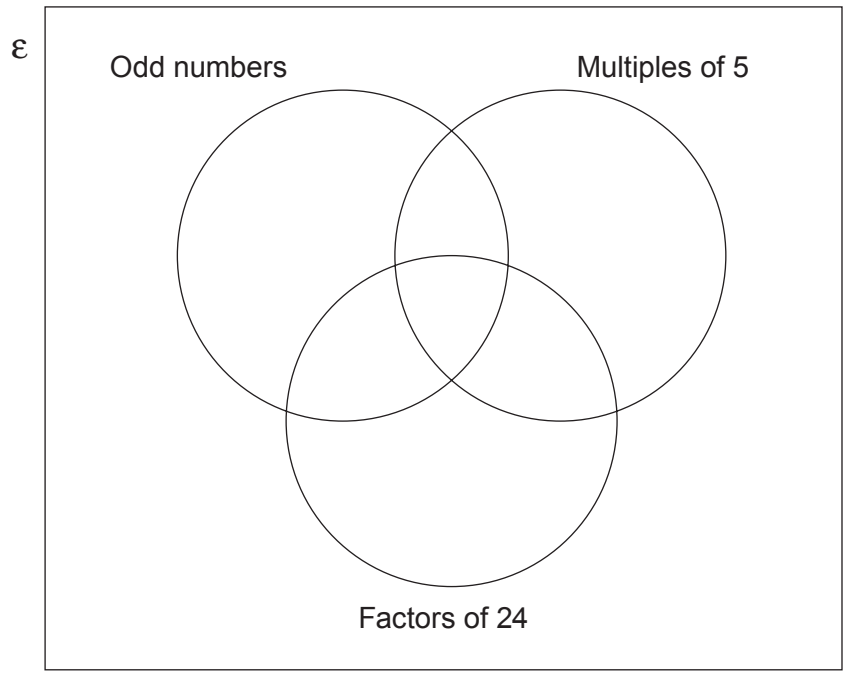
Missing Number is .....

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11. *(a)* Place the whole numbers 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 in the correct positions in the Venn diagram. [3]



(b) A whole number is selected at random from the set {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}.

Find the probability that the number selected is:

an odd number .....

an odd number that is a factor of 24 .....

not a multiple of 5 and not a factor of 24. ..... [3]

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12. A spinner shows 5 colours.
The spinner was spun 50 times.
Some of the outcomes were recorded in a table.

Colour	Purple	Black	White	Red	Yellow
Number of times	7	8	20	.....	.....

(a) Red occurred twice as many times as yellow.
Complete the table above. [1]

.....

.....

.....

.....

(b) Write down the best estimate for the following probabilities on a single spin.
You must express each of your answers as a **decimal**.

(i) The probability of obtaining black. [1]

.....

.....

(ii) The probability of **not** obtaining white. [2]

.....

.....

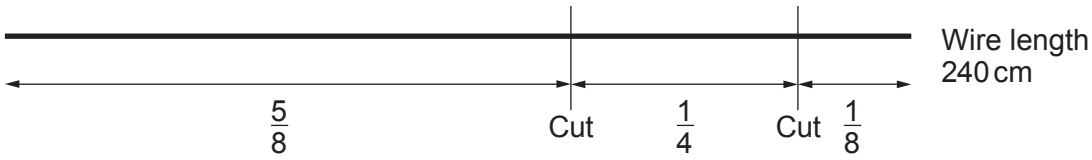
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13. *(a)* A length of wire measuring 240 cm is to be cut into 3 pieces as shown in the diagram.



Calculate the length of each of the 3 pieces of wire. [2]

(b) A different piece of wire of length 308 cm is cut in the ratio 2 : 4 : 5.
Calculate the length of each of the 3 pieces of wire. [3]

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14. *(a)* The diagram below shows dark and light triangular tiles.
The tiles are all identical isosceles triangles.

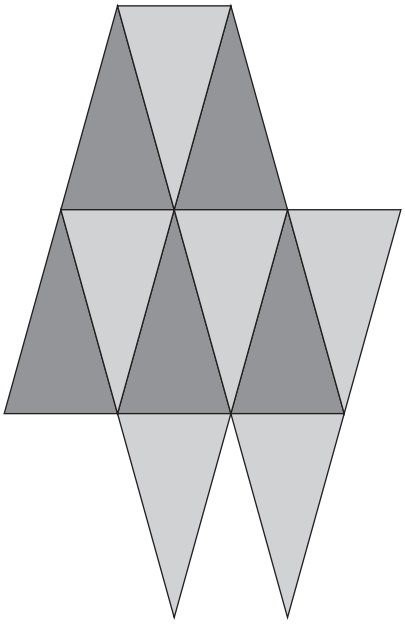


Diagram not drawn to scale

Explain why the tiles tessellate.
You must give a reason, based on angle facts, for your answer. [2]

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(b) Labels have been inserted on the diagram showing the tiles.

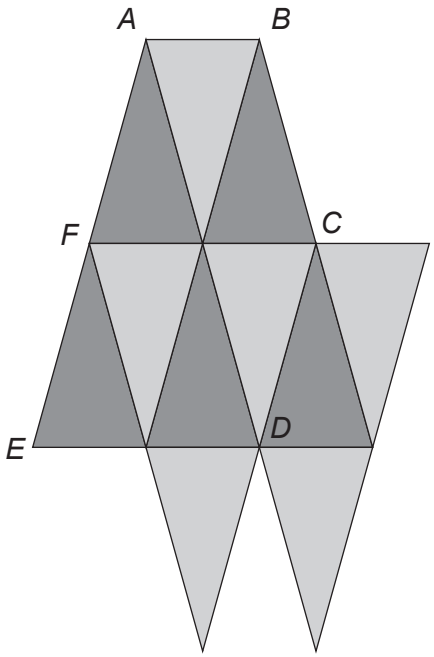


Diagram not drawn to scale

The smallest angle in each of the isosceles triangular tiles is 26°.
Use angle facts to show that *AB* is parallel to *FC*.
You must show your calculations. [3]

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END OF PAPER

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Other Names		0

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4363/01

W15-4363-01

METHODS IN MATHEMATICS

UNIT 1: Methods (Non-Calculator)
FOUNDATION TIER

A.M. FRIDAY, 9 January 2015

1 hour 30 minutes

CALCULATORS ARE NOT TO BE USED FOR THIS PAPER

ADDITIONAL MATERIALS

A ruler, a protractor and a pair of compasses may be required.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

Take π as 3·14.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **6**.

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**9**	
2.	**4**	
3.	**6**	
4.	**8**	
5.	**3**	
6.	**7**	
7.	**4**	
8.	**5**	
9.	**4**	
10.	**6**	
11.	**11**	
12.	**4**	
13.	**3**	
14.	**6**	
Total	**80**	

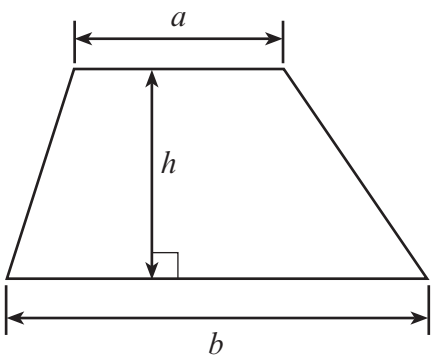
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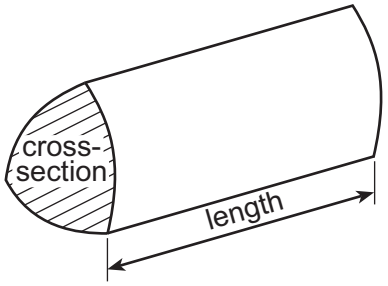
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Formula List

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



Volume of prism = area of cross-section × length



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1. *(a)* (i) Write down, in figures, the number nine thousand, two hundred and five. [1]

.....

(ii) Write down, in words, the number 8 500 000. [1]

.....

.....

(b) (i) Write down the sum of 75 and 37. [1]

.....

.....

.....

(ii) Write down the answer when 8 is multiplied by 8. [1]

.....

(iii) Write down the answer when 45 is divided by 5. [1]

.....

.....

(c) (i) Write 257 correct to the nearest 10. [1]

.....

(ii) Write 7548 correct to the nearest 100. [1]

.....

(d) Write down all the factors of 14. [2]

.....

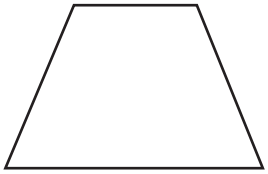
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2. Write down the special name given to each of the following shapes. [4]

SHAPE	NAME
	
	
	
	

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3. *(a)* Choose one term from the list below to describe the probability of each of the following events happening.

impossible **unlikely** **even chance** **likely** **certain**

(i) Obtaining a head when throwing a fair coin once. [1]

.....

(ii) Choosing a red counter from a bag containing only blue and yellow counters. [1]

.....

(iii) Obtaining a two when a fair dice numbered 1 to 6 is rolled once. [1]

.....

(b) Pupils have a choice of a sandwich and a drink for lunch on a school trip.

- They can choose a ham, cheese or salad sandwich.
- To drink, they can choose water, milk or orange juice.

Write down all the possible combinations of a sandwich and a drink that a pupil may have for lunch on the school trip. [3]

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4. Calculate each of the following.

(a) 892 – 506 [1]

(b) 267 × 15 [3]

(c) 5 × 0·7 [1]

(d) 0·3 × 0·2 [1]

(e) 15 – 4 × 3 [1]

(f) 20 ÷ (4 + 1) [1]

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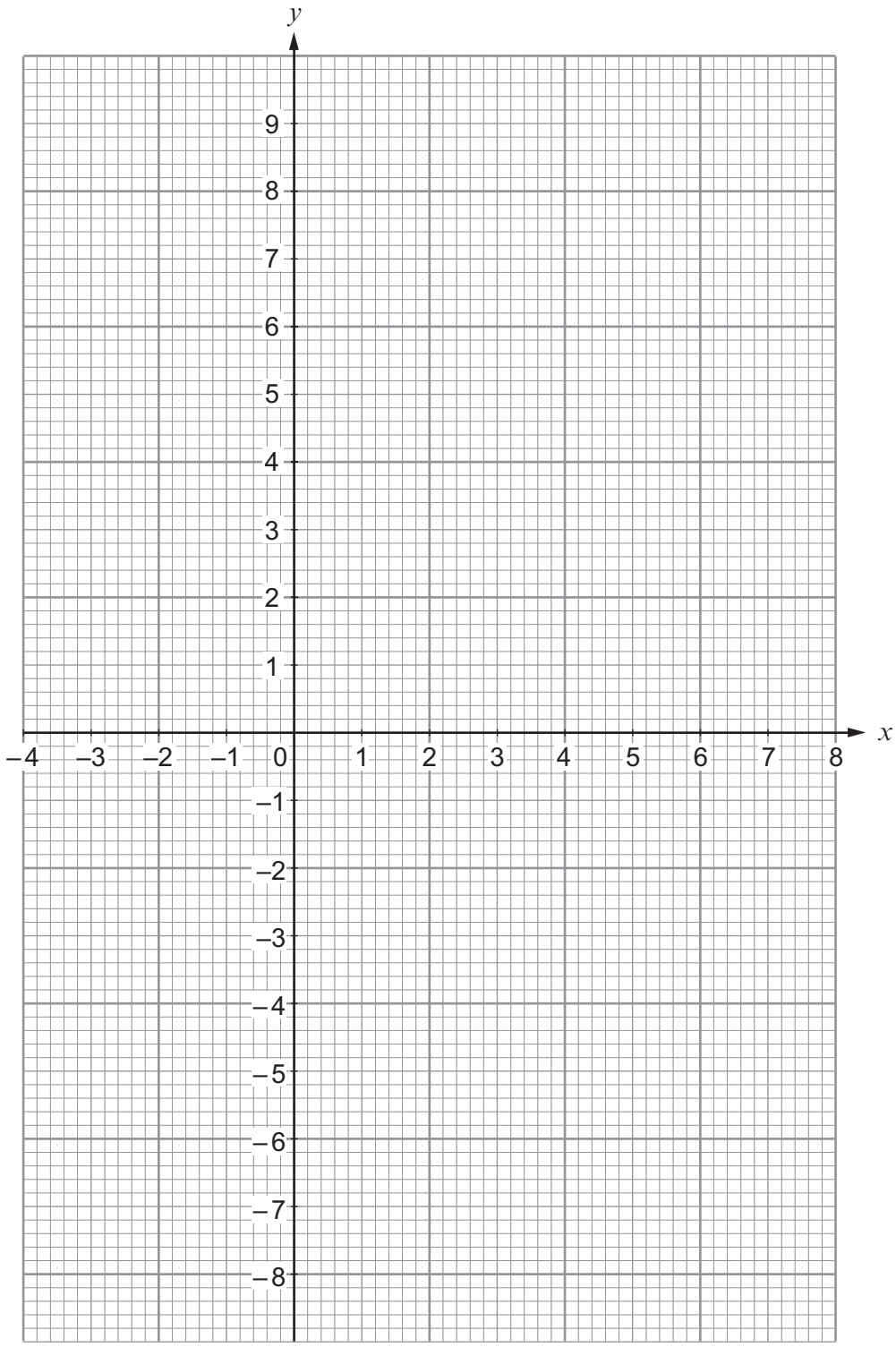
5. In a game, the rule for plotting points is $(x, 2x)$.

On the graph below, plot the points when $x = 1$, $x = 4$ and when $x = -2$. [3]

.....

.....

.....



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6. *You will be assessed on the quality of your written communication in this question.*

Two teams, Team A and Team B, took part in a school quiz.
They were asked 10 questions in a General Knowledge round and 5 questions in a Picture round.

In the General Knowledge round:
- correct answers scored 5 points
- incorrect answers scored –3 points.

In the Picture round:
- correct answers scored 10 points
- incorrect answers scored –5 points.

Here are the results:

Team A		**Team B**	
General Knowledge round	***Picture round***	***General Knowledge round***	***Picture round***
5 correct 5 incorrect	3 correct 2 incorrect	3 correct 7 incorrect	4 correct 1 incorrect

Which team won the competition and by how many points?
You must show all your working. [7]

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7. *(a)* Arrange the following in ascending order. [1]

0·75 0·5 0·07 0·507

.....

(b) Express each of the following as eighths. [3]

(i) $\frac{1}{4} = \frac{\quad}{8}$

(ii) $\frac{1}{2} = \frac{\quad}{8}$

Now, write $\frac{1}{4}$, $\frac{1}{2}$ and $\frac{3}{8}$ in order, starting with the **largest**.

.....

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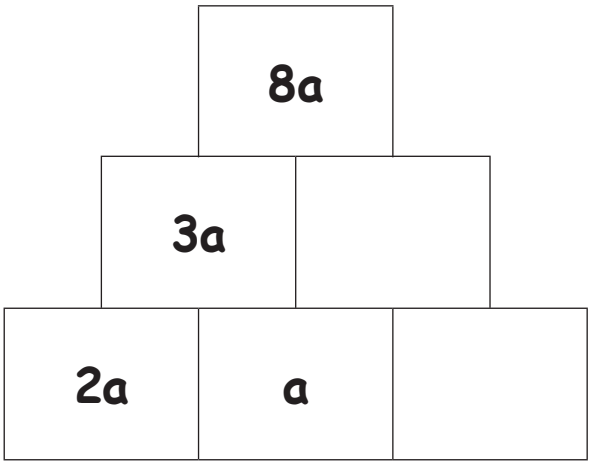
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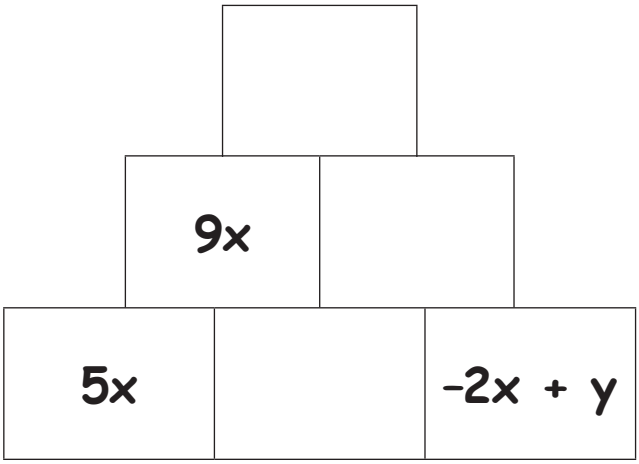
8. To fill in a block, you must add the values on the two blocks directly below it.
Some values are already displayed.
Fill in the empty blocks.
You must simplify your answer.

(a)



[2]

(b)



[3]

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9.

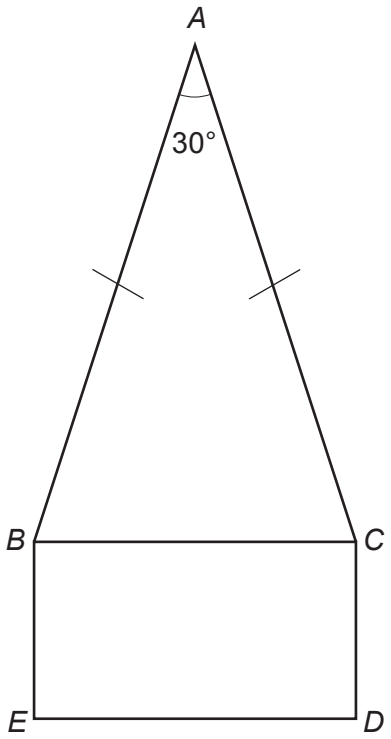


Diagram not drawn to scale

The diagram shows:

- an isosceles triangle *ABC*
- a rectangle *BCDE*.

Find the size of $A\hat{B}E$. [4]

.....

.....

.....

.....

.....

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10. A bag contains only red, yellow, green and blue coloured balls.

There are 30 balls in the bag.
There are 4 red balls.
There are twice as many yellow balls as there are red balls.
There are three times as many green balls as there are red balls.
The remaining balls are blue.

(a) Complete the table below to show the probability of choosing each colour of ball when one ball is chosen at random from the bag. [4]

.....

.....

.....

.....

.....

Colour	Red	Yellow	Green	Blue
Number	4			
Probability				

(b) What is the probability of obtaining a blue or red ball when one ball is chosen at random from the bag? [2]

.....

.....

.....

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11. *(a)* Simplify $11x + 6y + 14x - 9y$. [2]

.....

.....

(b) Find the value of $5a + 3b$ when $a = -3$ and $b = 6$. [2]

.....

.....

(c) Expand $p(2 + 5p)$. [2]

.....

(d) Factorise $3xy - 9y$. [2]

.....

(e) **equation** **inequality** **formula** **expression**

Use one of the special names above to describe the following: [2]

(i) $5x + 3y$ .....

(ii) $8p + 9 = 25$ .....

(f) Which has the greater value, $3x^2$ or $(3x)^2$, when $x = 2$?
You must show your working. [1]

.....

.....

.....

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12. An experiment was carried out to investigate the probability of obtaining a head when a biased coin is thrown.
The number of times the coin landed and showed a head in 4 sets of ten throws is shown in the table below.

Number of throws	Number of times a head is recorded
1st ten throws	2
2nd ten throws	4
3rd ten throws	3
4th ten throws	1

(a) Complete the table below to show the relative frequency of obtaining a head after throwing the coin a total of 10 times, 20 times, 30 times and 40 times. [2]

Number of times the coin is thrown altogether		**10**	**20**	**30**	**40**
Relative frequency of obtaining a head	Fraction	$\frac{2}{10}$	$\frac{6}{20}$		
	Decimal	0·2	0·3		

(b) Using the above results, write down the best estimate for the probability of obtaining a head when this biased coin is thrown.
Give a reason for your answer. [2]

.....

.....

.....

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13.

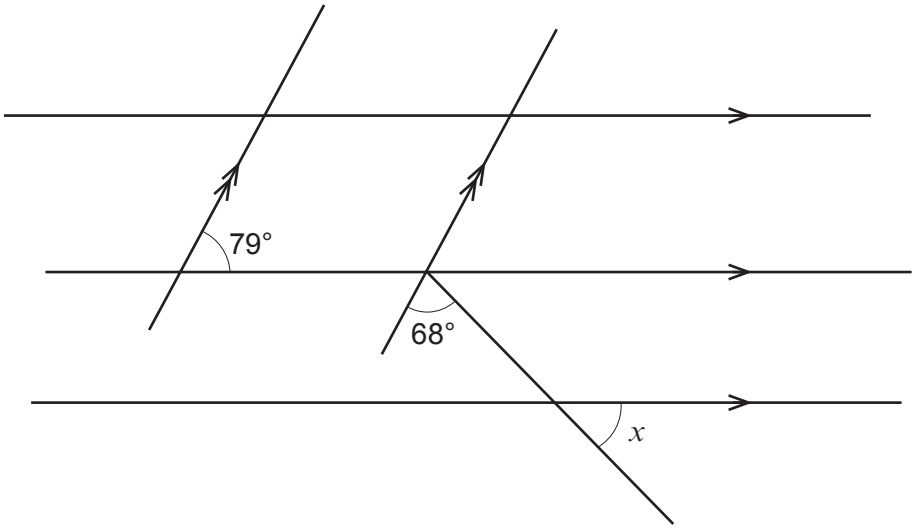


Diagram not drawn to scale

Calculate the size of the angle x.
You must show your working below or on the diagram. [3]

.....

.....

.....

x = ... °

Examiner only

14. *(a)* Find the highest common factor of 120 and 140. [1]

(b) Find the lowest common multiple of 14 and 22. [2]

(c) Express 180 as a product of prime numbers using index notation. [3]

END OF PAPER

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GCSE MARKING SCHEME

METHODS IN MATHEMATICS (LINKED PAIR PILOT)

JANUARY 2015

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INTRODUCTION

The marking schemes which follow were those used by WJEC for the January 2015 examination in GCSE METHODS IN MATHEMATICS (LINKED PAIR PILOT). They were finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conferences were held shortly after the papers were taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conferences was to ensure that the marking schemes were interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conferences, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about these marking schemes.

	Page
Unit 1 Foundation Tier	1
Unit 1 Higher Tier	5
Unit 2 Foundation Tier	10
Unit 2 Higher Tier	14

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METHODS UNIT 1
FOUNDATION TIER

<table>
<tr><th>Methods Unit 1 Foundation Tier
January 2015</th><th>Mark</th><th>Comment</th></tr>
<tr><td>1. (a) (i) 9205
(ii) eight million, five hundred thousand
(b) (i) 112
(ii) 64
(iii) 9
(c) (i) 260
(ii) 7500
(d) 1, 2, 7, 14</td><td>B1
B1
B1
B1
B1
B1
B1
B2

9</td><td>
Accept eight and a half million

B1 for 3 or 4 correct factors and 1 incorrect factor
OR for 2 or 3 correct factors and no incorrect factors</td></tr>
<tr><td>2. Rectangle
Parallelogram
Trapezium
Kite</td><td>B1
B1
B1
B1
4</td><td>

Award B0 for diamond.</td></tr>
<tr><td>3. (a) (i) even chance
(ii) impossible
(iii) unlikely
(b)
<table><tr><td>H(am)</td><td>W(ater)</td></tr><tr><td>H</td><td>M(ilk)</td></tr><tr><td>H</td><td>O(range juice)</td></tr><tr><td>C(heese)</td><td>W</td></tr><tr><td>C</td><td>M</td></tr><tr><td>C</td><td>O</td></tr><tr><td>S(andwich)</td><td>W</td></tr><tr><td>S</td><td>M</td></tr><tr><td>S</td><td>O</td></tr></table></td><td>B1
B1
B1

B3

6</td><td>

B2 for 6 correct combinations
B1 for 3 correct combinations

Ignore repeats

For incorrect combinations:
Add up the number of correct combinations and subtract the number of incorrect combinations (ignoring any repeats) and award marks based on this, e.g. 4 correct and 1 incorrect is 3 correct combinations so award B1.

Award SC2 for all combinations not explicitly given eg
ham with water, milk or orange juice
cheese with water, milk or orange juice
salad with water, milk or orange juice
Award SC1for 2 out of 3 of the above.</td></tr>
<tr><td>4. (a) 386

(b) 267
15 x
2670 OR 3000
1335 900
4005 105
4005

(c) 3.5
(d) 0.06
(e) 3
(f) 4</td><td>B1

M1

A1

A1

B1
B1
B1
B1
8</td><td>

Any correct method for multiplying 267 by 15

For either 2670 or 1335 OR 3000 or 900 or 105
(Apply ‘one error’ in other methods)
CAO
Place value errors get M0 A0</td></tr>
<tr><td>5. All three points plotted correctly</td><td>B3

3</td><td>B1 for each point plotted correctly.
Ignore a line joining the plotted points.
If B0 awarded, then SC1 for (1, 2), (4, 8), (-2, -4) shown</td></tr>
</table>

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Methods Unit 1 Foundation Tier January 2015	Mark	Comment
6. **Team A** General Knowledge (5 × 5) + (5 × -3) (= 10) AND Picture Round (3 × 10) + (2 × -5) (= 20) <u>Total: 30</u> **Team B** General Knowledge (3 × 5) + (7 × -3) (= -6) AND Picture Round (4 × 10) + (1 × -5) (= 35) <u>Total:29</u> Team A AND by one point Look for: Clear workings and labelling eg solution above (no need for brackets) QWC2: Candidates will be expected to • present relevant work clearly, with words explaining process or steps AND • make few if any mistakes in spelling, punctuation and grammar QWC1: Candidates will be expected to • present work clearly which is mostly relevant, with words explaining process or steps OR • make few if any mistakes in spelling, punctuation and grammar and include units in their final answer	M1 A1 M1 A1 B1 QWC 2 <

Methods Unit 1 Foundation Tier January 2015	Mark	Comment
9. For any angle in the rectangle = 90(˚) (180- 30)/2 (<ABC) or (<ACB) = 75(˚) (<ABE) = 165(˚)	 B1 M1 A1 A1 4	Angles may be seen on the diagram. FT 'their 75˚+90˚ provided M1 awarded
10. (a) 8 yellow, 12 green, 6 blue balls Red: 4/30 Yellow: 8/30 Green: 12/30 Blue: 6/30 (b) 4/30 +6/30 =10/30	B2 B2 M1 A1 6	Award B1 for either 8 yellow or 12 green and total is 30 OR 8 yellow and 12 green and total is not 30 FT 'their number of balls' / ' their total' OR 'their number of balls' /30 Award B1 for two or three correct. Penalise incorrect notation once only Do not penalise incorrect reduction here. If used subsequently in (b) only award M1 A0. *B1 for consistent incorrect denominator* but correct numerators, e.g. 4/29, 8/29, 12/29, 6/29'. FT from 'their P(red)' + 'their P(blue)' in (a)
11 (a) 25x-3y (b) 5×-3 + 3 × 6 (= -15+18) 3 (c) 2p +5p² (d) 3y(x-3) (e) Expression Equation (f) Conclusion (stated or implied) that $(3x)^2$ is greater with either sight of $3x^2 = 12$ AND $(3x)^2 = 36$ OR statement that $(3x)^2$ is 3 times the value of $3x^2$ OR Sight of $(3x)^2 = 9x^2$ is sufficient	B2 M1 A1 B2 B2 B1 B1 B1 11	Must be in an expression, B1 for either 25*x* or -3*y* Award B1 for 25*x* + - 3*y* If use 3 not -3 award M0 CAO Must be in an expression, B1 for either 2*p* or 5*p²* B1 for correct partial factorisation eg 3(*xy* – 3*y*) or *y*(3*x* – 9), or 3y(… - 3) or 3y(x - ….)…… Allow sight of $3x^2 = 12$ AND $(3x)^2 = 36$ as implied conclusion
12 (a) 9/30 and 0.3 10/40 and 0.25 (b) 0.25 or equivalent Reason eg 'most throws', 'last value', 'uses all the data'. 4	B1 B1 B1 E1	 FT from 'their 9/30' If B0 awarded for part (a) award SC1 for 9/30 AND 10/40 FT their final column entry in (a) Do not accept 'better estimate'.
13. 33(°) 3	B3	B2 for sight of '101 – 68', or '180 – 68 - 79' or '180 – 147' or '112 – 79', OR B1 for appropriate indication of 101° or 147° or 112°

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Methods Unit 1 Foundation Tier January 2015	Mark	Comment
14. (a) 20	B1	
(b) 154	B2	B1 for 2×7×11 or for finding multiples for both numbers i.e.(14,) 28, 42, … and (22,) 44, 66, .., or factors for both numbers (2×7 and 2×11) or sight of (14×22=) 308
(c) Method to find primes with 2 correct prime factors before the 2nd error	M1	At least 2 primes found before second error
2, 2, 3, 3, 5	A1	Ignore 1s
$2^2 \times 3^2 \times 5$	B1 6	Correct FT with no 1s and at least one power >1

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METHODS UNIT 1
HIGHER TIER

<table>
<tr><th>Methods Unit 1 Higher Tier
January 2015</th><th>Mark</th><th>Comment</th></tr>
<tr><td>1(a)
<table>
<tr><th></th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th></tr>
<tr><td>1</td><td>3</td><td>5</td><td>7</td><td>9</td><td>11</td><td>13</td></tr>
<tr><td>2</td><td>5</td><td>8</td><td>11</td><td>14</td><td>17</td><td>20</td></tr>
<tr><td>3</td><td>7</td><td>11</td><td>15</td><td>19</td><td>23</td><td>27</td></tr>
<tr><td>4</td><td>9</td><td>14</td><td>19</td><td>24</td><td>29</td><td>34</td></tr>
<tr><td>5</td><td>11</td><td>17</td><td>23</td><td>29</td><td>35</td><td>41</td></tr>
<tr><td>6</td><td>13</td><td>20</td><td>27</td><td>34</td><td>41</td><td>48</td></tr>
</table>
</td><td>B3</td><td>All 10 entries correct

B2 for any7 correct entries, B1 for any 4 correct entries
<u>FT for their completed table in (b) and ignore incorrect cancelling</u></td></tr>
<tr><td>(b)
4/36
9/36

27/36
2/36</td><td>
B1
B1

B1
B1
7</td><td>Penalise incorrect notation, e.g. ‘out of’, ‘in’, only once.
FT throughout consistent incorrect denominator

FT 1 – ‘their 9/36’, i.e. 1 – P(even)</td></tr>
<tr><td>2(a) Attempt at method 7÷8
= 0.875

(b) Numerator 0.48 OR correct first stage of simplification
Multiplying numerator and denominator by suitable multiple of 10 (if correct 100) – for eliminating decimals OR sight of answer 0.01
1/100

(c) 99

(d) Method to evaluate, allow 1 slip in tables
10.983
rounded to 11</td><td>M1
A1

B1

B1

B1

B2

M1
A1
A1

10</td><td>Or equivalent complete method

FT depending on their numerator.

CAO. B3 for an unsupported answer of 1/100

B1 for sight of 33, or x /3 + 7 = 40, or sight of 40-7 followed by ‘their 33’ ×3
or 2 trials substituted and correctly evaluated
Answer only ‘11’ is B0

Accept digits 1 0 9 8 3 with incorrect place value

FT their 10.983 provided M1 awarded
Do not allow 11.00 as a final answer.
Do not accept unsupported answer of 11</td></tr>
<tr><td>3. 33(°)</td><td>B3

3</td><td>B2 for sight of ‘101 – 68’, or ‘180 – 68 - 79’ or ‘180 – 147’ or ‘112 – 79’, OR
B1 for appropriate indication of 101° or 147° or 112°</td></tr>
</table>

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Methods Unit 1 Higher Tier January 2015	Mark	Comment
4. Intention to subtract the sum of the 4 angles given from 360°	M1	360 – (34 + 46 + 53 + 77) *Alternative using interior angles:* *900 – (146+134+127+103)*
(Sum of remaining 3 angles is) 150(°)	A1	*Sum of remaining 3 angles is) 390(°)*
40(°), 50(°), 60(°)	B2	If M1 awarded, B1 for 3 values all multiples of 10 with sum 'their 150' *Alternative using interior angles:* *B1 for values of 120(°), 130(°), 140(°)* *If no marks, award SC1 for answers of 220(°), 230(°) and 240(°) following on from use of the interior angle sum of 900° and treating the given angles as interior. FT to award QWC marks.*
QWC2: Candidates will be expected to • present work clearly, with words explaining process or steps **AND** • make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer QWC1: Candidates will be expected to • present work clearly, with words explaining process or steps **OR** • make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer	QWC 2 6	QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar OR evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar. QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar.
5(a) 20	B1	
(b) 154	B2	B1 for 2×7×11 or for finding multiples for both numbers i.e.(14,) 28, 42, … and (22,) 44, 66, .., or factors for both numbers (2×7 and 2×11) or sight of (14×22=) 308
(c) Two fractions correctly written in a form that allows for comparison	B1	Allow reasonably accurate diagrammatic form
For all three correctly written in forms that allow for comparison	B1	(e.g. 13/20, 15/20, 12/20 or 0.65, 0.75, 0.6 or 65/100, 75/100, 6/10)
3/4, 13/20, 3/5 and in this order or equivalent	B1	CAO. Answer only allow final B1 only
(d) Method to find primes with 2 correct prime factors before the 2nd error	M1	At least 2 primes found before second error
2, 2, 3, 3, 5	A1	Ignore 1s
$2^2 \times 3^2 \times 5$	B1 9	Correct FT with no 1s and at least one power >1
6(a) 47	B2	B1 for 5×9 + 8×¼ (i.e. substitution with $-3^2 = 9$) or for $5\times-3^2 + 2$ (i.e. substitution shown, may be an arithmetic error in evaluating the 1st term, 8×¼ = 2 shown) (B0 for $5\times-3^2 + 8\times¼$ or $(\pm)15^2 + 8\times¼$) *If no marks SC1 for an answer of -43*
(b) Conclusion (stated or implied) that $(3x)^2$ is greater with either sight of $3x^2 = 12$ AND $(3x)^2 = 36$ OR statement that $(3x)^2$ is 3 times the value of $3x^2$ OR Sight of $(3x)^2 = 9x^2$ is sufficient	B1 3	Allow sight of $3x^2 = 12$ AND $(3x)^2 = 36$ as implied conclusion

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Methods Unit 1 Higher Tier January 2015	Mark	Comment
7. $3 \times 35 \div 5$ OR $4 \times 35 \div 5$ OR equivalent 21(m) 28(m)	M1 A1 A1 3	 CAO CAO *Do not accept strategy 35/12 as a MR*
8. Intention to subtract 155 and 45 from 360° (Sum of remaining angles is) 160(°) Realising one of the remaining angles has to be 155° or 45° as a kite has 2 equal angles 155(°) AND 5(°) 45(°) AND 115(°)	M1 A1 B1 B1 B1 5	360 – 155 – 45 If considering exterior angles: 360 - (180 - 155) - (180 - 45) (Sum of remaining exterior angles is) 200(°) Realising that one of the remaining exterior angles is 35° or 135° *Allow B1 following M1 A0 for interior angles of (155, 45), and two angles equal to 'their 160'÷2* *An unsupported single correct set of all four angles e.g. (155, 45,) 155, 5(°) or (155, 45,) 45, 115(°) receives M1 A1 B1 with B1 B0 or B0 B1depending on the solution given.*
9(a) Indicates there are 4 ways of scoring 5 Indicates there are 40 possible outcomes, e.g. denominator 40 of a fraction 4/40 (= 1/10) (b) 200 × ⅛ or equivalent 25 (c) Explanation comparing answer from (b) with 80, e.g. 'six more often than expected' (d) Notices or implies that the (first) spinner must land on numbers other than 6 less often Implies best estimate would be less than (a)	B1 B1 B1 M1 A1 E1 M1 A1 8	1, 4 2, 3 3, 2 4, 1 Accept sight of …/8 × …/5 Do not accept …/8 + …/5 Ignore incorrect cancelling *Award B3 for an answer of 4/40* A final answer of 25/200 implies M1, A0 Accept explanation that states, e.g. '6 not used in scoring 5', or '6 is opposite the numbers needed to score 5' If no marks, SC1 if best estimate less than (a) with a reason based on an understanding of bias.
10(a) 6 (b) $n^2 + 5$ or equivalent	B1 B3 4	 Accept unsimplified equivalents B2 for sight of $n^2 \pm \ldots$ (not for n^2), or a partially correct expression (e.g. looking at strips) B1 for (9,) 14, 21, 30 with sight of second difference 2, or equivalent numerical pattern, or n^2
11(a) Correctly completing the tree diagram 0.2, 0.6. 0.6, 0.4 (b) 0.8 × 0.4 or 8/10 × 4/10 or equivalent = 0.32 or 32/100 or equivalent. (c) 0.2 × 0.4 or 2/10 ×4/10 or equivalent = 0.08 or 8/100 or equivalent	B2 M1 A1 M1 A1 6	B1 for any one pair of branches correct (total 1) An incorrect answer of 3.2 is awarded M1, A0 Or other complete method. FT for their P(stairs up) ×P(stairs down) correctly evaluated, or by alternative method An incorrect answer of 0.8 from a correct tree diagram is awarded M1, A0

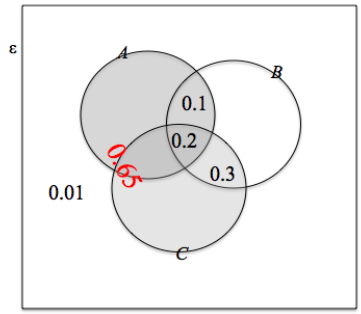
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Methods Unit 1 Higher Tier January 2015	Mark	Comment
12(a) 7×10^{-6}	B1	
(b) $7x - 3x = m + h$ or $4x = m + h$ $x = (m + h)/4$	B1 B1	FT until 2nd error Allow $x = (m+h)/(7-3)$
(c) $(x + 7)(x – 7)$	B1	ISW
(d)(i) $2x^2 + 6x + x + 3$ $2x^2 + 7x + 3$	B1 B1	Any 3 correct terms CAO
(ii) $2x^2 + 7x + 3 - 7 = 0$ or $2x^2 + 7x - 4 = 0$ $(2x – 1)(x + 4)$ (=0) $x = ½$ AND $x = -4$	M1 M1 A1 9	FT their $2x^2 + 7x + 3$ of equivalent difficulty OR correct use of formula with b^2-4ac correctly evaluated (including FT equivalent difficulty) CAO
13(a) $a \times 16.4 = 12 \times 4.1$ or equivalent $a = 3$ (cm)	M1 A1	
(b) $b = 69(°)$	B1	
(c) Angle opposite 146° in cyclic quadrilateral, $180(°) – 146(°)$ $(= 34(°))$ OR Reflex angle at the centre $2 \times 146(°)$ $(=292(°))$ $c = 68°$	M1 A1 5	Accept indicated on the diagram or implied by further working. The calculation $180(°) – 146(°)$ $(= 34(°))$ alone or with a misinterpretation as the angle at the centre is M0 Allow $(O =) 2 \times 146(°)$ provided not indicated as the acute angle on the diagram CAO. Accept a correct answer without working for M1, A1; do not accept an incorrectly placed 68°.
14. Numerator of $7(3x + 5) – 4(x– 3)$ Denominator of $(x– 3)(3x + 5)$ $\frac{17x+ 47}{(x– 3)(3x + 5)}$ or $\frac{17x+ 47}{3x^2 – 4x - 15}$	M1 M1 A2 4	FT 1 error from expansion of brackets or collection of like terms to allow A1, or A1 for a correct numerator with an incorrect expansion of the denominator or if the denominator un-simplified $(3x^2 – 9x + 5x – 15)$ If A2, penalise further incorrect work -1 *SC1 for sight of 17x + 47 if no other marks awarded*
15. Sight (gradient) -12/8 or 8/12 or equivalents	B1	
Selects $3y = 2x + 5$ AND $2x - 3y = 8$ **only**	B2	Provided 1st B1 is awarded, allow further B1 for either selected with no more than 1 incorrect selection. *Sight of gradient 12/8 with perpendicular gradient -8/12 award B0, B2 for y =(-2x+8)/3 AND 2x + 3y = 8, or B0 B1 for either selected with no more than one incorrect selection.*
Reason, e.g. ‘gradient given times gradient of these lines is -1’, or ‘(perpendicular) gradient is ⅔’, or ‘m×-1/m = -1’, or ‘product of gradients is -1’	E1 4	FT their gradient

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Methods Unit 1 Higher Tier January 2015	Mark	Comment
16(a) a = 5 $x^2 + 10x + 25 - 11$ or $(x+5)^2 - 25 + 14$ OR alternative full method to find b b = -11 (b) $(x + 5)^2 - 11 = 0$ $(x + 5)^2 = 11$ $x + 5 = (\pm)\sqrt{11}$ $x = -5 \pm \sqrt{11}$	B1 M1 A1 B1 M1 M1 A1 7	Accept an embedded answer FT their a Accept an embedded answer FT their (a) provided it is equivalent in difficulty If 'their 11' is negative then M0 CAO Must show ± or two answers Use of formula leading to $(-10 \pm 2\sqrt{11})/2$ gets B2, $(-10 \pm \sqrt{44})/2$ gets B0
17.  Note: Shaded $P(A \cup C) = 0.65$ Method to find B not intersecting with A nor C, e.g. 1 – 0.65 - 0.01 (= 0.34) P(B) = 0.34 + 0.1 + 0.2 + 0.3 P(B) = 0.94	 B1 B3 M1 M1 A1 7	Evidence for B marks may be seen in working Correct indication of 0.01 For Venn diagram shown, correct indication of • 0.1, 0.2 and 0.3, or • the 0.3 shown and $A \cap B$ is 0.3 used • the 0.1 shown and $B \cap C$ as 0.5 used <u>If not B3 then mark individually as follows</u>: B1 for correct indication of 0.2, B1 for correct indication of 0.3, B1 for correct indication of 0.1 *Allow "P(B)" = 0.34 (not from 2 – 1.66)* (FT 'their 0.34') CAO *Alternative* $P((A \cup C) \cap B') = 0.65 - 0.2 - 0.3 - 0.1 (= 0.05)$ M1 P(B) = 1 – 0.01 – 0.05 = 0.94 (FT 'their 0.05') M1 P(B) = 0.94 (CAO) A1

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Surname	Centre Number	Candidate Number
Other Names		0

GCSE LINKED PAIR PILOT

4363/01

METHODS IN MATHEMATICS

UNIT 1: Methods (Non-Calculator)
FOUNDATION TIER

A.M. MONDAY, 9 June 2014

1 hour 30 minutes

CALCULATORS ARE NOT TO BE USED FOR THIS PAPER

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

Take π as 3·14.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **5**.

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**8**	
2.	**4**	
3.	**4**	
4.	**8**	
5.	**6**	
6.	**6**	
7.	**5**	
8.	**4**	
9.	**9**	
10.	**4**	
11.	**4**	
12.	**4**	
13.	**3**	
14.	**4**	
15.	**3**	
16.	**4**	
Total	**80**	

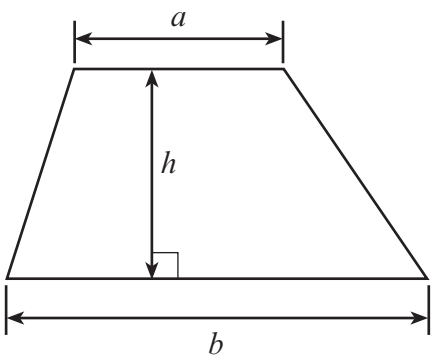
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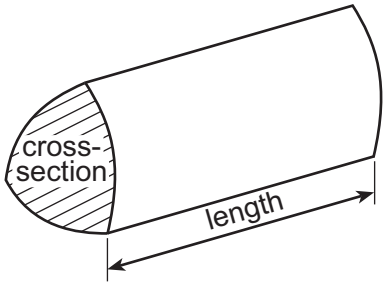
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Formula List

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



Volume of prism = area of cross-section × length



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1. *(a)* (i) Write down, in figures, the number nineteen thousand and four. [1]

.....

(ii) Write down, in words, the number 550 000. [1]

.....

(b) (i) Write down the sum of 129 and 251. [1]

.....

.....

.....

(ii) Write down the difference between 83 and 67. [1]

.....

.....

.....

(iii) Write down the answer when 9 is multiplied by 6. [1]

.....

(iv) Write down the answer when 65 is divided by 5. [1]

.....

.....

(c) (i) Write 2187 to the nearest 10. [1]

.....

(ii) Write 54 478 to the nearest 1000. [1]

.....

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2. Match each event to its chance of happening.
One is done for you. [4]

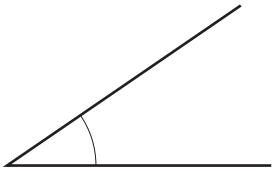
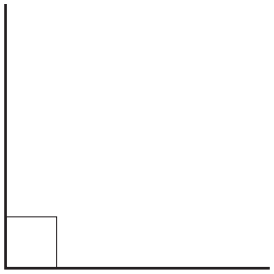
Obtaining a red counter when selecting one counter at random from a bag containing 5 red and 5 yellow counters	**CERTAIN**
Obtaining a number less than 7 when rolling a fair dice numbered 1 to 6	**LIKELY**
Obtaining a number greater than 1 when rolling a fair dice numbered 1 to 6	**EVEN CHANCE**
Obtaining a blue counter when selecting one counter at random from a bag containing 5 red and 5 yellow counters	**UNLIKELY**
Obtaining the number 4 when rolling a fair dice numbered 1 to 6	**IMPOSSIBLE**

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3. Complete the following table.
The first row has been done for you. [4]

Angle	Name of angle	Reason
	**Acute**	**The angle is between 0° and 90°**
		
		

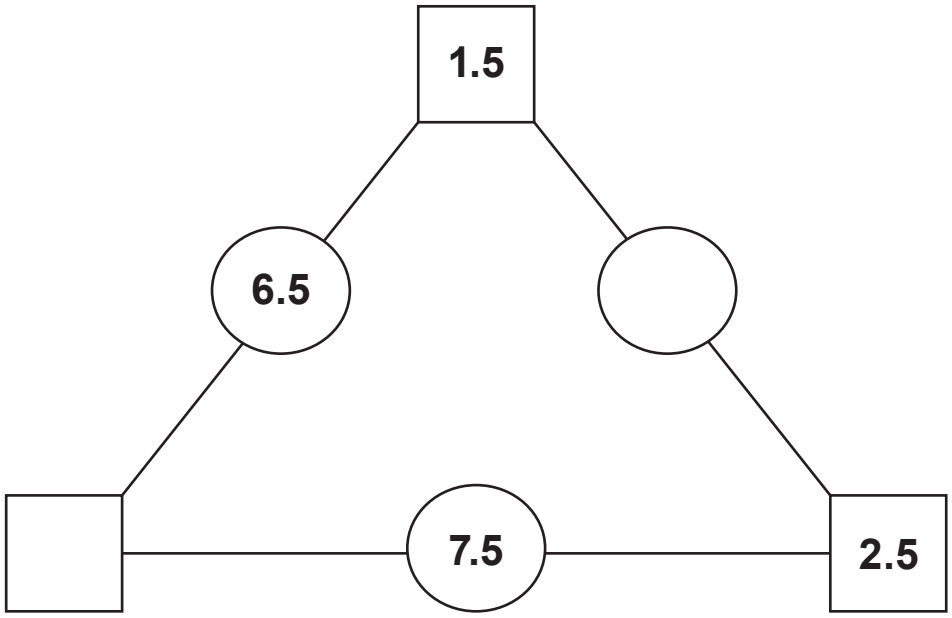
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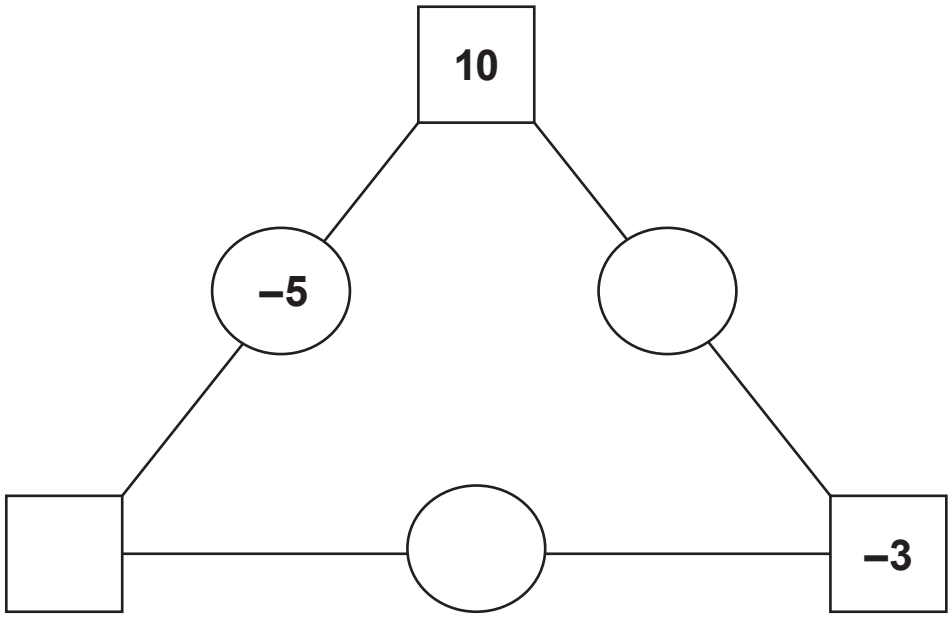
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4. *(a)* The number in each circle is equal to the sum of the two numbers in the squares on either side of the circle.
Fill in the missing numbers in each of the following diagrams.



[2]



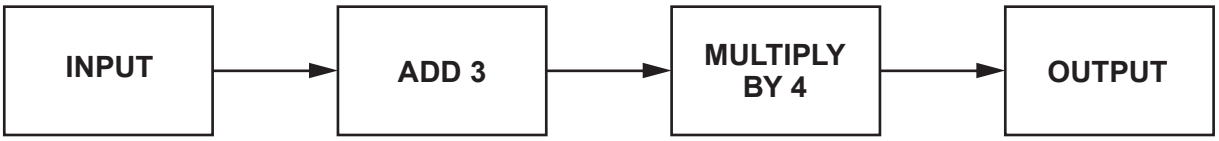
[3]

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(b) The diagram below shows a number machine.



Using the number machine, calculate

(i) the **OUTPUT** when the **INPUT** is 9, [1]

.....

(ii) the **OUTPUT** when the **INPUT** is –1, [1]

.....

(iii) the **INPUT** when the **OUTPUT** is 28. [1]

.....

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5. *You will be assessed on the quality of your written communication in this question.*

Both *Len's Store* and *Deb's Store* sell the same moisturising lotion, in the same sized bottles.





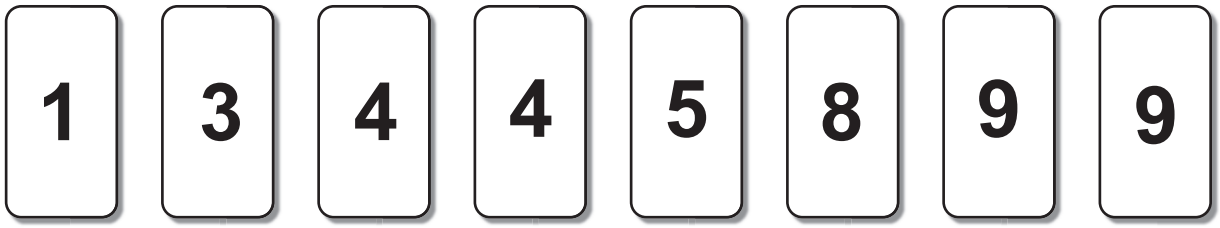
Siwan needs to buy 12 bottles of moisturising lotion.
Which of the two stores has the better offer for Siwan?
You must show all your working. [6]

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6.



One card is chosen at random from the cards shown above.

Write down the probability of selecting each of the following

(a) the number 5, [1]

.....

(b) a number less than 4, [1]

.....

(c) a multiple of 2, [1]

.....

(d) a square number, [1]

.....

(e) a prime number, [1]

.....

(f) the square root of 16. [1]

.....

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7. *(a)* **Showing all your working**, write $\frac{1}{2}$, $\frac{5}{8}$, and $\frac{3}{4}$ in order, starting with the largest. [3]

(b) Write down 50p as a fraction of £4 in its simplest form. [2]

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8.

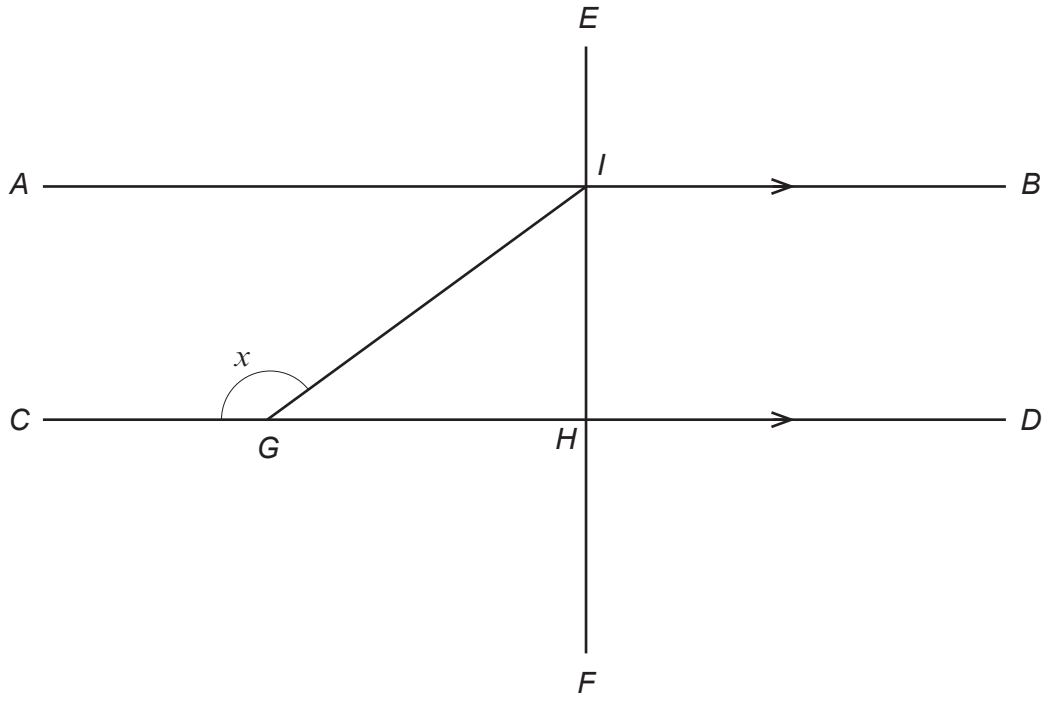


Diagram not drawn to scale

The line *AB* is parallel to the line *CD*.
The line *CD* is perpendicular to the line *EF*.
Triangle *GHI* is an isosceles triangle.
Find the size of angle x. [4]

.....

.....

.....

.....

.....

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9. *(a)* Simplify $x + 2x + 5x$. [1]

.....

(b) Simplify $10a + 7b - 12a + 2b$. [2]

.....

(c) Find the value of $10x + 3y$, when $x = -4$ and $y = 5$. [2]

.....

.....

(d) Expand $2x(3y + 7)$. [2]

.....

(e) Factorise $10ab - 25a$. [2]

.....

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10. *(a)* A bag contains only red, yellow, green and blue coloured sweets.
The table below shows the probability of choosing each colour of sweet, when one sweet is chosen at random from the bag.

Colour	**Red**	**Yellow**	**Green**	**Blue**
Probability	0·2	0·15	0·25	

(i) What is the probability of choosing a blue sweet? [2]

.....

.....

(ii) Which **two** colours are the least likely to be chosen? [1]

.....

(b) For a different bag of sweets, the probability of choosing a purple sweet is 0·7.
What is the probability of **not** choosing a purple sweet? [1]

.....

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11.

$6c + 3$ $\quad$ $3c + 6$ $\quad$ $3c$

$c + 3$ $\quad$ $6(c + 3)$

$\frac{c + 3}{6}$ $\quad$ $3(c + 6)$ $\quad$ $\frac{c}{6} + 3$

Fill in the table below to match each statement with one of the expressions given above. [4]

STATEMENT	EXPRESSION
Three times a number c	
Add 3 to a number c and then multiply this total by 6	
Three times a number c and then add 6	
Add 3 to a number c and then divide this total by 6	

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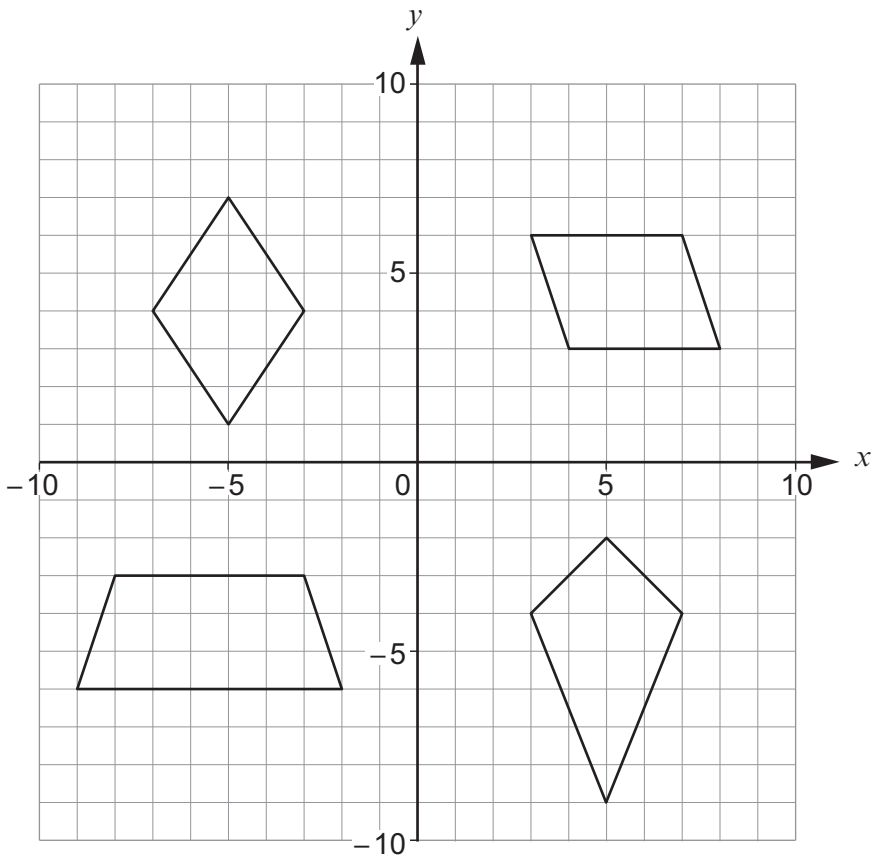
12. *(a)* Write down the name of a quadrilateral with diagonals that are equal in length. [1]

.....

(b) Write down the name of a quadrilateral with rotational symmetry of order 2. [1]

.....

(c) The diagram below shows four quadrilaterals drawn on a grid.



(i) Write down the coordinates of the centre of rotational symmetry of the rhombus. [1]

(..... , ...)

(ii) Write down the coordinates of the intersection of the diagonals of the kite. [1]

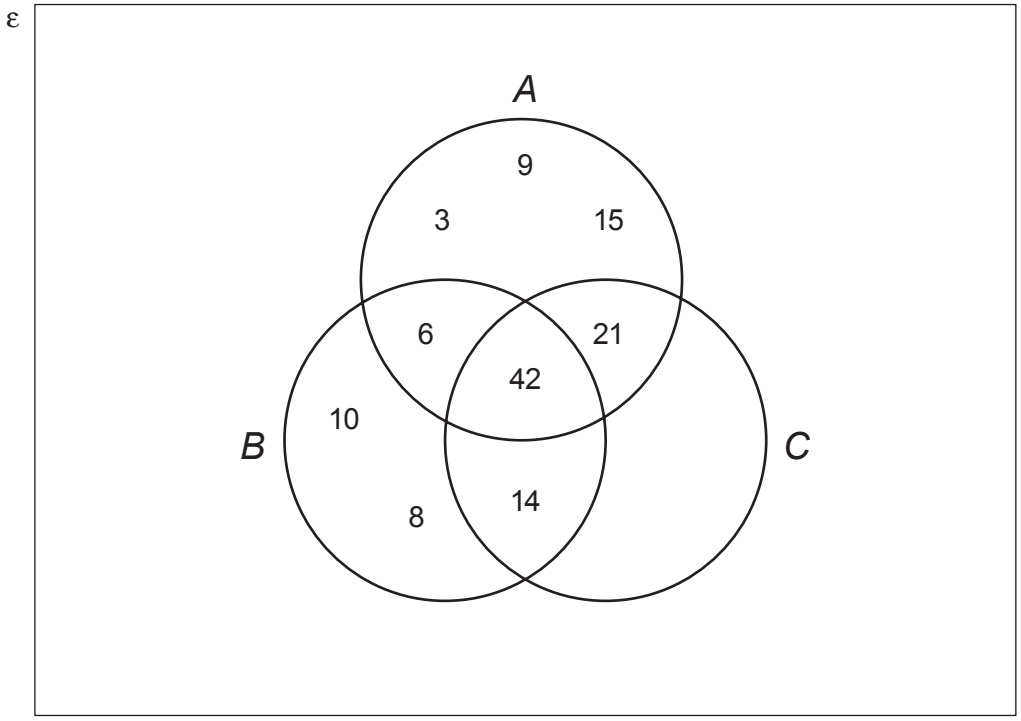
(..... , ...)

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13. The Venn Diagram below shows all the values of a given universal set, which have been placed within the subsets *A*, *B* and *C*.



(a) The descriptions for Set *A* and Set *B* are given below.
Complete the description for Set *C*. [1]

Set *A*: **multiples of 3**

Set *B*: **multiples of 2**

Set *C*: **multiples of** .....

(b) The numbers 28 and 35 are to be included in the universal set.
Write 28 and 35 in the correct positions in the Venn diagram above. [2]

.....

.....

.....

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14. There are two regular polygons, *X* and *Y*.
The size of each **exterior** angle in regular polygon *X*, is 9°.
Each **interior** angle of regular polygon *Y* is 120°.

Complete the sentences below. [4]

Regular polygon *X* has ..... sides.

Regular polygon *Y* has ..... sides.

15.

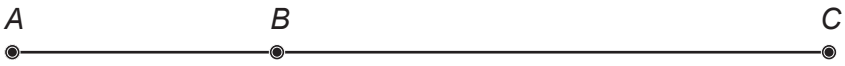
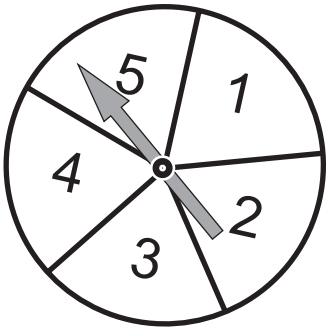


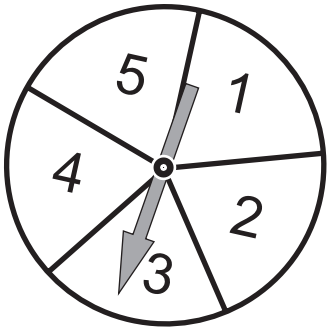
Diagram not drawn to scale

ABC is a straight line, *AB:BC* is 3:8 and the length of *BC* = 36 cm.
Calculate the length of *AC*. [3]

Examiner only

16.





The two spinners are spun.
The score is the total of the two numbers shown on the spinners.
The score shown above is eight.

There are two different game cards, card A and card B.
A game is played, crossing out the scores from the spinners on the game card as the spinners are spun repeatedly.
The first game card with all four scores crossed out is the winning card.

Game card A

3	2
9	10

Game card B

4	6
5	7

Which game card is more likely to be the winning card?
You must show your working and give a reason for your answer. [4]

.....

.....

.....

.....

.....

.....

.....

.....

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END OF PAPER

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GCSE MARKING SCHEME

METHODS IN MATHEMATICS (LINKED PAIR PILOT)

SUMMER 2014

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INTRODUCTION

The marking schemes which follow were those used by WJEC for the Summer 2014 examination in GCSE METHODS IN MATHEMATICS (LINKED PAIR PILOT). They were finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conferences were held shortly after the papers were taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conferences was to ensure that the marking schemes were interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conferences, teachers may have different views on certain matters of detail or interpretation.

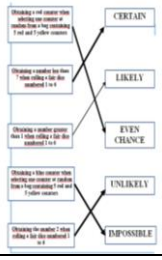
WJEC regrets that it cannot enter into any discussion or correspondence about these marking schemes.

	Page
Unit 1 - Foundation Tier	1
Unit 1 - Higher Tier	5
Unit 2 - Foundation Tier	9
Unit 2 - Higher Tier	13

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UNIT 1 (FOUNDATION TIER)

Methods in Mathematics June 2014 Unit 1 Foundation Tier	Mark	Comments
1. (a) (i) 19004 (ii) five hundred and fifty thousand (b) (i) 380 (ii) 16 (iii) 54 (iv) 13 (c) (i) 2190 (ii) 54000	B1 B1 B1 B1 B1 B1 B1 B1 8	
2. 	B4 4	B1 for each correct answer
3. Right angle 90(º) Obtuse angle Greater than 90(º) AND less than 180(º)	B1 E1 B1 E1 4	 Accept 90(º) - 180(º), between 90(º) and180(º)
4. 1st Diagram Circle : 4 Square : 5 2nd Diagram Right Hand Circle : 7 Square : -15 Bottom Circle : -18 (b)(i) 48 (ii) 8 (iii) 4	B1 B1 B1 B1 B1 B1 B1 B1 8	 FT from a negative answer in the square Accept embedded answer

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Methods in Mathematics June 2014 Unit 1 Foundation Tier	Mark	Comments
5. Any correct strategy for finding the need for paying for 9 bottles from Len's store AND 8 bottles from Deb's store	S1	
9 × 90(p) or 8 × (£)1.00	M1	Or equivalent
810(p) or (£)8.10 or (£)8	A1	Or equivalent
810(p) or (£)8.10 AND (£)8 AND Deb's store	A1	Or equivalent
		Accept 8.1 for £8.10 If units are given they must be correct
Look for: Clear process steps and labelling of calculations. Correct use of pounds and pence.		
QWC2: Candidates will be expected to • present relevant work clearly, with words explaining process or steps AND • make few if any mistakes in spelling, punctuation and grammar	QWC 2	QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar.
QWC1: Candidates will be expected to • present work clearly which is mostly relevant, with words explaining process or steps OR • make few if any mistakes in spelling, punctuation and grammar and include units in their final answer		QWC1 Presents material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar OR evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar. QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar.
	6	
6. a) 1/8 b) 2/8 c) 3/8 d) 5/8 e) 2/8 f) 2/8	B1 B1 B1 B1 B1 B1	penalise once only for consistent use of incorrect denominator, provided in a fraction <1 penalise once only for incorrect notation throughout Ignore incorrect cancelling throughout
	6	*SC2 for all correct cards for parts c)-f)* *SC1 for correct cards in 2 or 3 parts from c)-f)*
7. a) For 2 correct in a form which allows comparison	B1	
For all 3 correct in a form which allows comparison	B1	
¾, 5/8, ½	B1	Or equivalent Answer only gets B0, B0, B1
b) 50/400	M1	Or equivalent eg 0.5/4
1/8	A1	
	5	
8. Appropriate sight of 90(˚)	B1	
Appropriate sight 45(˚) or 90/2	B1	2nd B1 implies 1st B1
180(˚)-45(˚)	M1	FT 180- 'their 45' provided at least one B1 awarded
135(˚)	A1	CAO
	4	An unsupported answer gets full marks

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Methods in Mathematics June 2014 Unit 1 Foundation Tier	Mark	Comments
9. (a) $8x$ (b) $-2a + 9b$ (c) -25 (d) $6xy + 14x$ (e) 5a (2b - 5)	B1 B2 B2 B2 B2 9	 Must be in an expression, B1 for sight of either $-2a$ or $9b$. Mark final answer. B1 for either -40 or 15 Must be in an expression, B1 for sight of either $6xy$ or $14x$ B1 for $5a(\ldots - 5)$ or $5a(2b - \ldots.)$ or correct partial factorisation
10 (a)(i) 1- (0.2 + 0.15 + 0.25) 0.4 (ii) Red and Yellow (b) 0.3	M1 A1 B1 B1 4	Allow intention of brackets. *(1 – 0.42=)0.58 gets SC1* *If answer of 0.4 in table and contradicted in answer space then SC1* FT from their (a)(i) provided it is ≤ 0.2 and ≠0
11 Three times a number c — $3c$ Add 3 to a number c and then multiply this total by 6 — $6(c + 3)$ Three times a number c and then add 6 — $3c + 6$ Add 3 to a number c and then divide this total by 6 — $\frac{c + 3}{6}$	B4 4	B1 for each correct entry
12. (a) Square or rectangle or isosceles trapezium (b) Parallelogram or rhombus or rectangle (c)(i) (-5 , 4) (ii) (5 , -4)	B1 B1 B1 B1 4	
13a) Multiples of 7 b) 28 and 35 placed correctly	B1 B2 3	B1 for either
14. 360 ÷ 9 … X … has **40** sides 360 ÷ (180 – 120) OR equivalent full method … Y … has **6** sides	M1 A1 M1 A1 4	An unsupported answer is awarded M1, A1 e.g. looking at matching a multiple of 180 with a multiple of 120: 180 360 540 720 900 120 240 360 480 600 720 An unsupported answer is awarded M1, A1
15. Interpretation that 36cm is 8 parts $3 \times 36 \div 8 + 36$ OR $(3 + 8) \times 36 \div 8$ 49.5(cm) or 49 ½ (cm)	S1 M1 A1 3	Or sight of 36÷8 or 36/8 or 4.5 Full method to calculate AC. FT their miscalculated 36÷8, *not for 36÷11* CAO. Do not accept 50(cm), unless 49.5 seen

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<table>
<tr><th>Methods in Mathematics
June 2014 Unit 1 Foundation Tier</th><th>Mark</th><th>Comments</th></tr>
<tr>
<td>16. Considering all possible outcomes, e.g. use of two-way table, or showing all possible totals, or (Game card A) 6 possible (ways or outcomes) AND (Game card B) 16 possible (ways or outcomes)

Example:
<table>
<tr><th>+</th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th></tr>
<tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr>
<tr><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr>
<tr><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr>
<tr><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td></tr>
<tr><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr>
</table>
Conclusion, game card B has the better chance</td>
<td>B3

E1
4</td>
<td>Accept 6/25 and 16/25. No extra outcomes should be included, e.g. including numbers not on the spinners
If card A list complete, accept stopping listing card B possibilities as soon as >6 possible ways indicated correctly.

B2 for at least 1 possible outcome indicated for each of the 4 numbers on card A AND at least 2 possible outcomes indicated for each of the 4 numbers on card B, OR for all possible outcomes for card B

B1 for 1 way of scoring a number on card A AND 2 ways for a number on card B, OR all outcomes for card A

The conclusion must be based on working, i.e. provided at least B2 previously awarded</td>
</tr>
</table>

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UNIT 1 (HIGHER TIER)

<table>
<tr><th>Methods Unit 1 Higher Tier June 2014</th><th>Mark</th><th>Comment</th></tr>
<tr><td>1. a = 52°
b = 128°
c = 128°
d = 40°

e = 88°</td><td>B1
B1
B1
B1

B1
5</td><td>

FT their b = c
FT 92 – their a, or their b – 88,
or their c – 88, or 128 – their e
</td></tr>
<tr><td>2. Considering all possible outcomes, e.g. use of two-way table, or showing all possible totals, or
(Game card A) 6 possible (ways or outcomes) AND
(Game card B) 16 possible (ways or outcomes)

Example:
<table><tr><th>+</th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th></tr><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr><tr><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr><tr><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td></tr><tr><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td></tr><tr><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr></table>
Conclusion, game card B has the better chance

Look for:
• clear organisation, ordered lists or tables
• labels linking working and game cards
• clear explanation in a conclusion
• if used, correct notation for probability

QWC2: Candidates will be expected to
• present work clearly, with words explaining process or steps
AND
• make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer

QWC1: Candidates will be expected to
• present work clearly, with words explaining process or steps
OR
• make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer</td><td>B3

E1

QWC
2

6</td><td>Accept 6/25 and 16/25. No extra outcomes should be included, e.g. including numbers not on the spinners
If card A list complete, accept stopping listing card B possibilities as soon as >6 possible ways indicated correctly.

B2 for at least 1 possible outcome indicated for each of the 4 numbers on card A AND at least 2 possible outcomes indicated for each of the 4 numbers on card B, OR for all possible outcomes for card B

B1 for 1 way of scoring a number on card A AND 2 ways for a number on card B, OR all outcomes for card A

The conclusion must be based on working, i.e. provided at least B2 previously awarded

QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar.

QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar
OR
evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar.

QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar.</td></tr>
<tr><td>3.(a) 18 or equivalent
(b) 12 or equivalent
(c) 9
(d) Numerator 0.06(0) or 1 correct step in calculation
Multiplying numerator and denominator by suitable multiple of 10 – for eliminating decimals, or correct (FT) evaluation as a decimal

1/1000</td><td>B1
B1
B2
B1
B1

B1

7</td><td>Accept a product of factors
Accept a product of factors
B1 for sight of 3, or ¼ + 2¾, or 0.25 + 2.75

FT depending on their numerator.

These 1st 2 B marks are interchangeable
A final answer of 0.001 is awarded B1, B1, B0
CAO
(Example: 0.60/60 = 0.01 or 1/100 or 6/600 is awarded B0, B1, B0
60/600 as a 1st stage is awarded B0, B0, B0</td></tr>
</table>

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4. (a) Square or rectangle or isosceles trapezium (b) Parallelogram or rhombus or rectangle (c)(i) (-5 , 4) (ii) (5 , -4)	B1 B1 B1 B1 4	
5.(a) h + 4 = 5e or -5e = -4 - h e= $\frac{h+4}{5}$ or e = $\frac{-4-h}{-5}$ (b) (i) 9 (ii) 6 (iii) 3	B1 B1 B1 B1 B1 5	FT until 2nd error *(e.g. 4h=5e leading to 4h/5 = e is awarded B0, B1)*
6.(a) False with valid general reason, OR a correct general statement without selection of false	E2 <

10.(a)(i) $4n + 3$ (ii) $-2n + 74$ (iii) $n^2 - 8$ (b) $3\times20^2 + 4$ $= 1204$	B2 B2 B2 M1 A1 8	B1 for $4n$ B1 for $-2n$. Allow SC1 for $2n + 74$ B1 for n^2, not an^2 where $a\neq1$, OR B1 for sight of second differences 2 Must clearly be 20^2 not $(3\times20)^2$ CAO
11.(a) 2×10^{10} (b) 7.3×10^9	B2 B2 4	B1 for 20×10^9 or 0.2×10^{11} or similar attempt at standard form B0 for 20 000 000 000 B1 for $10^8(5 + 6.8\times10)$ or 73×10^8 or 0.73×10^{10} or similar attempt at standard form B0 for 7 300 000 000 *If no marks in (a) & (b) then SC1 for both answers correct but not in standard form*
12.(a) (i) $6x(2x + 3y)$ (ii) $(x + 10)(x - 10)$ (b) $(x + 2)(x - 7)$ $(=0)$ $x= -2$ and $x =7$	B2 B1 B2 B1 6	B1 for a correct partially factorised expression, OR for sight of $6x(2x ...)$ or $6x(... + 3y)$ B1 for $(x \dots 2)(x \dots 7)$ Must be from factorised expression or equation FT from their pair of brackets
13.(a) Explains parallel with intersection *y*-axis at 3, e.g. 'same gradient with intersection at (y=)3' (b) Reflection (in *x*-axis) or perpendicular (through the origin) or change the sign of the y-coordinate	E1 E1 2	Must imply parallel and mention (vertical) translation Allow 'put the line up another 3 squares' Do not accept 'm=1, c=3' unless related to y = x, Accept use of knowledge 'm × -1/m = -1', or '$m_1\times m_2 = -1$' Do not accept 'diagonally downwards', 'opposite (direction)', or 'reversed (direction)', or 'swap the coordinates' Allow 'same but decreasing instead of increasing (as it is minus)', 'rotate 90° (about the origin)', 'change the sign of one of the coordinates'
14.(a) 0.35 0.8 0.2 0.8 on the correct branches (b) 0.65×0.2 $= 0.13$	B2 M1 A1 4	B1 for any two correct entries. Accept fractions
15.(a) Correct region shaded (b) Correct region shaded (c) Correct region shaded	B1 B1 B1 3	Union of A and B All shaded except the intersection of A with B All except the non overlap region of A
16. (a) 37(°) Alternate segment theorem **and** isosceles triangle (b) 55(°) (Isosceles triangle,) angle at centre twice angle at circumference	 B1 E1 B1 E1 4	The E1 mark depends on the B1 or sight of a correct method. For E marks: Do not accept calculation Or equivalent. Or equivalent.
17. $30 \times 70 = 35 \times AC$ OR $30 \times (30 + 40) = 35 \times AC$ $AC = 60$ (cm) $AB = 60 - 35$ $= 25$ (cm)	M1 A1 m1 A1 4	May be within a calculation towards AB directly May be implied in further working FT for their AC provided M1 awarded

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18.(a)(i) Sketch of $y=x^2$ symmetrical passing through the origin	B1	Mark intention to be symmetrical passing through the origin
(ii) Sketch of $y=1/x$ in appropriate 2 quadrants with axes as asymptotes	B2	B1 for sketch in 1 quadrant with axes as asymptotes, or for 2 curves appropriately in both quadrants but not clearly with intention of axes as asymptotes
(b) Sketch of $y = 2^x$ through (0,1), with 1 indicated on the y-axis or coordinate (0, 1) given	B2 5	B1 for general shape, towards zero gradient for greater negative values of x, and rising for greater positive values of x, clearly through a point on positive y-axis
19.Substitution of (2, 26), e.g. sight of $26 = k \times 2^2 + 3 \times 2$ $k = 5$	M1 A1	
Equating $y = 0$, e.g. sight of $0 = kx^2 + 3x$	M1	FT their k with $k \neq 0$, including 'k'
$x(5x + 3) = 0$	m1	Extracting common factor, accept $x(kx + 3) = 0$
(0, 0) or $x = 0$	A1	Must be from correct working
(-3/5, 0) or $x = -3/5$ or equivalents	A1 6	Accept $x = -3/k$. Not dependent on m1
20.(a) $(x + 7)^2 + 4$	B2	B1 for a= (+)7, B1 for b = 4, only award B2 for $(x +7)^2 + 4$
(b) Attempt to use common denominator	B1	e.g. allow sight of all 3 fractions denominator 20 without change to numerators
$\frac{4(3x+2) - 5(5x-2) + 14}{(20)}$ or equivalent	M2	M1 for 2 of the three terms correct. May be expressed as separate fractions, or working without consideration of the denominator
$\frac{12x + 8 - 25x + 10 + 14}{20}$ or equivalent	A1	Convincing step. FT from 1 error, i.e. M1. Must be clearly implying +10 term rather than -10 from notation Denominator must be seen
$= \frac{32 - 13x}{20}$	A1 7	Must follow from correct working
21.Sight of P(A') = 0.6	B1	
$0.6 \times x = 0.48$ OR $x = 0.48/0.6$	M1	FT their 1 - 0.4 incorrectly evaluated for M1 only, do not FT 0.4 for P(A')
$x = 0.8$	A1 3	CAO

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Surname	Centre Number	Candidate Number
Other Names		0

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4363/01

METHODS OF MATHEMATICS

UNIT 1: Methods (Non-Calculator)
FOUNDATION TIER

A.M. FRIDAY, 10 January 2014

1 hour 30 minutes

CALCULATORS ARE NOT TO BE USED FOR THIS PAPER

ADDITIONAL MATERIALS

A ruler, a protractor and a pair of compasses may be required.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

Take π as 3·14.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **4**.

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**8**	
2.	**4**	
3.	**3**	
4.	**6**	
5.	**5**	
6.	**6**	
7.	**3**	
8.	**8**	
9.	**4**	
10.	**3**	
11.	**5**	
12.	**4**	
13.	**4**	
14.	**6**	
15.	**3**	
16.	**3**	
17.	**5**	
Total	**80**	

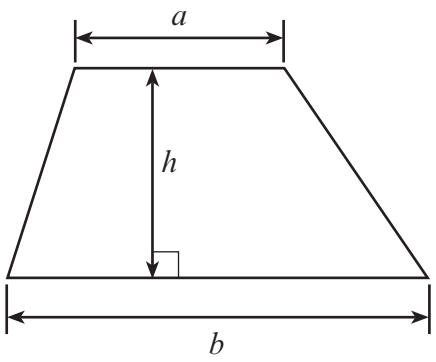
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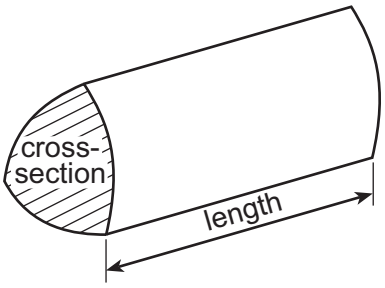
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Formula List

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



Volume of prism = area of cross-section × length



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1. *(a)* (i) Write down, in figures, the number five thousand and twenty five. [1]

.....

(ii) Write down, in words, the number 10 000 000. [1]

.....

(b) (i) Write down the sum of 35 and 86. [1]

.....

.....

.....

(ii) Write down the difference between 54 and 45. [1]

.....

.....

.....

(iii) Write down the answer when 6 is multiplied by 8. [1]

.....

(iv) Write down the answer when 32 is divided by 4. [1]

.....

.....

(c) (i) Write 1446 to the nearest 10. [1]

.....

(ii) Write 1446 to the nearest 100. [1]

.....

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Turn over.

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2. Fill in the blanks to match each event to its chance of happening.
The first one is done for you. [4]

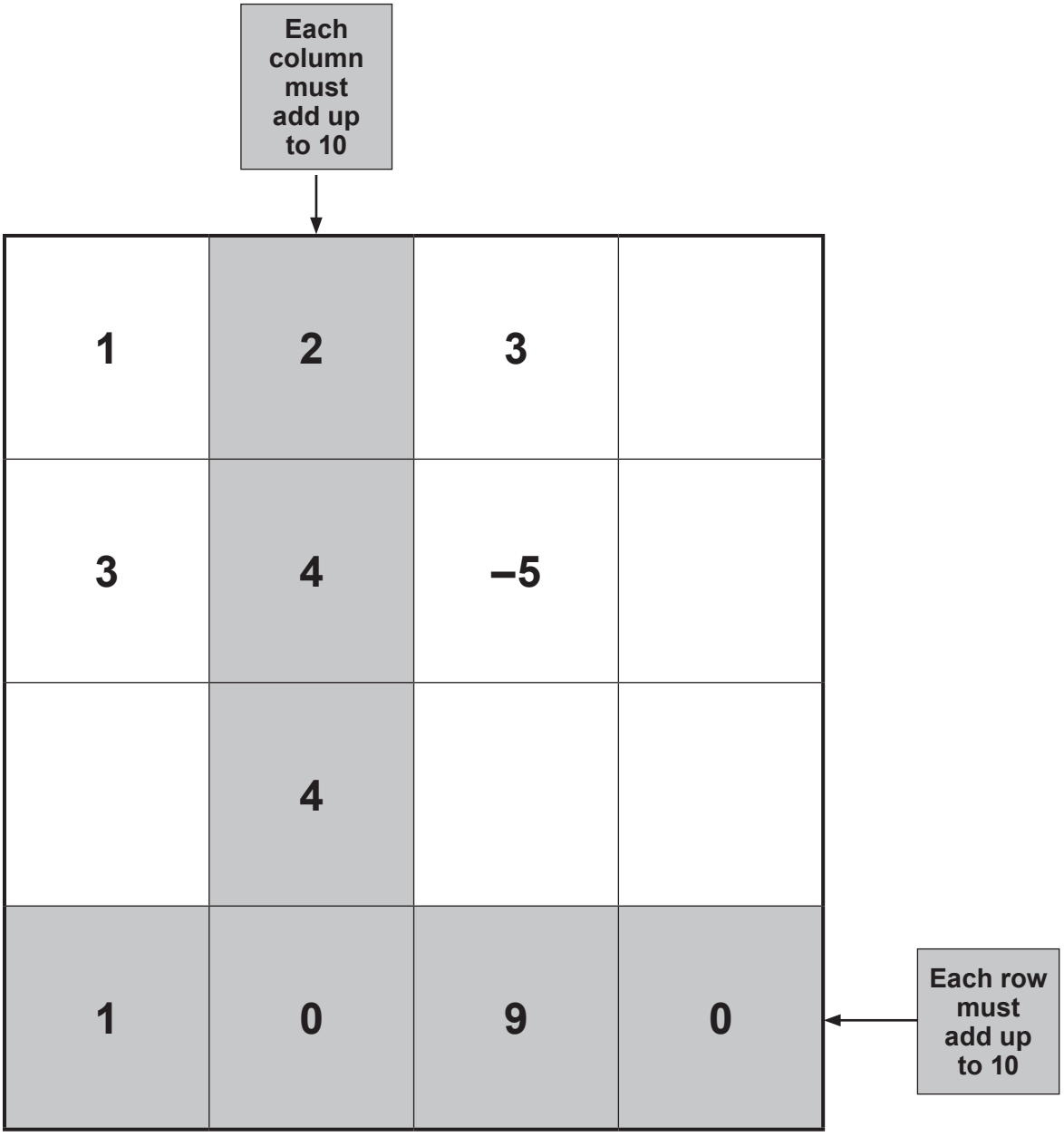
Obtaining the number **2** when a fair dice numbered 1 to 6 is rolled once.	**Unlikely**
Obtaining the number ..... when a fair dice numbered 1 to 6 is rolled once.	**Impossible**
Obtaining ..... when a fair dice numbered 1 to 6 is rolled once.	**Even Chance**
Obtaining ..... when a fair coin is thrown once.	**Even Chance**
Choosing a ..... coloured ball out of a bag containing only yellow balls.	**Certain**

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3. Using the two instructions given, fill in the blanks in the grid below. [3]



.....

.....

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4. *You will be assessed on the quality of your written communication in this question.*

Dylan's weekly wage is £400.
He saves $\frac{1}{10}$ of his wage each week in order to buy a bike.
After how many weeks will he be able to afford to buy a bike which costs £250?
You must show all your working. [6]

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5. *(a)* Use the following clues to find the missing number. [3]

- The number is between 1 and 20
- It is not an even number
- It is multiple of 3
- It is a square number

.....

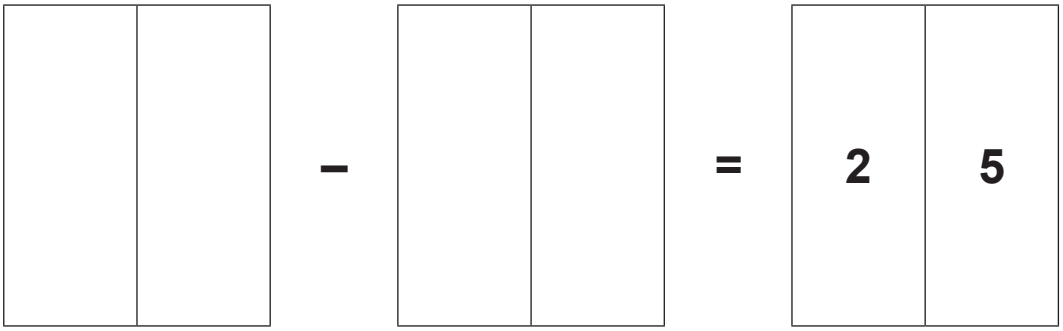
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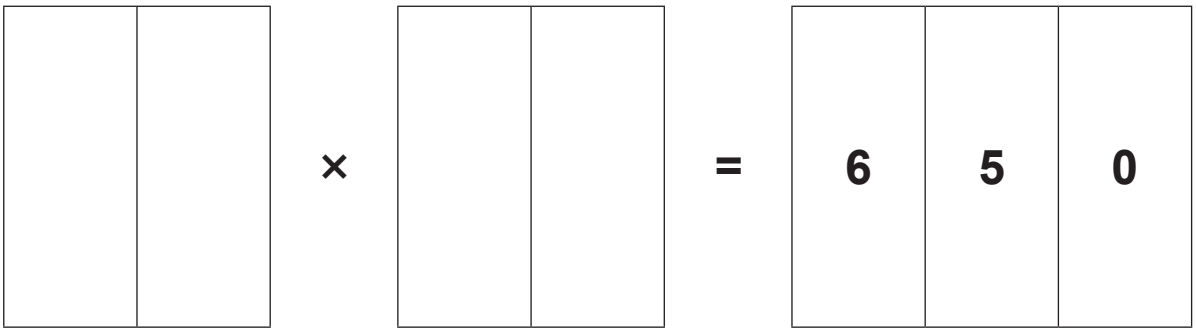
.....

Missing number is .....

(b) (i) Using all the numbers 0, 1, 3 and 5, fill in the blanks. [1]



(ii) Using all the numbers 0, 1, 3 and 5, fill in the blanks. [1]



For working:

.....

.....

.....

.....

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6.

25	**6**	**8**	**20**
7	**10**	**1000**	**24**

Choose a number from the table to match each statement.
You must give a reason for each answer. [6]

A factor of 12: .....

Reason: .....

.....

A prime number: .....

Reason: .....

.....

The square root of 100: .....

Reason: .....

.....

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7.

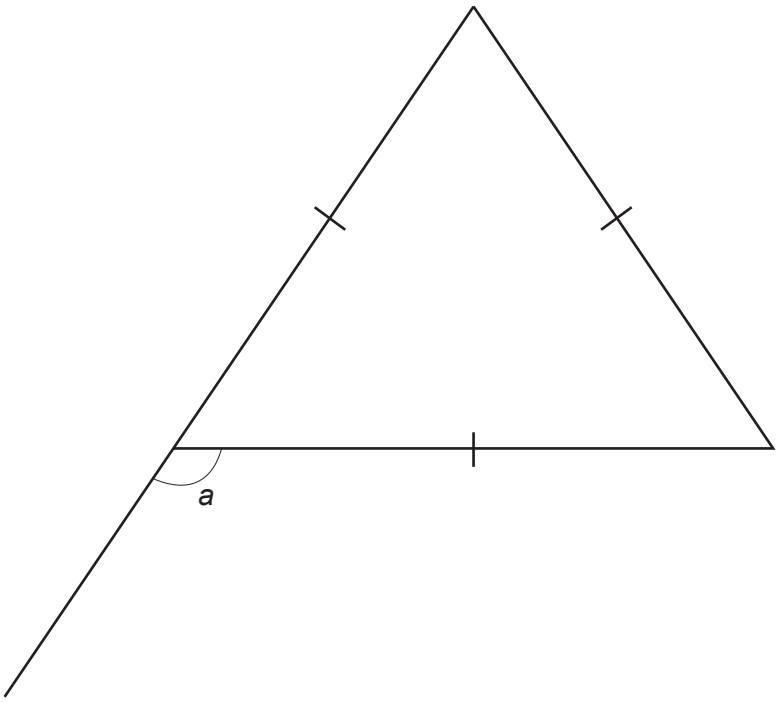


Diagram not drawn to scale

Find the size of angle *a*. [3]

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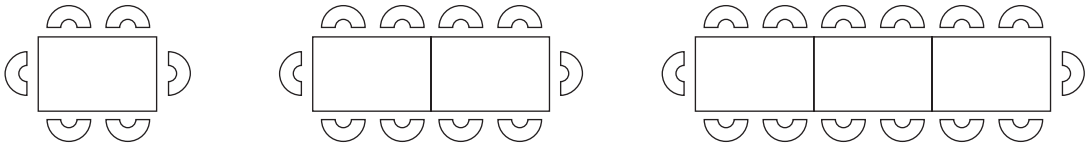
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Turn over.

Examiner only

8. Seating arrangements around 1, 2 and 3 tables are shown below.
Tables must be placed only side by side in one row.



(a) In the space below, draw a seating arrangement for a row of 4 tables. [1]

(b) Complete the following table for the seating arrangements. [2]

Number of tables	**1**	**2**	**3**	**4**	**5**
Number of seats	6	10			

(c) Complete the following formula which connects the number of seats and the number of tables. [2]

Number of seats = ...

(d) How many seats are there around a row of 7 tables? [1]

.....

.....

(e) How many tables are needed for 82 seats? [2]

.....

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9. *(a)* Simplify $7x + 5y - 3x - 2y$. [2]

.....

(b) Given that $e = 4f - 5$, find the value of e when $f = 3$. [2]

.....

.....

.....

10. **Showing all your working**, write $\frac{1}{2}$, $\frac{3}{8}$ and $\frac{3}{4}$ in ascending order. [3]

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Turn over.

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11. *(a)* Find the size of angles x and y. [2]

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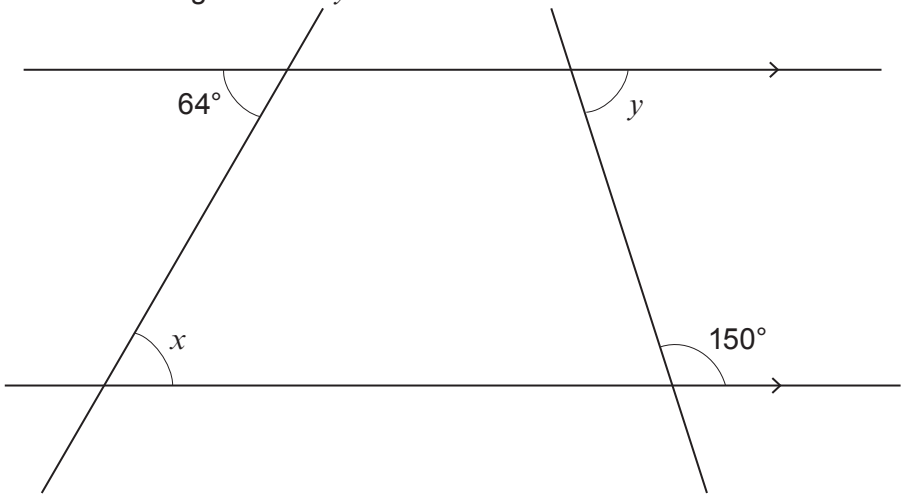


Diagram not drawn to scale

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x = ... ° y = ... °

(b) Find the size of angles a and b. [3]

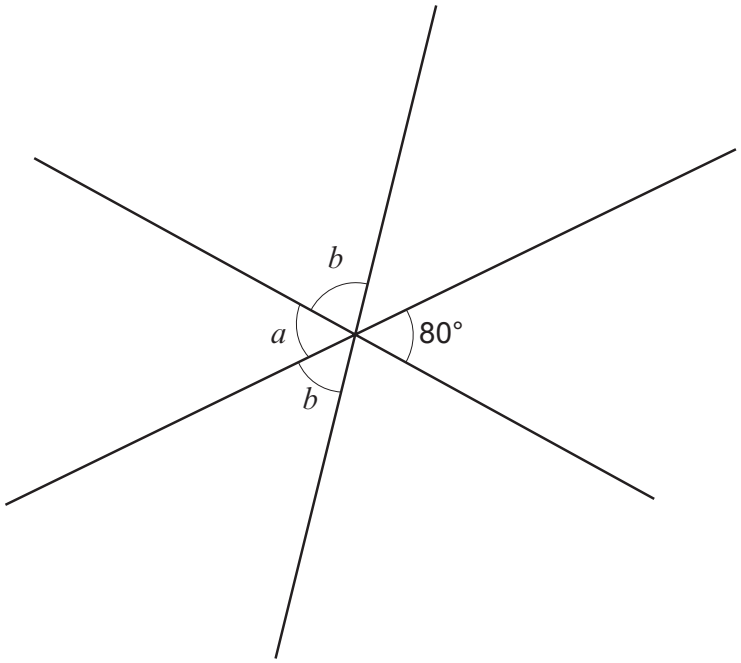


Diagram not drawn to scale

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.....

a = ... ° b = ... °

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12. A fair dice and a fair coin are thrown once.

(a) Fill in the table below to show all the possible outcomes. [2]

	1	**2**	**3**	**4**	**5**	**6**
Head (H)	H1	H2				
Tail (T)	T1					

(b) Write down the probability of obtaining a head and a 4. [1]

.....

(c) Write down the probability of obtaining a tail and a number less than 3. [1]

.....

13. *(a)* Expand and simplify $5(x - 4) + 3(2x - 1)$. [2]

.....

.....

(b) Factorise $8x - 4xy$. [2]

.....

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14. *(a)*

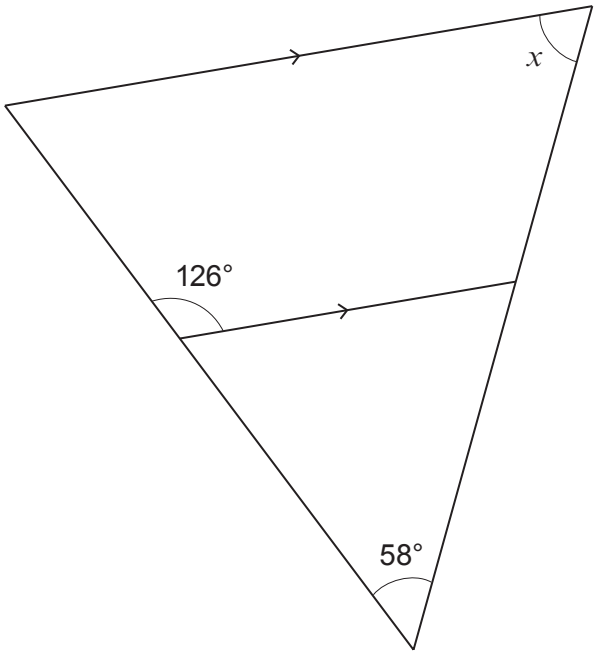


Diagram not drawn to scale

Calculate the size of angle x.
You must show all your working and explain each step of your answer. [3]

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(b) The tile shown is a rhombus.

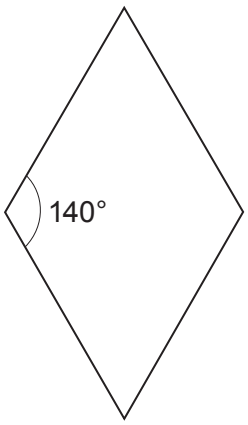


Diagram not drawn to scale

Explain why tiles identical to the one shown tessellate.
You must give reasons for your answer. [3]

.....

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15. Complete the following table.
The fraction must be expressed in its simplest form. [3]

Fraction	Decimal	Is this a recurring or terminating decimal?
$\frac{2}{3}$	$0\cdot\dot{6}$	recurring
.....	0·15	.....
$\frac{7}{11}$	.....	.....

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16. Points are plotted on a grid.
The rule $(a, 3a)$ is used to find all the points.

(a) Does the point with coordinates $(-5, -2)$ fit the rule?
You must give a reason for your answer. [1]

.....

.....

(b) Plot five possible points with coordinates that fit the rule $(a, 3a)$ on the grid. [2]

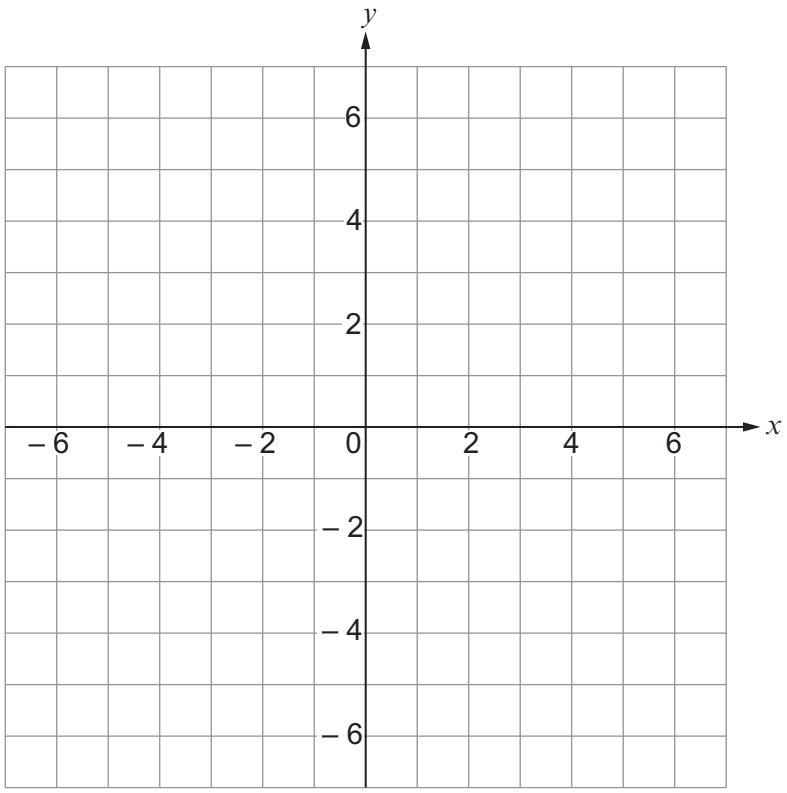
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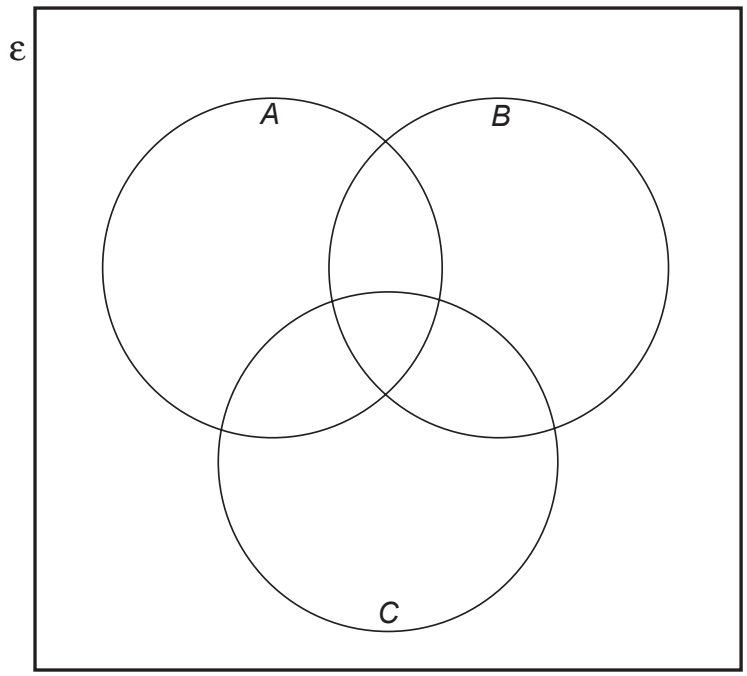
Examiner only

17. The universal set, ε = {22, 23, 24, 25, 26, 27, 28, 29, 30}.

Within this universal set ε,

- set *A* is the multiples of 2
- set *B* is the multiples of 4
- set *C* is the multiples of 5

(a) Complete the Venn diagram. [3]



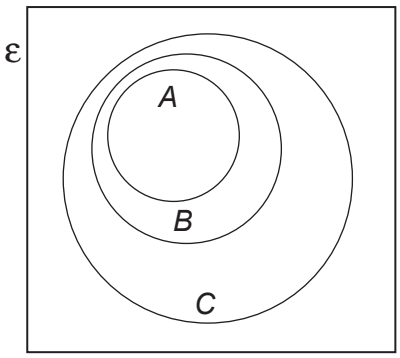
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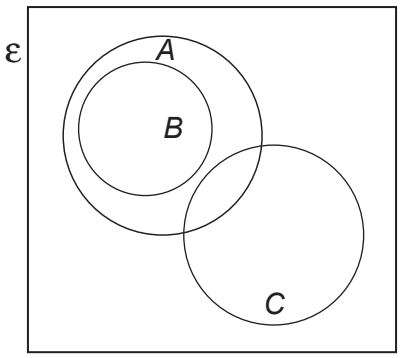
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(b) Which one of the following Venn diagrams could also be used to represent the sets ε, *A*, *B* and *C*?
You must give a reason for your choice. [2]

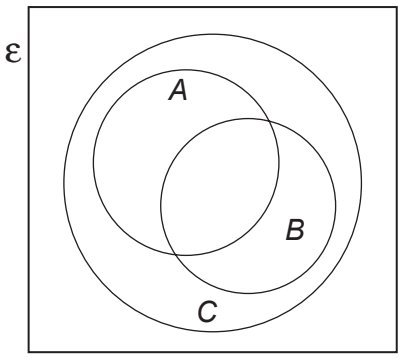
Venn Diagram 1



Venn Diagram 2



Venn Diagram 3



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END OF PAPER

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GCSE MARKING SCHEME

METHODS IN MATHEMATICS
(LINKED PAIR PILOT)

JANUARY 2014

INTRODUCTION

The marking schemes which follow were those used by WJEC for the January 2014 examination in GCSE METHODS IN MATHEMATICS (LINKED PAIR PILOT). They were finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conferences were held shortly after the papers were taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conferences was to ensure that the marking schemes were interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conferences, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about these marking schemes.

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METHODS - UNIT 1
FOUNDATION TIER

<table>
<tr><th>Methods Unit 1 Foundation Tier January 2014</th><th>Mark</th><th>Comments</th></tr>
<tr><td>1. (a) (i) 5025
(ii) ten million
(b) (i) 121
(ii) 9
(iii) 48
(iv) 8
(c) (i) 1450
(ii) 1400</td><td>B1
B1
B1
B1
B1
B1
B1
B1
8</td><td></td></tr>
<tr><td>2. Number other than 1-6
Any three different numbers from 1 to 6

Head OR Tail
Yellow</td><td>B1
B1

B1
B1
4</td><td>
Eg, Odd (numbers) OR Even (numbers)
OR any other correct answer e.g. ‘1,2, or 3’ or ‘a prime number’’.

</td></tr>
<tr><td>3.
<table><tr><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>3</td><td>4</td><td>-5</td><td>8</td></tr><tr><td>5</td><td>4</td><td>3</td><td>-2</td></tr><tr><td>1</td><td>0</td><td>9</td><td>0</td></tr></table></td><td>B3

3</td><td>B2 for any 3 or 4 correct entries
B1 for 2 correct entries</td></tr>
<tr><td>4. (Dylan saves) (1/10 × 400 =)(£) 40
(No of weeks) 250/ 40

6.25

(He can afford the bike after) 7 (weeks)

Look for:
• Clear workings and labelling
• Correct use of units eg £, weeks

QWC2: Candidates will be expected to
• present relevant work clearly, with words explaining process or steps
AND
• make few if any mistakes in spelling, punctuation and grammar

QWC1: Candidates will be expected to
• present work clearly which is mostly relevant, with words explaining process or steps
OR
• make few if any mistakes in spelling, punctuation and grammar and include units in their final answer</td><td>B1
M1

A1

A1

QWC
2

6</td><td>
FT their 40
Any appropriate method eg 40 × 6 or 40 × 7 or 240 or 280

Any correct indication
FT for equivalent level of difficulty

QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar.

QWC1 Presents material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar
OR
evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar.

QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar.</td></tr>
</table>

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Methods Unit 1 Foundation Tier January 2014	Mark	Comments
5. (a) 9	B3	B2 for meeting any 3 clues e.g. 3, 15, 81,… B1 for meeting any two clues e.g. 1, 4, 5, 6, 7, 11, 12,...
(b) (i) 35 -10	B1	
(ii) 13 × 50 or 50 ×13	B1	
	5	
6. 6	B1	
Valid Reason	E1	E marks dependent on B marks Eg 6 × 12=12
7	B1	
Valid Reason	E1	Eg 1 and itself goes into it. Only 2 factors.
10	B1	
Valid Reason	E1	Eg 10 × 10 =100. Ten squared=100.
	6	
7. 180/3 or 60	B1	Or seen in diagram.
180- 60	M1	FT their 60
120	A1	CAO
	3	
8. (a) Correct diagram	B1	
(b) 14, 18, 22	B2	Award B1 for two correct entries
(c) Number of seats = Number of tables(t) × 4 +2	B2	Accept n for number of tables Award B1 for × 4 + 2 Do not accept 'add four '
(d) 30	B1	FT for equivalent level of difficulty
(e) (82 – 2)/4	M1	FT for equivalent level of difficulty Or equivalent method
=20	A1	
	8	
9. (a) $4x + 3y$	B2	Must be an expression, as shown. Award B1 for either of the 2 terms correct within an expression or both terms correct but not in an expression.
(b) (4 x 3) – 5	M1	
=7	A1	CAO
	4	
10. For 2 correct in a form which allows comparison	B1	
For all 3 correct in a form which allows comparison	B1	
3/8, ½, ,¾	B1	Answer only gets B1. CAO
	3	
11. (a) $x = 64$	B1	
$y = 30$	B1	
(b) $a = 80$	B1	
Noticing that b and b and 80 is 180	M1	FT their 80
$b = 50$	A1	
	5	

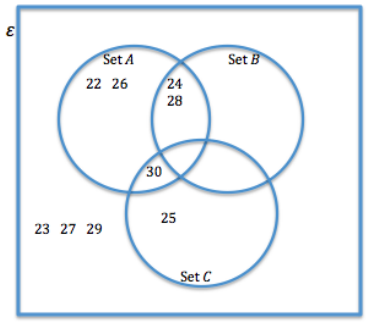
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Methods Unit 1 Foundation Tier January 2014	Mark	Comments
12. (a) | | 1 | 2 | 3 | 4 | 5 | 6 | | Head | H1 | H2 | **H3** | **H4** | **H5** | **H6** | | Tail | T1 | **T2** | **T3** | **T4** | **T5** | **T6** |	B2	B1 for at least 6 correct entries Across parts (b) and (c), penalise incorrect notation, e.g. 1 in 12, once only.
(b) 1/12	B1	
(c) 2/12	B1 4	ISW FT for consistent incorrect denominator
13. (a) $5x - 20 + 6x - 3$ $11x - 23$ (b) $4x\ (2 - y)$	B1 B1 B2 4	B1 for $4x(\ldots - y)$ or $4x(2 - \ldots.)$ or correct partially factorised
14(a) 180 – 126 (=54°)	B1	1st step of appropriate working OR an appropriate 54(°) indicated on the diagram. Allow B1 even if then incorrectly assuming an 'isosceles trapezium'
x indicated as (180 – 58 – '54' =) 68(°)	B1	FT 'their 54°' (=180 – 126) evaluated correctly May be on diagram, do not accept contradiction in answers for x in working space and on diagram
Two appropriate stages of explanation given, e.g. 'angles on a straight line 180°'AND • 'angles in a triangle 180°', or • corresponding angles or equivalent, or • interior angles, or equivalent	E1	Accept reference to 'C' and 'F' angles Allow FT for 'isosceles trapezium' provided both stages explained, i.e. parallel fact and sum 360° If no marks: SC2 for x = 61° from an isosceles triangle with explanation of triangle sum 180° AND a parallel line fact, OR SC1 for x = 61° from an isosceles triangle *Alternative method* *M1 126 – 58* *A1 = 68(°)* *B1 Explanation: 'exterior angle of a triangle is the sum of the two other angles' AND 'corresponding angle'*
(b) Sight of 40(°)	B1	May be shown on a diagram, showing angles at a point, or a diagram showing they do tessellate
Showing or stating 140 + 140 + 40 + 40 OR 140 + 40 = 180° WITH straight line sum 180° stated	B1	FT their '180 - 140'
Use of, or statement that, angles at a point add to 360(°)	E1 6	OR 'angle sum of the tile is 360(°). For award of E1 360(°) at a point MUST be stated, not simply implied If no marks then allow B2 for the statement 'all quadrilaterals tessellate', then possible E1 for an explanation, e.g. 'angle sum at a point is 360(°)'
15(a) All 4 correct entries | Fraction | Decimal | Recurring or terminating? | | | | | | 3/20 | | Terminating | | | 0.6363(63…) | Recurring |	B1 B1 B1 3	3/20. Do not accept 15/100 0.6363... Do not accept 0.63 unless 0.6363 seen in working Terminating and recurring in the correct cells. CAO

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Methods Unit 1 Foundation Tier January 2014	Mark	Comments
16(a) **No** AND a reason, e.g. 'y coordinate is not 3 times the x coordinate', or 'a=-5 then 3a=-15' (b) All 5 points plotted fit rule (a, 3a), with no incorrect plots	E1 B2 3	Any counter example ((-5, -15) or (-2/3, -2)) must be relevant and correct with NO stated B1 for at least 3 correct plots and no more than 2 incorrect plots, OR B1 for 5 sets of possible coordinates listed, which may be outside the grid
17(a) All 9 numbers placed correctly  	B3	B2 for any 7 or 8 numbers placed correctly, the other numbers omitted or incorrectly placed, OR B1 for any 5 or 6 numbers placed correctly, the other numbers omitted or incorrectly placed. *Any ambiguous duplicates are marked as an incorrect placement for that number*
(b) Venn diagram 2 AND full reason, e.g. 'multiples of 4 are a subset of multiples of 2 and there is a multiple of 2 which is a multiple of 5', or 'set B is a subset of set A, and set A intersects with set C', or 'A & B share some of the numbers, but C only shares numbers with A', or 'C & B have nothing in common, and B shares everything with A'	E2 5	OR selects Venn diagram 2 and explains why the other 2 Venn diagrams are not selected E1 for choice of Venn diagram 2 AND a partial reason, i.e. only mentions 1 aspect or attempts an explanation e.g. '4 times table is within 2 times table', or 'shows which of A are within 4 times table', or '22 is in A but not in C', or 'no multiples of 4 in C' OR E1 for selection of Venn diagram 2 and explains why 1 of the other 2 Venn diagrams are not selected *Accept informal words such as 'within' for 'subset', 'overlap' for 'intersection'*

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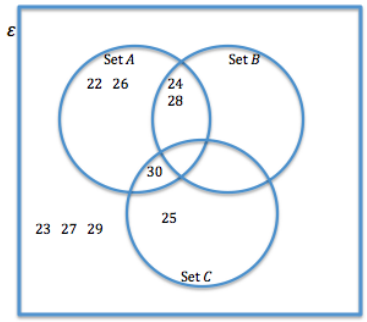
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METHODS UNIT 1
HIGHER TIER

Methods Unit 1 Higher Tier January 2014	Mark	Comment
1(a) (12 + 10)/(9 + 2) = 2 (b) -18x – 33y (c) $(2x + 7)^3$	M1 A1 B2 B1 5	Allow 1 error with a sign or 1 slip CAO Must be an expression as shown B1 for either of the 2 terms Do not ignore further work if B2 then -1 ISW
2(a) 180 – 126 (=54°) x indicated as (180 – 58 – '54' =) 68(°) Two appropriate stages of explanation given, e.g. 'angles on a straight line 180°'AND • 'angles in a triangle 180°', or • corresponding angles or equivalent, or • interior angles, or equivalent Look for: • Clear identification of any angles referred to on the diagram • Use of degree symbol • Appropriate use of '=' • Use of correct terminology for angles, not 'C' or 'F' angles QWC2: Candidates will be expected to • present work clearly, with words explaining process or steps **AND** • make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer QWC1: Candidates will be expected to • present work clearly, with words explaining process or steps **OR** • make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer (b) Sight of 40(°) Showing or stating 140 + 140 + 40 + 40 OR 140 + 40 = 180° WITH straight line sum 180° stated Use of, or statement that, angles at a point add to 360(°)	B1 B1 E1 B1 B1 E1 8	1st step of appropriate working OR an appropriate 54(°) indicated on the diagram. Allow B1 even if then incorrectly assuming an 'isosceles trapezium' FT 'their 54°' (=180 – 126) evaluated correctly May be on diagram, do not accept contradiction in answers for x in working space and on diagram Accept reference to 'C' and 'F' angles Allow FT for 'isosceles trapezium' provided both stages explained, i.e. parallel fact and sum 360° If no marks: SC2 for x = 61° from an isosceles triangle with explanation of triangle sum 180° AND a parallel line fact, OR SC1 for x = 61° from an isosceles triangle *Alternative method* *M1 126 – 58* *A1 = 68(°)* *B1 Explanation: 'exterior angle of a triangle is the sum of the two other angles' AND 'corresponding angle'* QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar OR evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar. QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar. May be shown on a diagram, showing angles at a point, or a diagram showing they do tessellate FT their '180 - 140' OR 'angle sum of the tile is 360(°). For award of E1 360(°) at a point MUST be stated, not simply implied If no marks then allow B2 for the statement 'all quadrilaterals tessellate', then possible E1 for an explanation, e.g. 'angle sum at a point is 360(°)'

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Methods Unit 1 Higher Tier January 2014	Mark	Comment
3(a) All 4 correct entries Fraction | Decimal | Recurring or terminating? 3/20 | | Terminating | 0.6363(63…) | Recurring	B1 B1 B1	3/20. Do not accept 15/100 0.6363... Do not accept 0.63 unless 0.6363 seen in working Terminating and recurring in the correct cells. CAO
(b) $\frac{0.0072}{0.002}$ OR 120×0.03 OR $\frac{24 \times 0.03}{0.2}$ $\frac{72}{20}$ OR 3.6 OR $\frac{0.72}{0.2}$ OR $\frac{7.2}{2}$ 18/5	M1 m1 A1 6	OR any appropriate **correct first calculation** Place value must be correct for M1 OR appropriate **correct second calculation** CAO. Allow sight of $3^3/_5$ Must be from correct working, watch for compensating errors. If no working then $3^3/_5$ allow M1 m1 A1
4(a) **No** AND a reason, e.g. 'y coordinate is not 3 times the x coordinate', or 'a=-5 then 3a=-15' (b) All 5 points plotted fit rule (a, 3a), with no incorrect plots (c) y = 3x	E1 B2 B2 5	Any counter example ((-5, -15) or (-2/3, -2)) must be relevant and correct with NO stated B1 for at least 3 correct plots and no more than 2 incorrect plots, OR B1 for 5 sets of possible coordinates listed, which may be outside the grid FT their points provided they fall on a straight line B1 for attempt to find the gradient as 3/1, or y = 3a, or equivalent
5(a) All 9 numbers placed correctly  (b) Venn diagram 2 AND full reason, e.g. 'multiples of 4 are a subset of multiples of 2 and there is a multiple of 2 which is a multiple of 5', or 'set B is a subset of set A, and set A intersects with set C', or 'A & B share some of the numbers, but C only shares numbers with A', or 'C & B have nothing in common, and B shares everything with A' (c) 3/9 (=1/3) 7/9 1/9	B3 E2 B1 B1 B1 8	B2 for any 7 or 8 numbers placed correctly, the other numbers omitted or incorrectly placed, OR B1 for any 5 or 6 numbers placed correctly, the other numbers omitted or incorrectly placed. *Any ambiguous duplicates are marked as an incorrect placement for that number* OR selects Venn diagram 2 and explains why the other 2 Venn diagrams are not selected E1 for choice of Venn diagram 2 AND a partial reason, i.e. only mentions 1 aspect or attempts an explanation e.g. '4 times table is within 2 times table', or 'shows which of A are within 4 times table', or '22 is in A but not in C', or 'no multiples of 4 in C' OR E1 for selection of Venn diagram 2 and explains why 1 of the other 2 Venn diagrams are not selected *Accept informal words such as 'within' for 'subset', 'overlap' for 'intersection'* FT their Venn diagram. FT a slip in the denominator used consistently FT a slip in the denominator used consistently

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Methods Unit 1 Higher Tier January 2014	Mark	Comment
6(a) (10) | 20 | 30 | 40 | 50 (7/10) | 14/20 | 20/30 | 24/40 | 28/50 (0.7) | 0.7 | 0.66… | 0.6 | 0.56 0.66 or 0.67 Not 0.6 (b) Relative frequencies plotted accurately (c) Conclusion, 'no, as there is still a variation in relative frequencies', 'no, the results are not settled', 'results are still going down'	B1 B1 B1 B2 E1 6	Cumulative numbers 7, 14, 20, 24, 28 Fractions, FT their cumulative numbers Decimals, FT their cumulative numbers as quotients over cumulative denominators, correctly evaluated Ignore if points joined or not FT their relative frequencies provided no more than 1 is outside the range 0.4 to 0.8. B1 for 3 plots accurate. Do not accept FT answers of yes. Allow 'no, needs more to get a more accurate answer'. Ignore further foolish comments. Do not accept 'no, need to throw more times'
7. Total of interior angles $5 \times 180(°)$ $= 900(°)$ 900 – sum of 4 angles given (594°) (=306) ÷3 (Each of the 3 angles is) 102(°)	M1 A1 M1 m1 A1 5	Or equivalent full method FT 'their 900' provided >594 Unique division by 3, no further operations Alternative: Corresponding exterior angles are 66(°), 30(°), 20(°) and 10(°) B1 Remaining exterior angles = 360 – sum of exterior angles found (126°) (=234°) M1 ÷ 3 m1 (Each of the remaining 3 exterior angles =) 78(°) A1 (Each of the remaining 3 interior angles =) 102(°) *FT provided B1, M1, m1, 180 – 'their 78'* A1
8(a) 18 (b) $\sqrt{(16 \times 9)}$ $= 12$ (c) Two of the prime factors are 2 and 5 Other factor is either 3 or 7 Missing number is 70	B1 M2 A1 M1 M1 A1 7	 M1 for sight of each of 16 or 9 FT from M1 provided simplified using surd notation if necessary An answer of 2×5×7 gets M1, M1, A0 Award all 3 marks for sight of unsupported 70. An answer of 70 from incorrect working is not awarded all 3 marks *Example: An answer of 30 is M1, M1, A0 (as it meets M1, M1 for factors 2 and 5, with 3)* If no marks, allow SC1 for prime numbers which sum to 70 AND clues 2 to 4 are met, e.g. 2+31+37 *Alternative:* *Considering multiples of a number which would include 210 M1* *Considering multiples of 10 which would include 210, i.e. multiples of 30 or 70 m1* *Answer 70 A1*
9(a) Correct sketch (b) Correct sketch (c) Correct sketch	B1 B1 B1 3	 FT reflection in x-axis of their (a)
10(a) $5\times40^2 - 3\times40 - 1$ with 5×40^2 evaluated as 8000 $= 7879$ (b) $n^2 + 3$ or equivalent	M1 A1 B3 5	 Accept full description in words or given in a fully labelled diagram for B3, B2 or B1 as appropriate B2 for $1n^2 \pm \ldots$ (not for $1n^2$), OR B1 for $1n^2$ or for sight of the 2nd difference 2

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Methods Unit 1 Higher Tier January 2014	Mark	Comment
11(a) Correct entries 0.7 and 0.2 Other entries 0.8, 0.2 with 0.8 Labels correct for no cereal, no toast, toast and no toast (b) 0.3×0.2 $= 0.06$ (=6/100)	B1 B1 B1 M1 A1 5	 In this order if no labels, otherwise as their label order Not a FT need to match probabilities. If labels incorrect B0, however allow previous B1 for order 0.8, 0.2, 0.8 FT from their probability tree for M1 only CAO. Allow M1 for sight of an unsupported 0.6
12(a) $(2x + 5)(3x -1)$ (b) $dw = 3m^2$ $m^2 = dw/3$ $m = (\pm) \sqrt{(dw/3)}$ (c) $ab – bc = e$ $b(a – c) = e$ $b = \frac{e}{a-c}$	B2 M1 m1 A1 B1 B1 B1 8	B1 for $(2x\pm \ldots)(3x\pm \ldots)$ Square root must clearly be over dw/3 entirely If no marks SC1 for $\sqrt{(w/3d)}$ from 1 initial error Collect FT until 2nd error Factorise Divide
13. Strategy, e.g. suitable outline of a suitable tree diagram Sight of P(man red) = 1/5 or P(woman red) = 3/10 $1/5 \times 3/10$ $= 3/50$ Conclusion ‘greater than’ stated or implied, with reason, e.g. 6/100>5/100	S1 B1 M1 A1 E1 5	Listing WM, MW, MM, WW is not a suitable strategy The award of M1 also implies S1 FT provided at least 1 other mark has been awarded. Accept if compared with 6%, i.e. same format for 5% and their answer
14(a) $6x^2 + 14xy -15xy – 35y^2$ (+ xy) $= 6x^2 – 35y^2$ (b) $7x(3x – 2) + 2(2x + 3)$ as a numerator $(2x + 3)(3x – 2)$ as a denominator $21x^2 -14x + 4x + 6$ $\frac{21x^2 -10x + 6}{(2x + 3)(3x – 2)}$	B2 B1 M1 M1 A1 A1 7	B1 for any 2 of the expansion terms correct FT from B1. Mark final answer. Allow $6x^2 +– 35y^2$ Mark final answer. If the denominator is expanded it must be correct. FT from 1 error in numerator expansion, provided it is a trinomial
15. Selecting $4y = x$ AND $y = -4x$ Showing that $m_1 = ¼$ and $m_2 = -4$ $¼ \times -4 = -1$ or equivalent	B1 M1 A1 3	
16(a) P indicated correctly, where XY touches the circle (b) WXY is a tangent meeting the circle radius at 90° Corresponding angles equal (angles at X and W) OR Supplementary angles OR shows or states both angles are 90° (c) <HBG=160° or <ABW= 80° or equivalent Reason, e.g. ‘angle at the centre is twice the angle at the circumference’ 100° Reason, e.g. ‘ sum of angles in a quadrilateral is 360° (and right angle where tangent meets the radius)’ or ‘allied (interior) angles’	B1 B1 B1 B1 E1 B1 E1 7	 Accept description in words Accept description in words

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Methods Unit 1 Higher Tier January 2014	Mark	Comment
17(a) a = 4 $x^2 + 8x + 16$ (-11) OR alternative method to find b b = -11 (b) $(x + 4)^2 - 11 = 0$ $(x + 4)^2 = 11$ $x + 4 = (\pm)\sqrt{11}$ $x = \pm\sqrt{11} - 4$	B1 M1 A1 B1 M1 M1 A1 7	Accept embedded answers Accept embedded answers Use of completing the square from (a), FT from their (a) provided equivalent format Must show $\pm$ Use of formula leading to $(-8\pm2\sqrt{11})/2$ gets B2, $(-8\pm\sqrt{44})/2$ gets B0

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Surname	Centre Number	Candidate Number
Other Names		0

GCSE LINKED PAIR PILOT

4363/01

METHODS IN MATHEMATICS

UNIT 1: Methods (Non-Calculator)
FOUNDATION TIER

A.M. TUESDAY, 11 June 2013

$1\frac{1}{2}$ hours

CALCULATORS ARE NOT TO BE USED FOR THIS PAPER

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

Take π as 3·14.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **8**.

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1	**9**	
2	**8**	
3	**3**	
4	**7**	
5	**10**	
6	**5**	
7	**7**	
8	**6**	
9	**2**	
10	**3**	
11	**4**	
12	**4**	
13	**4**	
14	**4**	
15	**4**	
TOTAL MARK		

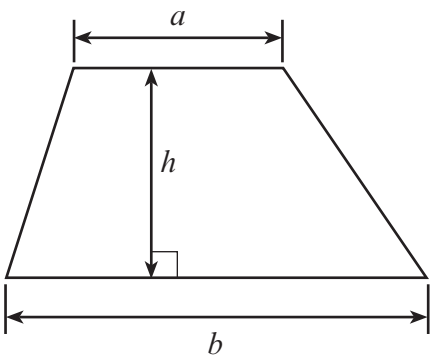
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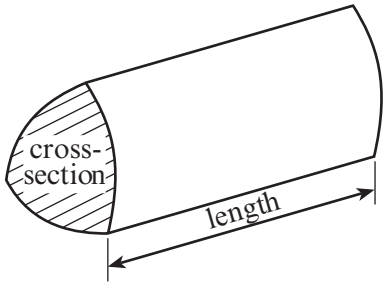
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Formula List

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



Volume of prism = area of cross-section × length



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1. *(a)* Write down, in figures, the number eight thousand and thirty nine.

.....

[1]

(b) Write down, in words, the number 48 702.

.....

[1]

(c) Using only the numbers in the following table,

7	**4**	**25**
16	**36**	**10**

write down

- a factor of 12,

.....

- a multiple of 8,

.....

- a prime number.

.....

[3]

(d) What is the value of the 3 in the number 13 265?

.....

[1]

(e) Round 51 684 to the nearest 100.

.....

[1]

(f) **Estimate** the answer to $51 \times 3{\cdot}9$.

.....

.....

[2]

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Examiner only

2. Calculate each of the following.

(a) 396 + 128

.....

.....

.....

[1]

(b) 910 – 631

.....

.....

.....

[1]

(c) 252 ÷ 7

.....

.....

.....

[1]

(d) 516 × 82

.....

.....

.....

.....

.....

[3]

(e) 19 – 2 × 5

.....

.....

[1]

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Examiner only

(f) Sian worked out that she would need to order 10 coaches to take 312 people to the theatre.
Each coach holds 53 people.
Is Sian correct or incorrect? Explain your answer.

.....

.....

.....

.....

.....

.....

[1]

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Turn over.

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Examiner only

3. In a magic square, each row, column and diagonal have the same total.
The following magic square uses each of the numbers 1, 2, 3, 4, 5, 6, 7, 8 and 9 once.

6	1	
	5	
		4

Complete the magic square above by filling in the missing numbers.

Workings:

.....

.....

.....

.....

[3]

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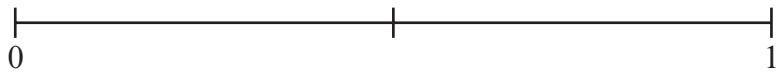
4. *(a)* On the probability scale shown below, mark the points **A**, **B**, **C** and **D** where:

A is the probability that when a fair coin is thrown you will get a tail.

B is the probability that there will be 12 months in the next year.

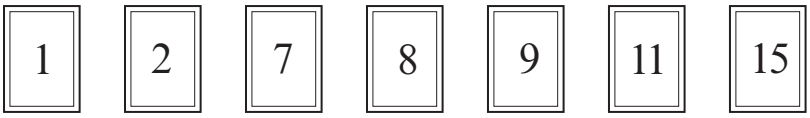
C is the probability that next year will be 2005.

D is the probability that a disc selected, at random, from a bag containing 1 red disc, 1 white disc and 1 green disc will be a white disc.



[4]

(b) Joshua has these seven numbered cards which he places face down.



His friend chooses one card at random.

What is the probability that the card will have

- an odd number, ...
- a number greater than 8? .....

[2]

(c) Raffle tickets are numbered 1 to 200.
Rachel buys five tickets and gets the numbers 10, 11, 12, 13 and 14.
Tomos buys five tickets and gets the numbers 25, 78, 95, 104 and 162.
One ticket is chosen at random.
Is Rachel or Tomos more likely to have the winning ticket? Explain your answer.

.....

.....

.....

.....

.....

[1]

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5. *(a)* Give the next term in the sequence **and** write in words the rule for finding the next term in the sequence.

1, 3, 9, 27, ...

Rule: .....

.....

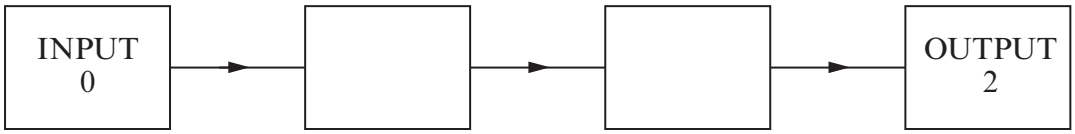
[2]

(b) Simplify $7x + 4 - 3x - 7$.

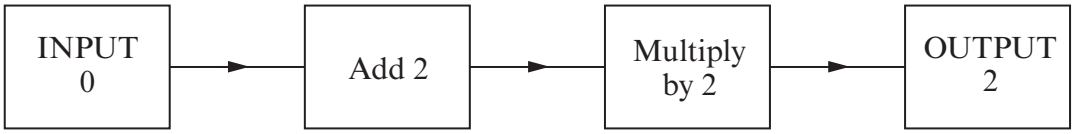
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[2]

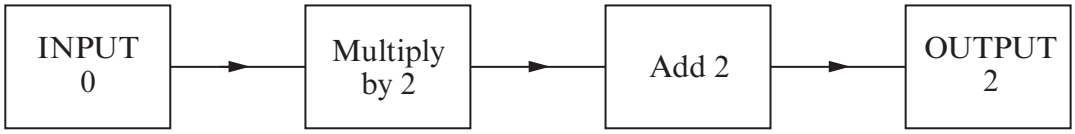
(c) Jenny and Steve were asked to find a rule for the following function machine.



Jenny wrote the rule as



Steve wrote the rule as



Showing all the working for both rules, explain who is correct.

.....

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[2]

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(d) Given that $P = 3q + n$, find the value of n when $P = 27$ and $q = 4$.

.....

.....

.....

.....

[2]

(e) Simplify $\frac{10x}{2}$.

.....

[1]

(f) Expand $3(4x - 7)$.

.....

[1]

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6. *(a)* Showing all your working, write 0·37, $\frac{2}{5}$ and $\frac{35}{100}$ in ascending order.

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.....

.....

.....

[3]

(b) Find the value of $2^3 \times 5^2$.

.....

.....

.....

[2]

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7. Find the size of the angles a, b and c in the diagram below.

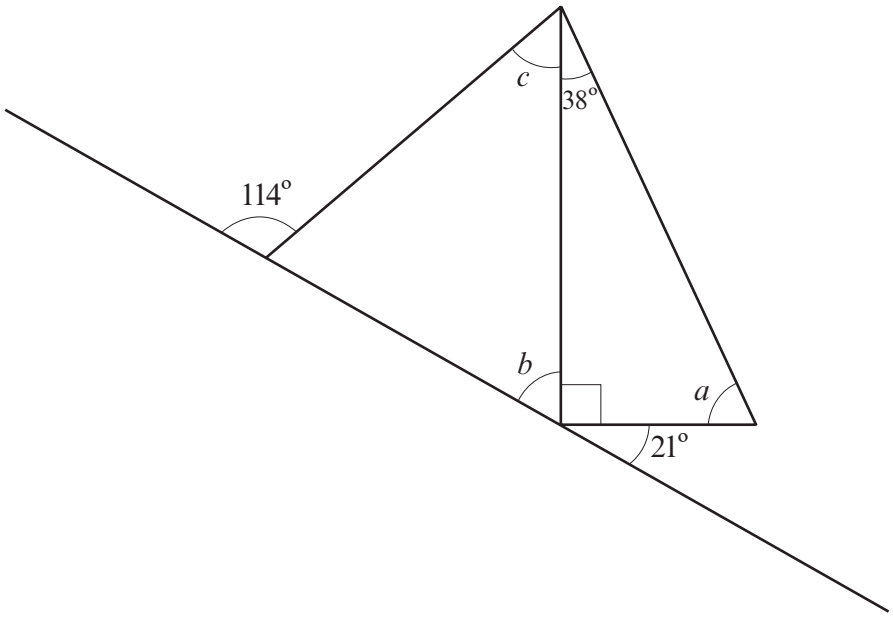


Diagram not drawn to scale

.....

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.....

a = ... ° b = ... ° c = ... °

[7]

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8. *You will be assessed on the quality of your written communication in this question.*

A holiday company advertises two package holidays to the same destination and hotel.



Best Beach Holidays

Package 1	Package 2
5 nights £655 per person	7 nights £845 per person
Includes: • Accommodation • Return Airfare	Includes: • Accommodation • Return Airfare

The cost of the accommodation, per night, is the same in both packages.
The cost of the return airfare is the same in both packages.

Find the cost of the return airfare. Explain clearly how you have reached your answer.

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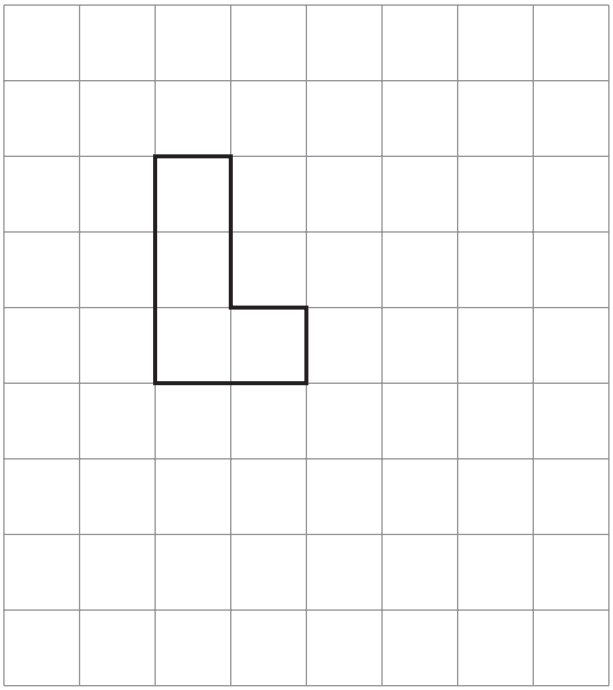
[6]

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9. Show that the given shape tessellates by drawing more of the shapes on the grid below.



[2]

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Turn over.

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10.

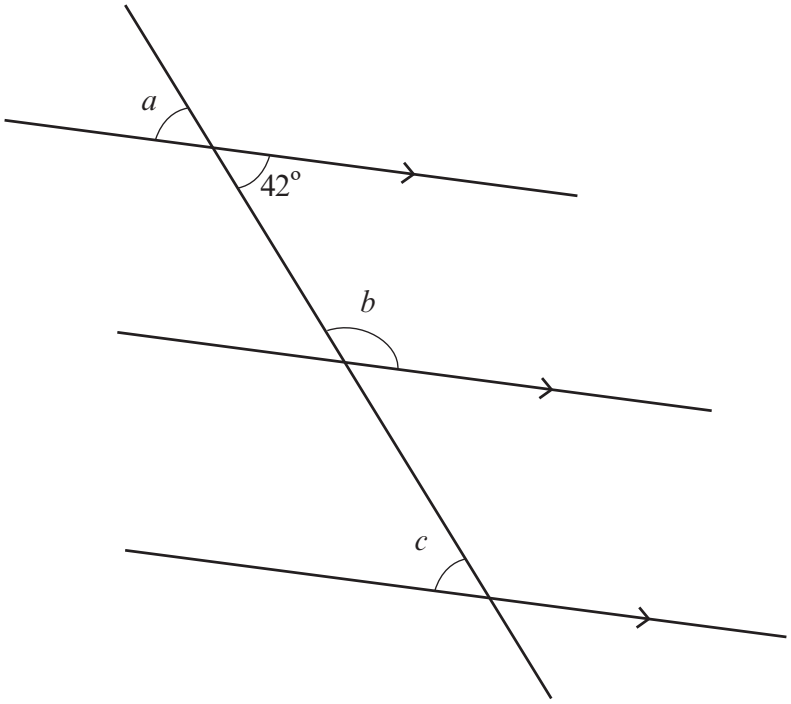


Diagram not drawn to scale

Find the size of each of the angles a, b and c.

.....

.....

.....

a = ... ° b = ... ° c = ... °

[3]

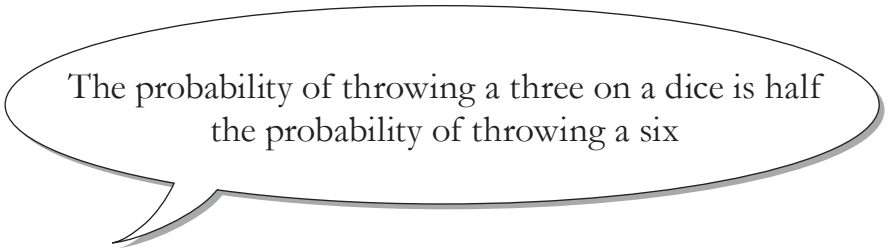
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11. Nancy makes two statements about the probability of events based on throwing fair dice.

For each of her statements below, decide if Nancy is correct or not.
You must explain your decisions **using probabilities**.



Is Nancy correct? .....

Explanation:

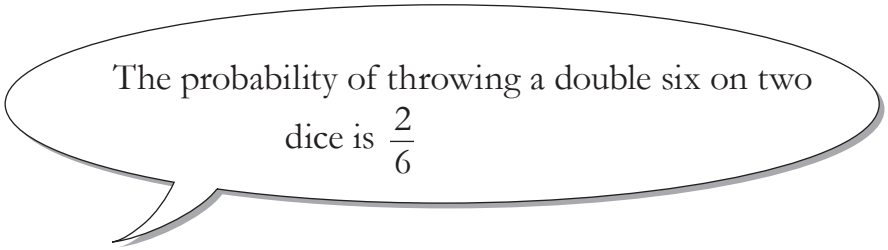
.....

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.....

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[2]



Is Nancy correct? .....

Explanation:

.....

.....

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.....

[2]

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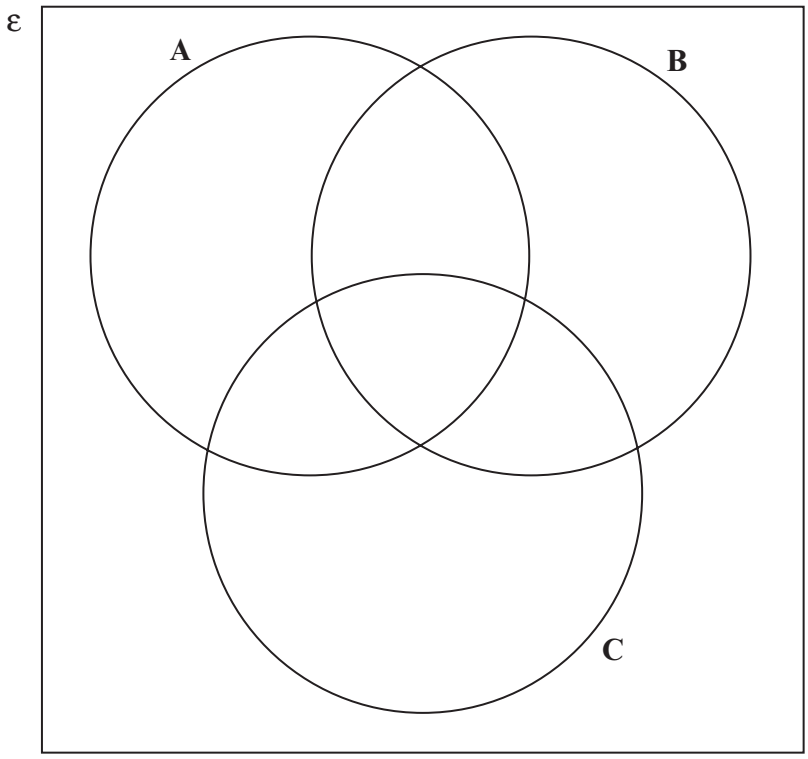
Turn over.

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12. Given the following information, complete the Venn diagram shown below.

- $\varepsilon = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$
- **A** is the set of factors of 24
- **B** is the set of multiples of 3
- **C** is the set of common factors of 30 and 70



[4]

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13. You are given the coordinates of three of the four vertices of a parallelogram.

They are (3, 2) (5, –2) (7, 2).

Find the coordinates of two possible positions for the fourth vertex.

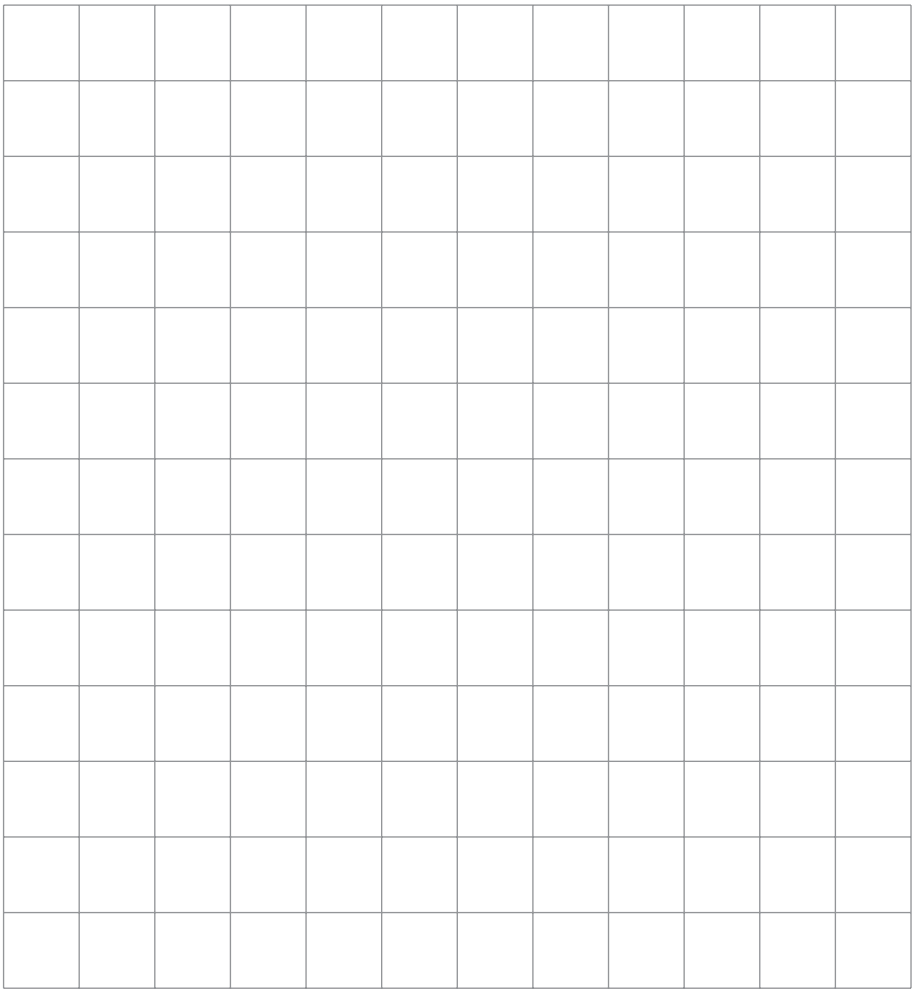
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.....



Coordinates of one of the possible answers (..... , ...)

Coordinates of another possible answer (..... , ...)

[4]

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14. Use the grid below to draw graphs to represent each of the following equations.

(i) $y = \frac{1}{2}x + 6$

(ii) $x + y = 8$

.....

.....

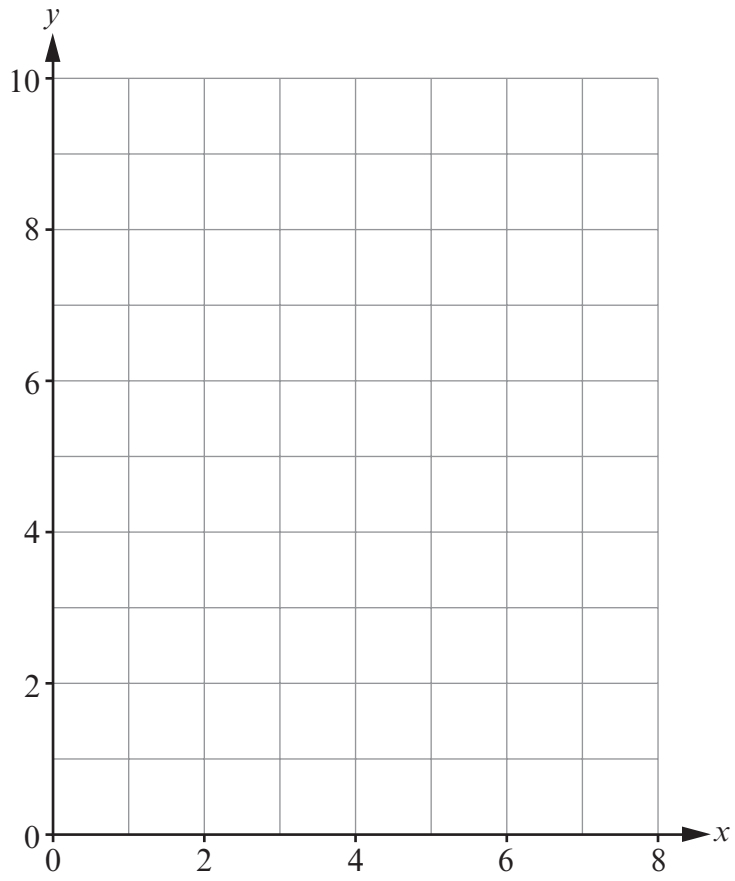
.....

.....

.....

.....

Label your lines (i) and (ii) as appropriate.



[4]

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15. Find the *n*th term of the following sequences.

(a) 3, 13, 23, 33, 43, ...

.....

.....

[2]

(b) 50, 40, 30, 20, 10, ...

.....

.....

.....

[2]

END OF PAPER

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GCSE MARKING SCHEME

METHODS OF MATHEMATICS (LINKED PAIR PILOT)

SUMMER 2013

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INTRODUCTION

The marking schemes which follow were those used by WJEC for the Summer 2013 examination in GCSE METHODS OF MATHEMATICS (LINKED PAIR PILOT). They were finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conferences were held shortly after the papers were taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conferences was to ensure that the marking schemes were interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conferences, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about these marking schemes.

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UNIT 1 (FOUNDATION TIER)

Methods Unit 1 Foundation June 2013		Final
1. (a) 8039 (b) forty eight thousand seven hundred and two (c) 4 16 7 (d) 3000 or 3 thousand (e) 51700 (f) Sensible estimates, that would lead to single digit multiplication Correct answer from their estimates	B1 B1 B3 B1 B1 M1 A1 9	 Award B1 for each correct answer. Accept thousand(s) but not 1000. Eg 50 × 4 or 50 × 3.9 or 51 × 4 Award M1 A1 for unsupported answers of 200, 195 or 204 Award M1 A1 for unsupported answer of 195 - 204 Award M0 A0 for (51 × 3.9 =) 198.9
2. (a) 524 (b) 279 (c) 36 (d) 516 × 82 1032 41280 42312 (e) 9 (f) Explanation given AND Sian given as incorrect (stated or implied)	B1 B1 B1 M1 A1 A1 B1 E1 8	 Any correct method for the multiplication of 516 by 82 For either 1032 or 41280 (Apply 'one error' in other methods) CAO Place value errors get M0 A0 Watch out for an incorrect answer of -9 Eg Sian incorrect because 6 coaches would be just over 300 people, so 10 coaches would be far too many. Or 530 is a lot more. Do not award E1 for statement incorrect only.
3. 6 1 **8** **7** 5 **3** **2** **9** 4	B3 3	Award B3 for all correct Award B2 for 3 or 4 correct entries Award B1 for 1 correct row or column or the other diagonal or 2 correct only if working to a total of 15.
4. (a) A at ½ B at 1 C at 0 D at or near $^1/_3$ (b) 5/7 3/7 (c) Explanation given and neither more likely or both equally likely (stated or implied)	B1 B1 B1 B1 B2 E1 7	 For position of 'D' accept >1/4 but < 1/2 Award B1 for each correct answer. Penalise -1 once only if consistent use of incorrect notation. Eg.Both have the same chance as they each have 5 tickets with different numbers. Each number has the same probability.
5.(a) 81 Multiplying previous term by three (b) $4x - 3$ (c) Workings for Jenny (0 + 2) × 2 = 4 AND Steve 0 × 2 + 2 = 2 AND Steve correct stated or implied by correct working (d) $27 = 12 + n$ $n = 15$ (e) $5x$ (f) $12x - 21$	B1 B1 B2 B2 B1 B1 B1 B1 10	 Accept "times by 3" or "× 3" Award B1 for either $4x$ or -3 within an expression. Award B1 for $4x + -3$ Award B1 for workings for Jenny (0 + 2) × 2 = 4 OR Steve 0 × 2 + 2 = 2 Accept embedded answers Mark final answer
6. (a) For 2 correct in a form which allows comparison. For all 3 correct in a form, or steps, that will allow comparison of all 3 $^{35}/_{100}$, 0.37, $^2/_5$ or equivalent (b) 200	B1 B1 B1 B2 5	 CAO. Correct answer only award B0 B0 B1 B1 for either 8 or 25.

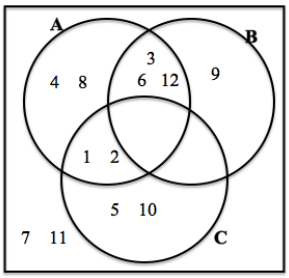
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7. $a = 180 - 90 - 38$ $= 52(°)$ $b = 180 - 90 - 21$ $= 69\ (°)$ Sight of $(180 - 114 =) 66\ (°)$ $c = 180 - 69 - 66$ $= 45\ (°)$	M1 A1 M1 A1 B1 M1 A1 7	*Alternative method 114 – 'b'* *= 45(°) S1 M1 A1* FT their *b* and/or their 66
8. (Difference in cost of packages) $(845 - 655 =)$ (£)190 (Cost per night) $(190 \div 2 =)$ (£)95 (5 nights costs) $(5 \times 95 =)$ (£)475 (Return airfare) $(655 - 475 =)$ (£)180 QWC: Look for • Correct units used • Clarity of text explanation • Correct terminology • the use of simplified notation (watch for the use '=' being appropriate) QWC2: Candidates will be expected to • present work clearly, with words explaining process or steps AND • make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer QWC1: Candidates will be expected to • present work clearly, with words explaining process or steps OR • make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer	B1 B1 B1 B1 Q W C 2 6	FT their 190 FT their 95 *OR 7 nights costs (7 × 95 =) (£)665* FT their 475 *Return airfare (845 – 665 =) (£)180 FT their 665* QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar OR evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar. QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar.
9. At least 6 additional given shapes tessellating correctly For B2 the tessellation must be in more than one direction. (ie a cluster)	B2 2	Award B1 for at least 3 additional given shapes tessellating correctly with at least one that meets the given shape
10. 42, 138, 42	B3 3	B1 for each correct answer. FT c = a or c = 180 - b
11. No AND reason (both the same) 1/6 No AND reason $(1/6 \times 1/6 =) 1/36$	B2 B2 4	Accept NO with appropriate sight of 1/6. Accept refer to 1/6 in words. B1 for No AND reason implying both the same, i.e. 1/6 not given in the response, or sight of 1/6 with no conclusion or 'Yes' B1 for No AND reason maybe based on sample space, e.g. 'No because there are more ways of getting it' (without contradiction) or, gives $1/6 \times 1/6$ without stating 1/36, or,, gives $1/6 \times 1/6$ with an incorrect response, e.g. 2/36 or, sight of 1/36 with no conclusion Do not accept incorrect probability with statement 'No' without working

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12. Venn diagram correct  	B4 4	No extra number >12 Mark unique placements of numbers, for duplicates mark the incorrect number then award as follows: B3 for any 9, 10 or 11 numbers correctly placed with no more than 1 extra number >12 B2 for any 6, 7 or 8 numbers correctly placed with no more than 2 extra numbers >12 B1 for any 3, 4 or 5 numbers correctly placed and ignore any extra numbers If no marks awarded SC1 for sight of sets A, B and C correct (including any extra numbers), shown in working or within Venn diagram
13.(a) Strategy to find at least one 4th vertex, e.g. axes with 3 plots of given points **and** show understanding of parallel side requirement, OR a correct arithmetic method Any 2 of: (5, 6) (9, -2) (1, -2)	M2 A2 4	M1 axes and plot the 3 points given, OR a reasonable attempt at an arithmetic method, OR axes and plot the 2 of the 3 points given with an attempt draw 2 appropriate parallel lines A1 for one correct, or for 2 indicated but coordinates not given or given incorrectly If one correct, this implies M2 (and A1) If no marks, award SC1 for evidence that the 3 coordinates have been reversed but a strategy to draw an appropriate parallel line is attempted. Do not penalise reverse coordinates if SC1 awarded. *Candidates clearly and consistently working with reverse coordinates should be penalised -1 only*
14. (i) At least 2 correct points found or plotted Correct straight line shown (ii) At least 2 correct points found or plotted Correct straight line shown	M1 A1 M1 A1 4	
15. (a)10n - 7 (b) -10n + 60 or equivalent	B2 B2 4	B1 for sight of 10n For B2 mark final answer. B1 for sight of -10n

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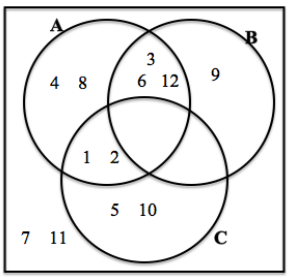
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UNIT 1 (HIGHER TIER)

<table>
<tr><th>Methods Unit 1 June 2013 Higher Tier</th><th></th><th>Final</th></tr>
<tr><td>1. 42, 138, 42</td><td>B3
3</td><td>B1 for each correct answer.
FT c = a or c = 180 - b</td></tr>
<tr><td>2. No AND reason (both the same) 1/6

No AND reason (1/6×1/6 =) 1/36</td><td>B2

B2

4</td><td>Accept NO with appropriate sight of 1/6.
Accept refer to ⅙ in words.
B1 for No AND reason implying both the same, i.e. 1/6 not given in the response,
or sight of 1/6 with no conclusion or ‘Yes’
B1 for No AND reason maybe based on sample space, e.g. ‘No because there are more ways of getting it’ (without contradiction)
or, gives 1/6×1/6 without stating 1/36,
or,, gives 1/6×1/6 with an incorrect response, e.g. 2/36
or, sight of 1/36 with no conclusion
Do not accept incorrect probability with statement ‘No’ without working</td></tr>
<tr><td>3. Venn diagram correct

</td><td>B4

4</td><td>No extra number >12
Mark unique placements of numbers, for duplicates mark the incorrect number then award as follows:
B3 for any 9, 10 or 11 numbers correctly placed with no more than 1 extra number >12
B2 for any 6, 7 or 8 numbers correctly placed with no more than 2 extra numbers >12
B1 for any 3, 4 or 5 numbers correctly placed and ignore any extra numbers
If no marks awarded SC1 for sight of sets A, B and C correct (including any extra numbers), shown in working or within Venn diagram</td></tr>
<tr><td>4.(a) Strategy to find at least one 4th vertex, e.g. axes with 3 plots of given points and show understanding of parallel side requirement, OR a correct arithmetic method

Any 2 of: (5, 6) (9, -2) (1, -2)

(b)
<table>
<tr><td>Quadrilateral</td><td>Line symmetry</td><td>Diagonals perpendicular</td><td>Opposite angles equal</td></tr>
<tr><td>(Kite)</td><td>1</td><td>Yes</td><td>No</td></tr>
<tr><td>(Isos. Trap.)</td><td>1</td><td>No</td><td>No</td></tr>
<tr><td>Rhombus</td><td>(2)</td><td>(Yes)</td><td>(Yes)</td></tr>
</table></td><td>M2

A2

B3

7</td><td>M1 axes and plot the 3 points given, OR a reasonable attempt at an arithmetic method, OR axes and plot the 2 of the 3 points given with an attempt draw 2 appropriate parallel lines

A1 for one correct, or for 2 indicated but coordinates not given or given incorrectly
If one correct, this implies M2 (and A1)

If no marks, award SC1 for evidence that the 3 coordinates have been reversed but a strategy to draw an appropriate parallel line is attempted. Do not penalise reverse coordinates if SC1 awarded.

Candidates clearly and consistently working with reverse coordinates should be penalised -1 only

B2 for any 5 or 6 correct entries
B1 for any 3 or 4 correct entries</td></tr>
<tr><td>5.
<table>
<tr><td>Fraction</td><td>Decimal</td><td>Recurring</td><td>Terminating</td></tr>
<tr><td>2/5</td><td>0.4</td><td>No</td><td>Yes</td></tr>
<tr><td>5/8</td><td>0.625</td><td>No</td><td>Yes</td></tr>
<tr><td>7/9</td><td>0.77(777..) or 0.78</td><td>Yes</td><td>No</td></tr>
<tr><td>2/11</td><td>0.18(18..)</td><td>Yes</td><td>No</td></tr>
</table></td><td>B4

4</td><td>All correct
B3 any 3 rows correct or all 4 decimals correct
B2 any 2 rows correct or 3 decimals correct
B1 any 1 row correct or 2 decimals correct

Accept unambiguous intention for Yes/No columns
Accept if candidate indicates yes without giving the corresponding no, unless there is a contradiction, and vice versa</td></tr>
<tr><td>6. (1share is 60/4 =) 15kg
Either 3×15 or 7×15 seen in working
Jade 105 (kg) Bethan 45 (kg)</td><td>B1
M1
A2

4</td><td>
FT their 60/4 incorrectly evaluated
A1 for each correct response
If answers reversed then, B1 M1 A1
SC1 if 60kg misinterpreted but then used correctly leading to correctly evaluated responses, 60/14 = 4.285… leading to 12.85…, 17.14… and 30 (accept 13, 17 and 30)</td></tr>
</table>

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7. An example of a tessellation covering a space having an element of a **repeating** pattern with at least one 360° point formed by using both of the shapes of tiles Use of angles at a point is 360(°) Shows sum to 360(°) including at least one 90(°) and at least one 60(°)	B2 B1 B1 4	B1 for an example of a tessellation covering a space with at least one 360° point formed by using **both** of the shapes of tiles. Accept sight of knowledge that angles at a point is 360(°) Accept if implied, e.g. '2 squares 180° and 3 (isosceles) triangles 180°'
8. (Sum of the three angles given is 300(°)) (Each of other two exterior angles is) 360 – 300 ÷ 2 (Each of the other exterior angles is) 30(°) Use of 'interior angle + exterior angle = 180(°)' Interior angles 75(°), 65(°), 100(°), 150(°), 150(°) QWC2: Candidates will be expected to • present relevant work clearly, with words explaining process or steps AND • make few if any mistakes in spelling, punctuation and grammar QWC1: Candidates will be expected to • present work clearly which is mostly relevant, with words explaining process or steps OR • make few if any mistakes in spelling, punctuation and grammar and include units in their final answer	M1 m1 A1 M1 A1 QWC 2 7	FT their 300, sum of the three angles given FT their 300, sum of the three angles given CAO Or use of 'interior = 180 – exterior' FT 180 – their 30 provided M1 awarded OR Alternatively: (Use of interior angle + exterior angle = 180°) Interior angles 75(°), 65(°), 100(°) B1 Sum of the interior angles = 3 × 180(°) (= 540(°)) M1 Remaining interior angles = 540 – (75 + 65 + 100) m1 =300(°) A1 Each of the remaining angles = 150(°) A1 *If no marks, SC1 for answers of 120° and 120° from incorrectly using 540° as exterior sum of the angles* QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar OR evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar. QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar.

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9. 180÷36 = 5 and 180÷60=3, OR 36 =2×2×3×3, 60 =2×2×3×5, and 180 =2×2×3×3×5, OR 36, 72, 108, 144, 180, … with 60, 120, 180, … HCF of 36 & 60 is 2×2×3 or 12 Conclusion, e.g. 'this common factor of 12 is a factor of 180 so Jack is not correct (for this part of his statement)'	B1 B1 E1 3	Must <u>check</u> 1st part of Jack's statement Depends on 2nd B1
10.(a) (i) At least 2 correct points found or plotted Correct straight line shown (ii) At least 2 correct points found or plotted Correct straight line shown (b) No AND a reason, e.g. 'they don't intersect (meet) at 90° (right angles)'	M1 A1 M1 A1 E1 5	 Do not accept 'No they are not perpendicular' FT provided one of their lines is correct Also FT provided one of their lines is correct, but then the incorrect line happens to be perpendicular, then 'Yes' with the reason 'intersect at 90°'
11.(a) $3t - 3g = hf - ht$ $3t + ht = hf + 3g$ $t(3 + h) = hf + 3g$ $t = \frac{hf + 3g}{h + 3}$ (b)(i)10n - 7 (ii) -10n + 60 or equivalent (iii) $2n^2 + 6$ or equivalent	B1 B1 B1 B1 B2 B2 B2 10	Incorrect expansions is 1 error ***FT until 2nd error*** Collection of t terms, or all negative Factorise t Division. Mark final answer B1 for sight of 10n For B2 mark final answer. B1 for sight of -10n For B2 mark final answer. B1 for sight of $2n^2$ (or equivalent)
12.(a)(i) Correct sketch (ii) Correct sketch (b)(i) Correct sketch through (0,0) (ii) Sketch of any vertical translation Correct sketch with either (0,3) stated or 3 indicated on the y-axis (iii) Correct sketch through (0,0)	B1 B1 B1 B1 B1 B1 6	*Throughout this question mark intention in the 2 correct quadrants*
13. $2x^2 + 7x - 8x - 28 + x^2 + x + 4$ OR $2x^2 - x - 28 + x^2 + x + 4$ $3x^2 - 24 = 3(x^2 - 8)$, i.e.both steps shown	M2 A1 3	M1 if 1 slip or error CAO
14.(a) 5×10^3 (b) 2.4×10^9 (c) 3.36×10^8	B2 B2 B2 6	B1 for 0.5×10^4 or $\frac{1}{2} \times 10^4$ or 5000 B1 for 24×10^8 or 2 400 000 000 B1 for attempt to match addition of numbers, e.g. breaking down to $3.24 \times 10^7 \times 10$ or alternative strategy, or sight of 336 000 000
15.(a) 60 (b) 324	B2 B3 5	B1 for sight of $\sqrt{5} \times \sqrt{5} = 5$ B2 for $(3\sqrt{2})^4$ with an attempt to evaluate, 81× ..or ..×4, OR 18×18 B1 for $(3\sqrt{2})^4$ OR multiply pair brackets to 18
16.(a) b = cd/a (b)(i) 90° or right angle Reason 'tangent meets radius (at 90°)' (ii) 2x x	B2 B1 B1 B1 B1 6	B1 for a×b = c×d May be indicated on the diagram

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17.(a) Sight of 6, 12, 18 (as winning tickets) or realising there are 3 winning tickets	B1	
Idea to calculate P(win) × P(win)	S1	Accept from incorrect replacement idea
$3/20 \times 2/19$	M1	FT their 3 if clear that an attempt to find multiples of 6
6/380 (=3/190)	A1	ISW
(b) Sight of 1, 2, 3, 6, 9, 18 or realising that there are 6 winning tickets	B1	
Considers P(win) × P(win), P(win) × P(lose), P(lose) × P(win)	S1	OR 1 – P(not winning). Accept from incorrect replacement idea
$6/20 \times 5/19 + 6/20 \times 14/19 + 14/20 \times 6/19$ (30/380 + 84/380 + 84/380)	M1	FT their factors, provided clearly shown at least 4 of them OR $1 - 14/20 \times 13/19$ (= 1 – 182/380)
198/380 (= 99/190)	A1	ISW
	8	
18.(a) $(x + 9)(x – 9)$	B1	
$(2x - 5)(x + 9)$	B2	B1 for $(2x \ldots 5)(x \ldots 9)$
$\underline{x – 9}$	B1	FT if possible for similar level of difficulty
$2x - 5$		Mark final answer, do not ISW
(b)(i) a = 6	B1	
$x^2 + 12x + 36$ (-22) OR method to find b	M1	
b = -22	A1	Accept embedded answers
(ii) $(x + 6)^2 – 22 = 0$	B1	Use of completing the square from (i), FT
$(x + 6)^2 = 22$	M1	
$x + 6 = \underline{+}\sqrt{22}$	M1	
$x = \underline{+}\sqrt{22} - 6$	A1	Must show $\underline{+}$
	11	

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Surname	Centre Number	Candidate Number
Other Names		0

GCSE LINKED PAIR PILOT

4363/01

METHODS IN MATHEMATICS

UNIT 1: Methods (Non-Calculator)
FOUNDATION TIER

A.M. FRIDAY, 11 January 2013

$1\frac{1}{2}$ hours

CALCULATORS ARE NOT TO BE USED FOR THIS PAPER

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

Take π as 3·14.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **6**.

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1	**8**	
2	**6**	
3	**4**	
4	**7**	
5	**8**	
6	**7**	
7	**3**	
8	**5**	
9	**4**	
10	**6**	
11	**6**	
12	**4**	
13	**7**	
14	**5**	
TOTAL MARK		

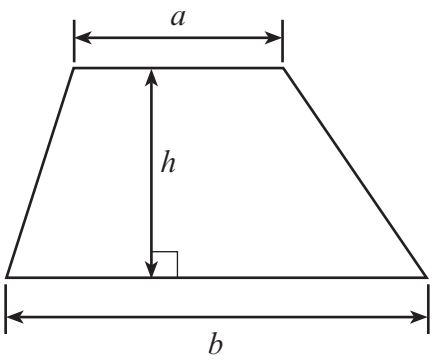
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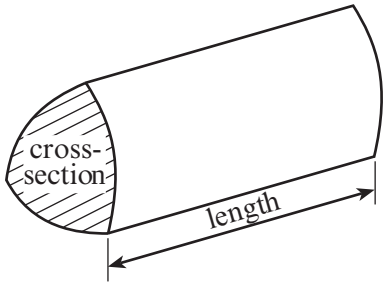
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Formula List

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



Volume of prism = area of cross-section × length



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1. *(a)* Write down, in figures, the number seven thousand and twenty eight.

.....

[1]

(b) Write down, in words, the number 9 200 000.

.....

.....

[1]

(c) Write down the sum of 47 and 58.

.....

.....

.....

[1]

(d) Write down the number that is half way between 75 and 83.

.....

[1]

(e) Write down the answer when 8 is multiplied by 7.

.....

[1]

(f) Write down **all** the factors of 55.

.....

[2]

(g) Write 2836 correct to the nearest 10.

.....

[1]

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2. *(a)* Choose one term from the table below to describe the probability of each of the following events happening.

impossible		unlikely
even chance	likely	certain

(i) The first baby born tomorrow, at a hospital, will be a boy.

.....

[1]

(ii) You will obtain a ten when a fair six-sided dice numbered 1 to 6 is rolled.

.....

[1]

(iii) A person chosen at random was born on a weekend.

.....

[1]

(b) A factory employs 100 people.
Some of these people bring their lunch to work and some do not.
This information is displayed in the following table.

	Male	Female	**Total**
Bring lunch	13	36	49
Do not bring lunch	42	9	51
Total	55	45	100

Work out the probability that a person chosen at random

(i) is female,

.....

[1]

(ii) does not bring their lunch to work,

.....

[1]

(iii) is a male who brings his lunch to work.

.....

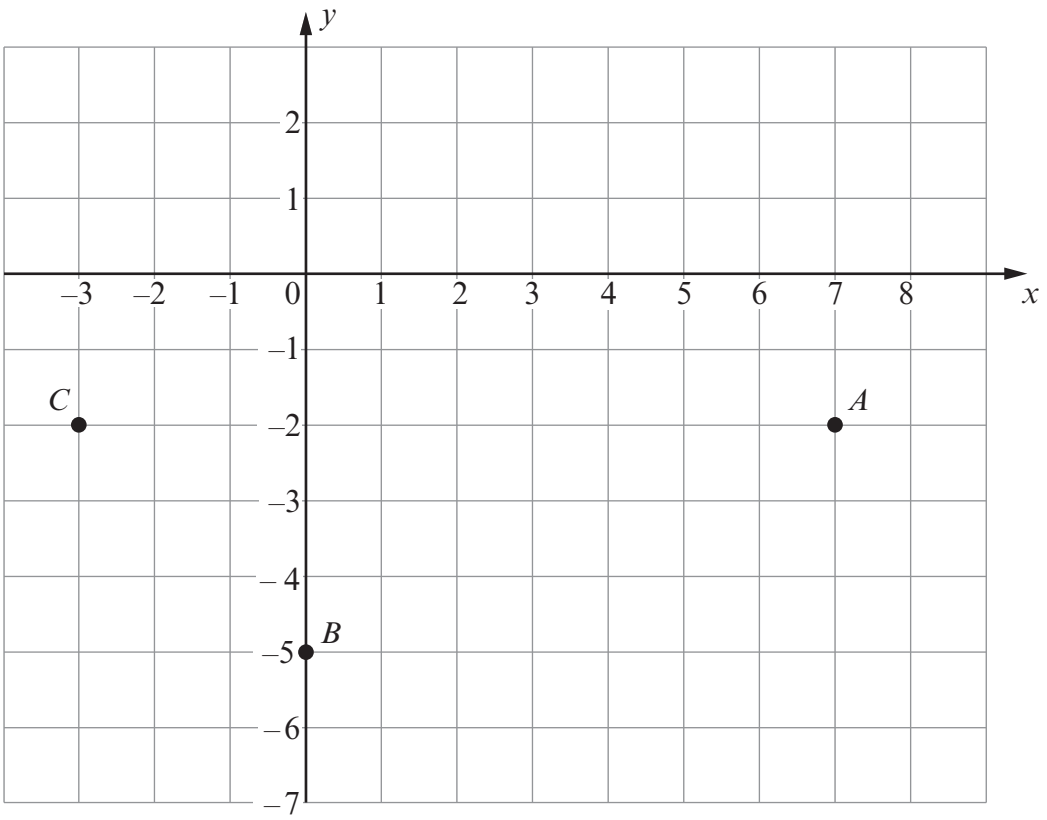
[1]

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3. *(a)* Write down the coordinates of the points *B* and *C* shown in the grid below.



The coordinates of *B* are (..... , ...)

The coordinates of *C* are (..... , ...)

[2]

(b) *A*, *B*, *C* and *D* are the vertices of a kite.
Plot the 4th vertex of the kite on the grid above and label it as the point *D*.

[1]

(c) Draw a line through *C* so that it is perpendicular to *AC*.

[1]

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Turn over.

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4. Calculate each of the following.

(a) 7396 – 4718

.....

.....

.....

.....

[1]

(b) 294 ÷ 6

.....

.....

.....

[1]

(c) 706 × 38

.....

.....

.....

.....

.....

.....

[3]

(d) 12 + 18 ÷ 6

.....

.....

[1]

(e) 3 × (17 – 5)

.....

.....

[1]

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5. *(a)* Write down the next term in the following sequence.

21, 18, 15, 12, ...

[1]

(b) Write down the next term in the following sequence **and** describe the rule for continuing the sequence.

2, 6, 18, 54, ...

Rule: .....

.....

[2]

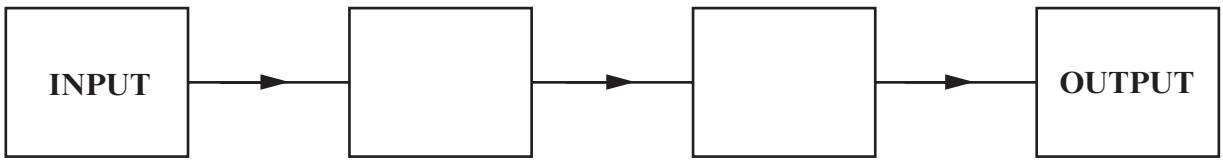
(c) The following numbers have been produced using a number machine.

$2 \longrightarrow 8 \longrightarrow 7$

$5 \longrightarrow 20 \longrightarrow 19$

$10 \longrightarrow 40 \longrightarrow 39$

Complete the boxes for the number machine.



[1]

(d) Simplify $2d + 5d - d$.

.....

[1]

(e) Simplify $3m - 4n + 5m - 2n$.

.....

.....

[2]

(f) Factorise $7y + 14$.

.....

[1]

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6. *You will be assessed on the quality of written communication in this question.*

Nia and Charlotte each play a game where the points are scored as follows:

Each win +6 points
Each loss –4 points

Nia wins 5 games and loses 3 games.
Charlotte wins 3 games and loses 5 games.
What is the difference in their final scores?

.....

.....

.....

.....

.....

.....

[7]

7. *(a)* Arrange the following in ascending order.

0·34 0·3 0·04 0·403

.....

.....

[1]

(b) Evaluate $\frac{3}{8} + \frac{1}{2}$.

.....

.....

.....

.....

.....

[2]

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8. *(a)* Find the size of angle x.

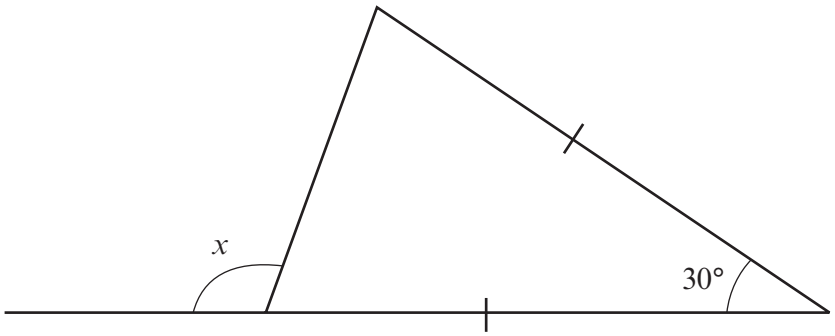


Diagram not drawn to scale

.....

.....

.....

.....

[3]

(b) The diagram below shows a regular pentagon.
Find the size of angle t.

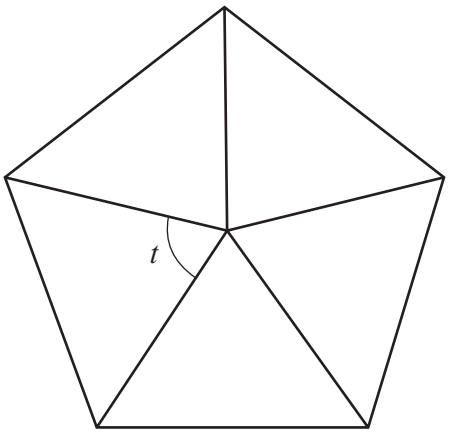


Diagram not drawn to scale

.....

.....

.....

.....

[2]

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Turn over.

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9.



A plumber has a call out fee of £35.
He then charges £20 an hour.

(a) Find the **total cost** if the plumber works for 4 hours.

.....

.....

.....

[2]

(b) Write down a formula to work out the plumber's **total cost** for any number of hours.

.....

.....

.....

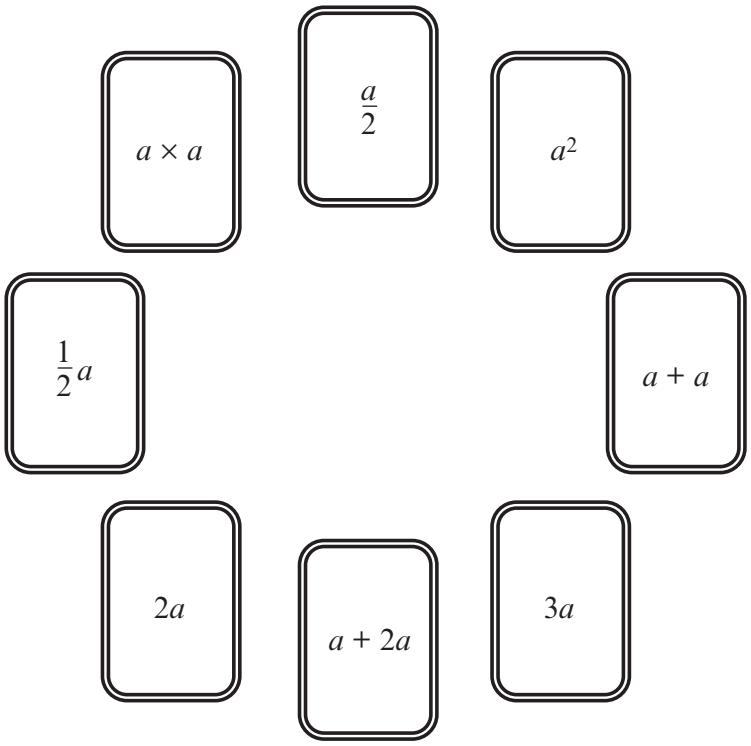
[2]

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10. Sammy and Jack play snap with these algebra cards.

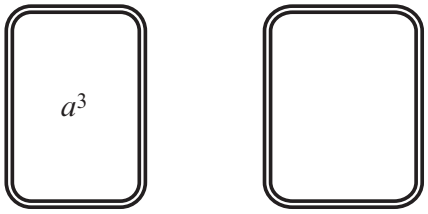


(a) Draw lines to connect the pairs of cards that are equivalent.

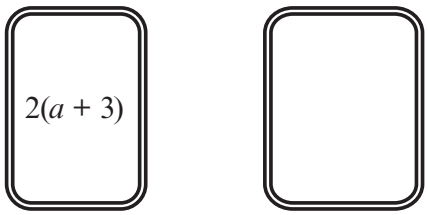
[4]

(b) For each of the following cards, write another equivalent card.

(i)



(ii)



.....

.....

.....

.....

[2]

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11. A survey about the cereals that people bought was conducted in a local supermarket on a Saturday afternoon.
95 people bought Brecky Bix, 100 people bought Crispy Flakes and 59 people bought Pop Chocs.

Of these people

- 50 bought Brecky Bix and Crispy Flakes
- 37 bought Brecky Bix and Pop Chocs
- 25 bought Crispy Flakes and Pop Chocs
- 5 bought Brecky Bix, Crispy Flakes and Pop Chocs

Everyone surveyed bought at least one of these cereals.

How many people took part in this survey?

The number of people that took part in the survey = ...

[6]

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12. Find the size of the angles q, r, s and t.

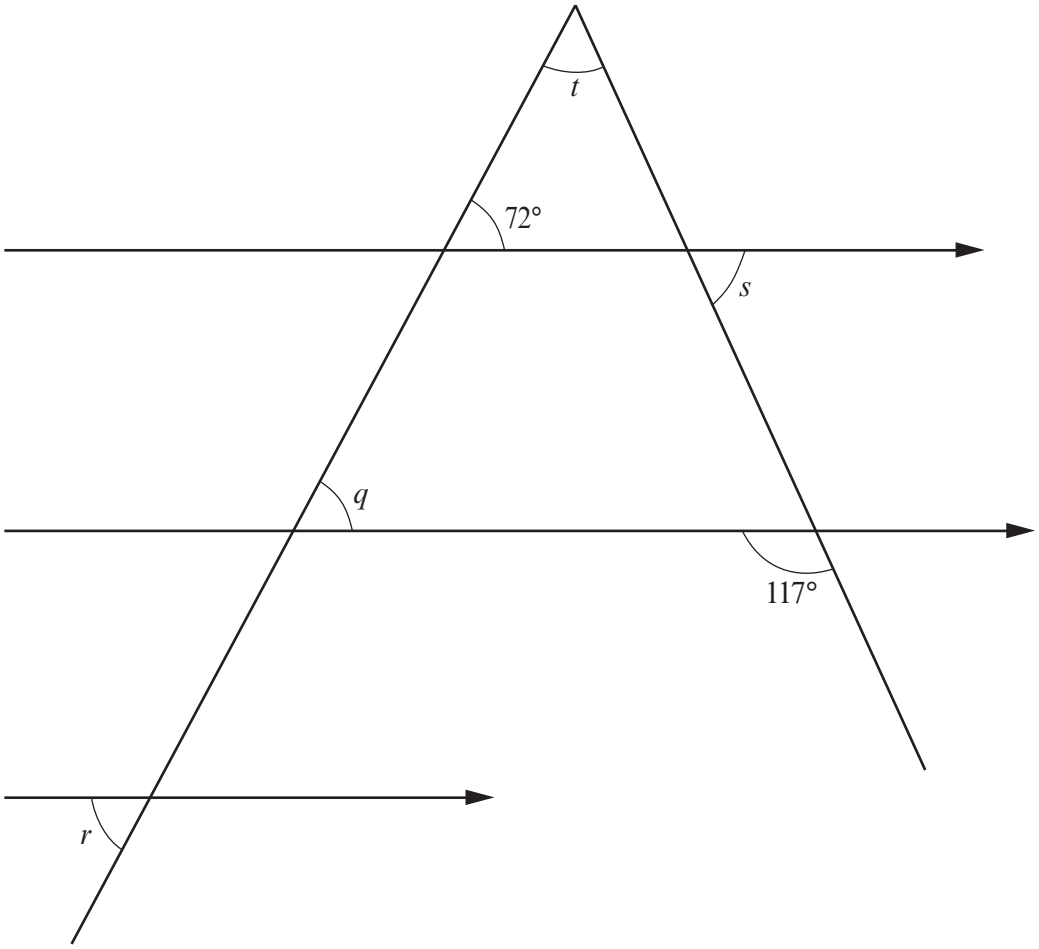


Diagram not drawn to scale

.....

.....

.....

q = ... ° r = ... ° s = ... ° t = ... °

[4]

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Turn over.

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13. *(a)* Write 3600 as a product of prime factors using index notation.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

[3]

(b) The sum of 4 consecutive prime numbers is 60.
Calculate the sum of these 4 prime numbers together with the next two prime numbers.

.....

.....

.....

.....

.....

.....

.....

[4]

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14. A ten-sided spinner has sides labelled with numbers from 1 to 10.

The spinner is spun 20 times.
It shows the number 3 on six of these occasions.

The spinner is spun another 20 times.
It shows the number 3 on four of these occasions.

(a) Do you think this is a fair spinner?
You must show your working and give a reason for your answer.

.....

.....

.....

.....

.....

[2]

(b) Find the best estimate for the probability of the spinner showing the number 3 on a single spin.

.....

.....

.....

[2]

(c) How could your estimate for the probability of the spinner showing the number 3 be improved?

.....

.....

.....

[1]

END OF PAPER

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GCSE MARKING SCHEME

METHODS IN MATHEMATICS (LINKED PAIR PILOT)

JANUARY 2013

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INTRODUCTION

The marking schemes which follow were those used by WJEC for the January 2013 examination in GCSE METHODS IN MATHEMATICS (LINKED PAIR PILOT). They were finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conferences were held shortly after the papers were taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conferences was to ensure that the marking schemes were interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conferences, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about these marking schemes.

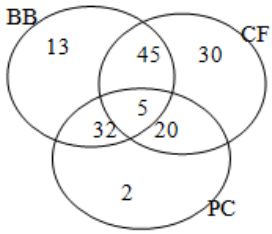
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UNIT 1 - FOUNDATION TIER

Methods Unit 1 Foundation Tier January 2013		Final
1. (a) 7028	B1	
(b) nine million two hundred thousand	B1	Accept ninety two hundred thousand and nine point two million
(c) 105	B1	
(d) 79	B1	
(e) 56	B1	
(f) 1, 5, 11, 55	B2	B1 for 2 or 3 correct factors with no incorrect factors OR 3 or 4 correct factors and only 1 incorrect, Ignore duplicates.
(g) 2840	B1 8	
2.(a) (i) even chance	B1	
(ii) impossible	B1	
(iii)unlikely	B1	
(b)(i) 45/100 or equivalent	B1	Penalise consistent use of incorrect notation eg. 45 in 100 once only in part (b)
(ii) 51/100 or equivalent	B1	
(iii) 13/100 or equivalent	B1 6	If no marks awarded in (b) award SC1 if (i), (ii) and (iii) have correct numerators in a fraction < 1.
3. (a) B (0, -5)	B1	Reversed coordinates B0 throughout
C (-3, -2)	B1	
(b) D plotted at (0, 1)	B1	
(c) Line drawn through C perpendicular to AC	B1 4	
4. (a) 2678	B1	
(b) 49	B1	
(c) 706	M1	Any correct method for the multiplication of 706 by 38
× 38 OR		
5648 228	A1	For either 5648 or 21180 OR 228 or 26600 (Apply 'one error' in other methods)
21180 26600		
26828 26828	A1	CAO Place value errors get M0 A0 *Note - count incorrect multiplication of 0 by 3 and 8 as 1 error.*
(d) 15	B1	
(e) 36	B1 7	
5. (a) 9	B1	
(b) 162	B1	
Multiply (the previous term) by three	B1	Accept ' times by 3' or × 3 or equivalent
(c) × 4 and -1	B1	Accept Multiply by 4, subtract 1
(d) 6*d*	B1	
(e) 8*m* – 6*n*	B2	Award B1 for either 8*m* or – 6*n* within an expression or for 8*m* AND -6*m* written separately, eg. Award B1 for 8*m*, -6*m*. Award B1 for 8*m* + - 6*m*.
(f) 7(*y* + 2)	B1 8	ISW

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Methods Unit 1 Foundation Tier January 2013		Final
6. (Nia =) 5 × 6 + 3 × -4 (30 – 12) = 18 (Charlotte =) 3 × 6 + 5 × -4 (18 – 20) = -2 Difference = (18 - -2 =) 20 Look for • Spelling • Labels • Correct terminology • the use of simplified notation, watch for the use of '=' being appropriate For QWC2 labels and the correct use of "-" must be evident. QWC2: Candidates will be expected to • present work clearly, with words explaining process or steps AND • make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer QWC1: Candidates will be expected to • present work clearly, with words explaining process or steps OR • make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer	M1 A1 M1 A1 A1 Q W C 2 7	*Be aware for alternative strategies eg 10 points difference per game, so total difference is 20.* Follow through their Nia and their Charlotte if at least one M1 awarded, **providing one is negative**. QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. QWC1 Presents material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar OR evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar. QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar.
7. (a) 0.04, 0.3, 0.34, 0.403 (b) 3/8 + 4/8 7/8 or equivalent	B1 M1 A1 3	Any correct method
8. (a) (180 – 30) ÷ 2 =75(°) 105(°) (b) 360 ÷ 5 72(°)	M1 A1 A1 M1 A1 5	Check diagram throughout this question FT 180 - their 75 evaluated correctly, provided M1 awarded
9(a) 35 + 20 × 4 = (£)115 (b) (total cost =) 35 + 20 × number of hours	M1 A1 B2 4	For the intention of multiplying and then adding Accept use of letters. Award B1 for sight of 20 × number of hours OR for a correct description of how to calculate the cost
10. (a) $a/2 = ½ a$ $a^2 = a \times a$ $a + a = 2a$ $3a = a + 2a$ (b) $(a^3 =) a \times a \times a$ or equivalent $(2(a + 3) =) 2a + 6$ or equivalent	B4 B1 B1 6	Award B1 for each correct pair
11. Three circles with the number 5 in the correct place 45 correct for Brecky Bix & Crispy Flakes only 32 correct for Brecky Bix & Pop Chocs only 20 correct for Crispy Flakes & Pop Chocs only 13 30 2 (any 2 correct) The number of people that took part in the survey = 147  	B1 B1 B1 B1 B1 B1 6	CAO

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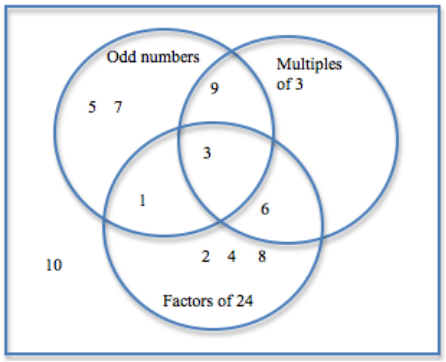
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Methods Unit 1 Foundation Tier January 2013		Final
12. (q=) 72 (r =) 72 (s=) 63 (t=) 45	B1 B1 B1 B1 4	 FT their q FT '108 – their s', i.e. check s + t = 108°
13.(a) Method to find prime factors 2, 2, 2, 2, 3, 3, 5, 5 $2^4 \times 3^2 \times 5^2$ (b) 1 correct trial by summing 4 (consecutive) primes 11, 13, 17, 19 Next two consecutive primes: 23, 29 112	M1 A1 B1 S1 B1 M1 A1 7	2 correct before 2nd error Ignore 1s for A1, but not for B1 FT provided an index>1 involved. Accept "." Must be sum 4 primes numbers (e.g. 7, 11, 19, 23) Seen or implied (by next prime being 23) FT their 4 numbers ('primes') to next 2 primes CAO
14.(a) Reason, e.g. '1/10 (expected if fair)', or '(6/20 =) 3/10 AND (4/20 =)2/10', or '10/40 = 2.5/10' or 'should be 2 times in 20 spins' Conclusion 'No' from a comparison with 1/10 (b) 10/40 (=1/4 = 0.25 or 25%) (c) Explanation, e.g. 'more spins'	M1 A1 B2 E1 5	Must show numerical value for reason Do not accept 10/40 = ¼ unless comparison with 1/10 Do not accept 'No' if an aspect of **reasoning statement** is incorrect, other than 1 slip in reading one of the given statements Ignore incorrect cancelling B1 for sight denominator 40, or sight of '… in/out of 40' *If no marks (a) and (b) then SC1 for sight of 10/40 (=1/4 = 0.25 or 25%) in the part (a)*

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UNIT 1 - HIGHER TIER

Methods Unit 1 Higher Tier January 2013		Final
1. (a)  	B3	Penalise any extra numbers (e.g. >10), -1 only B2 for 7, 8 or 9 of the numbers placed correctly, marking any repeats as incorrect, OR B1 for 4, 5 or 6 of the numbers placed correctly, marking any repeats as incorrect
(b) 5/10 ISW 2/10 ISW 3/10 ISW	B1 B1 B1 6	OR FT from their Venn diagram OR FT from their Venn diagram. OR FT from their Venn diagram If no marks in (b) award SC1 for 5, 2 and 3 or identifying the correct regions by listing the correct numbers *Penalise incorrect notation once only, -1*
2. (q=) 72 (r =) 72 (s=) 63 (t=) 45	B1 B1 B1 B1 4	 FT their q FT '108 – their s', i.e. check s + t = 108°
3.(a) Method to find prime factors 2, 2, 2, 2, 3, 3, 5, 5 $2^4 \times 3^2 \times 5^2$ (b) 1 correct trial by summing 4 (consecutive) primes 11, 13, 17, 19 Next two consecutive primes: 23, 29 112	M1 A1 B1 S1 B1 M1 A1 7	2 correct before 2nd error Ignore 1s for A1, but not for B1 FT provided an index>1 involved. Accept "." Must be sum 4 primes numbers (e.g. 7, 11, 19, 23) Seen or implied (by next prime being 23) FT their 4 numbers ('primes') to next 2 primes CAO
4.(a) 360(°) – 70(°) – 30(°) or equivalent full method = 260(°) 130(°) (and 130(°)) (b) An isosceles trapezium, drawn with equal sides indicated or statement 'isosceles trapezium', or equal base angles indicated, or equal 'top' angles indicated, (or symmetrical) would be a sufficient reason	M1 A1 A1 B3 6	Allow intention only if 260 seen FT 'their 260' ÷ 2 evaluated correctly OR Alternatively Reflex kite, 360 – 70 - 30 – 70 = 190, so other angles are 70 and 190, M1, A1, A1, with FT to last A1 from 1 arithmetic error only, provided M1 Accept statements or indication on their diagram. Ignore spelling. Parallel lines need to appear as such, but may not be indicated B2 for trapezium drawn which may have equal diagonals but the equal sides or equal angles are not marked i.e. intention isosceles trapezium, or B1 for an attempt to draw trapezia (at least 2) working towards equal diagonals (showing some ideas), one of these may be a rectangle *If no marks then allow SC1 for a rectangle with a pair of opposite sides indicated as equal*
5.(a) Method to evaluate, allow 1 slip in tables 5.473 rounded to 5.5 (b) 0.875 0.22(22…) 0.36(36…) terminating, recurring, recurring (decimal) stated	M1 A1 A1 B1 B1 B1 B1 7	Accept digits 5 4 7 3 with incorrect place value FT their 5.473 provided M1 awarded FT their responses provided at least B2 already awarded

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Methods Unit 1 Higher Tier January 2013		Final
6.(a) 4.5 ÷ 15 (=0.3 litres) or 4500 ÷ 15 (= 300ml or cm^3) ×3 ×3 (3 × 0.3 =) 0.9(litres) or (3 × 300 =) 900(ml or cm^3) 2 tins needed (£)7.44 Look for • relevance • spelling • clarity of ongoing text explanations, • the use of notation and units For QWC2 there must be sufficient process steps, not from a simplified problem. If simplified problem then QWC1 if process steps, units and labelled staged with clear final answer QWC2: Candidates will be expected to • present work clearly, with words explaining process or steps AND • make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer QWC1: Candidates will be expected to • present work clearly, with words explaining process or steps OR • make few if any mistakes in mathematical form, spelling, punctuation and grammar in their final answer (b) 0.1(litre) or 100(ml or cm^3)	M1 m1 A1 A1 A1 QWC 2 <

Methods Unit 1 Higher Tier January 2013		Final
8. Method to find the sum of the interior angles of a pentagon, e.g. 3× 180°	M1	
(Sum of interior angles) 540°	A1	
(Hence 540 – 90 – 90 so first three angles total is) 360°	B1	May be implied in later work. FT 'their 540°'
Strategy, e.g. use of trial and improvement meeting both criteria i.e. their relative angles are in the ratio 1 to 2 to 6 AND also working towards a total of 360°	S2	FT 'their 360°' Accept if working with the 2 angles of 90° and working to a total of 'their 540°', this implies previous B1 provided 540° correct. S1 for sight of their relative angles in the ratio 1 to 2 to 6 B marks are independent of S marks
(Smallest angle =) 40° OR sight of calculation 360 ÷9 ×6	B1	FT their 2nd angle twice their first angle Also FT 'their 540°'
(Largest angle =) 240°	B1	FT 6× their 1st angle, their largest angle six times their first angle provided answer >90° *Candidates working from total sum 360° rather than 540° may be awarded:* *M0, A0, FT for possible* *B1 (360-180=) 180,* *S2 (strategy 1 to 2 to 6 and working towards '180°') or S1* *B1 (1st 20°, 2nd 40°)* *B1 (1st 20°, largest 120°)*
	7	
9.(a) Correctly completing the tree diagram 0.6, 0.3. 0.3, 0.7	B2	B1 for any one pair of branches correct (total 1)
(b) 0.4 × 0.7	M1	
= 0.28	A1	
(c) 0.6 × 0.7	M1	Or other complete method. FT for their P(walk to college) ×P(walk home) correctly evaluated, or by alternative method
= 0.42	A1	
	6	
10.(a) 3	B2	B1 for one appropriate step, e.g. cancelling $\sqrt{5}/\sqrt{5}$, or sight of $\sqrt{9}$. Do not accept $\sqrt{45}/\sqrt{5}$ until simplified.
(b) ½ or 0.5 (with no working or from correct working)	B3	B2 for 1/8 AND 4 respectively OR 2^{-1} OR 4/8 B1 for 1/8 OR 4 respectively OR $2^{-3}\times(2^4)^{1/2}$
(c) 8.5×10^{-4}	B1	
(d) 3×10^9	B2	B1 for 3 000 000 000 or sight of 10^9
	8	
11.(a) $n^2 + 7$	B2	B1 for $n^2 + \ldots$ OR second difference of 2 with n^2
(b) $ax + b = 2(cx + d)$	B1	Accept intention, i.e. missing brackets. FT until 2nd error
$ax + b = 2cx + 2d$	B1	
$ax – 2cx = 2d – b$ OR $b – 2d = 2cx – ax$	B1	
$x(a – 2c) = 2d – b$ OR $b – 2d = x(2c – a)$	B1	
$x = \frac{2d - b}{a - 2c}$ OR $\frac{b - 2d}{2c - a} = x$	B1	
	7	
12. $5 \times 12 = AD \times 6$ or equivalent OR CD = 4 (cm)	M1	
AD = 10 (cm)	A1	
	2	
13.(a) (x +15)(x -1)	B2	B1 for (x…15)(x…1) or split mid term and 1st step factor
-15 and 1	B1	FT from a pair of brackets
(b) $(x + 3)^2 + 16$	B2	B1 for a=3 or B1 for b=16
	5	

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Methods Unit 1 Higher Tier January 2013		Final
14.(a) Suitable uniform scales on both axes	B1	x from -5 to 2 and y from -24 to 0 OR FT their y values provided at least 3 are correct
Evidence of finding at least 5 correct points	B1	
Plotting all 8 correct points correctly	P2	P1 for at least 5 correct points plotted correctly
Intention of joining all points plotted with a curve	C1	Depends on P1 Accept if the curve slightly missing plots, it is for intention
		x: -5, -4, -3, -2, -1, 0, 1, 2 y: -10, 0, 6, 8, 6, 0, -10, -24
(b) -4 and 0	B2	FT for their curve Accept if given as coordinates. B1 for any 1 correct
(c) Use of gradient -2	M1	
Intersection with y axis found to be -8	M1	
Equation y = -2x - 8	A1	
		Or alternative method:
		$y = -2x + c$ *M1*
		$0 = -2\times -4 + c$ *or* $c = -8$ *M1*
	10	$y = -2x - 8$ *A1*
15.Attempt to use a common denominator	B1	Or multiply each term by 4x(2x+1)(2x-1)
(2x-1)(4x) + (2x+1)(4x) – (2x+1)(2x-1)	M1	For sight of, not necessarily seen as a numerator
$8x^2 – 4x + 8x^2 + 4x – 4x^2 + 1$	A2	Allow A1 for one slip, or error with the final '-' affecting the final pair of brackets
Convincing $\frac{12x^2 + 1}{4x(4x^2 – 1)}$	A2 6	A1 if convincing, but left as $\frac{12x^2 + 1}{4x(2x+1)(2x-1)}$
16.(a) 0.6 x 1 or equivalent, AND an attempt to consider the other 40%	M1	Not for sight of 60% alone
0.4 x 0.2 or 40(%)÷5 or equivalent	M1	
Showing the need to add (0.6 + 0.08)	M1	Method considers '60% + 40% of 1/5'
0.68 or equivalent	A1	
(b)Probability from part (a)×200 or 60% of 200+1/5 of 80	M1	FT from part (a), apart from 60% giving an answer of 120, this is M0 A0
136	A1 6	FT from part (a), apart from 60% A final answer of 136/200 is M1, A0

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Surname	Centre Number	Candidate Number
Other Names		0

GCSE LINKED PAIR PILOT

4363/01

METHODS IN MATHEMATICS

UNIT 1: METHODS (NON-CALCULATOR)
FOUNDATION TIER

P.M. MONDAY 11 June 2012

$1\frac{1}{2}$ hours

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1	**6**	
2	**6**	
3	**13**	
4	**4**	
5	**3**	
6	**7**	
7	**7**	
8	**6**	
9	**2**	
10	**6**	
11	**3**	
12	**4**	
13	**3**	
14	**4**	
15	**6**	
TOTAL MARK		

CALCULATORS ARE NOT TO BE USED FOR THIS PAPER

4363 010001

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

Take π as 3·14.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

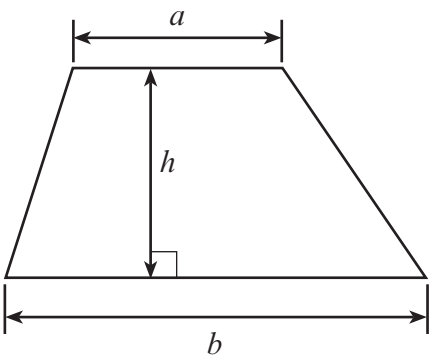
You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **10**.

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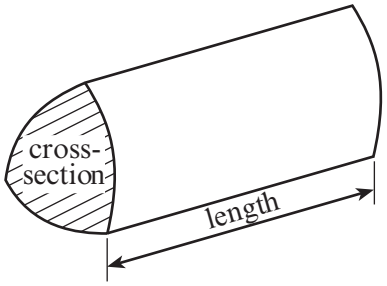
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Formula List

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



Volume of prism = area of cross-section × length



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Examiner only

1. From the numbers,

27	**13**	**9**	**10**	**48**	**8**

write down

- the answer to 4 multiplied by 12 .....
- a factor of 30 .....
- a prime number .....
- a square number .....
- the value of 3^3 .....
- $\sqrt{64}$ .....

[6]

2. *(a)* Write the number thirteen thousand, five hundred and six in figures.

.....

[1]

(b) Write the number 7 500 000 in words.

.....

.....

[1]

(c) What is the value of the 9 in the number 239 815?

.....

[1]

(d) Using all the digits **6** **7** **3** **8** write down the smallest odd number.

.....

.....

[1]

(e) Estimate the answer to $98 \times 5{\cdot}1$

.....

.....

[2]

4363 010003

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3. Calculate each of the following.

(a) $4 + 3 \times 7 - 6$

.....

.....

[1]

(b) $592 - 137$

.....

.....

.....

.....

[1]

(c) 63×8

.....

.....

.....

.....

[1]

(d) $602 \div 14$

.....

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.....

.....

[2]

(e) 519×43

.....

.....

.....

.....

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.....

.....

[3]

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(f) Add $\frac{7}{10}$ to 5·92

.....

.....

.....

[2]

(g) New pylons are needed in an area of Wales.

- The pylons are in a straight line.
- The distance between the first and last pylon is 9 km.
- The pylons need to be 0·5 km apart.



How many pylons, in total, are needed for the 9 km stretch of land?

.....

.....

.....

.....

[3]

4363 010005

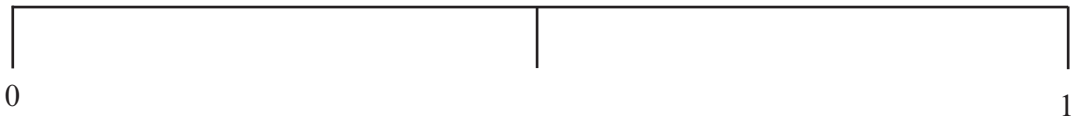
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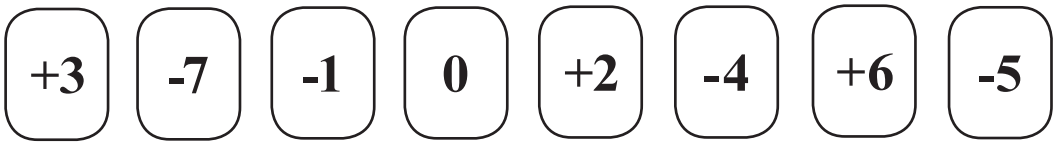
4. On the probability scale shown below, mark the point**s A, B, C** and **D** where:

A is the probability that when a fair dice is thrown an even number is obtained
B is the probability that the day after Saturday will be Sunday
C is the probability that the next object you see flying in the sky will be a live pink elephant
D is the probability that a marble picked out of a bag containing 1 red, 1 blue, 1 green and 1 black marble will be blue.



[4]

5. In a game, a player is asked to select as many cards as possible from the ones shown below and add together the numbers on the selected cards to make a total.



Using as many cards as possible, show how a player could achieve a total of –2.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

[3]

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6. *(a)* Simplify $4y + 9y - 7y$.

.....

[1]

(b) Simplify $5a + 7b + 8a + 5b$.

.....

[2]

(c) Given that $C = 2p + m$ find the value of m when $C = 20$ and $p = 6$.

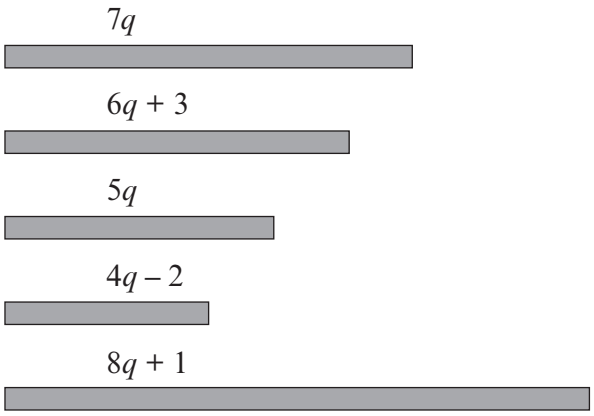
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.....

[2]

(d) Rods of different lengths are shown below.



Diagrams not drawn to scale

The rods are placed end to end.
Write down an expression, in its simplest form, for the total length of the rods.

.....

.....

.....

[2]

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7. *(a)* Find the size of angle *a*.

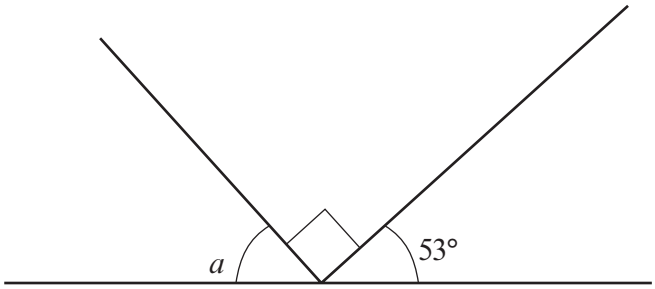


Diagram not drawn to scale

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.....

.....

[2]

(b) Find the size of angle *b*.

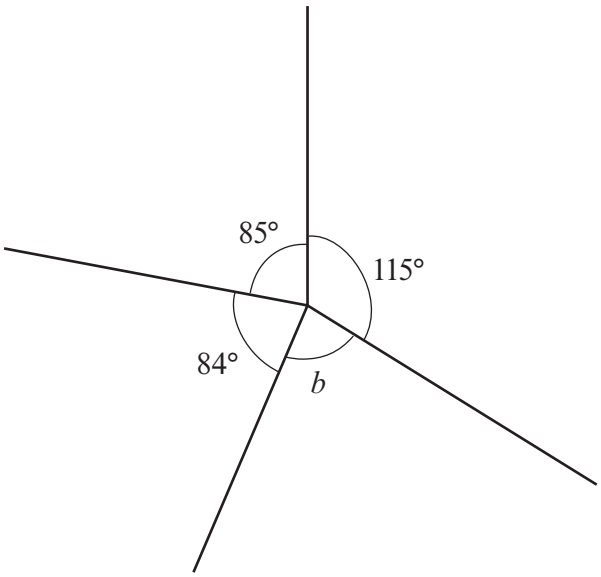


Diagram not drawn to scale

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[2]

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(c) Find the size of angle *c*.

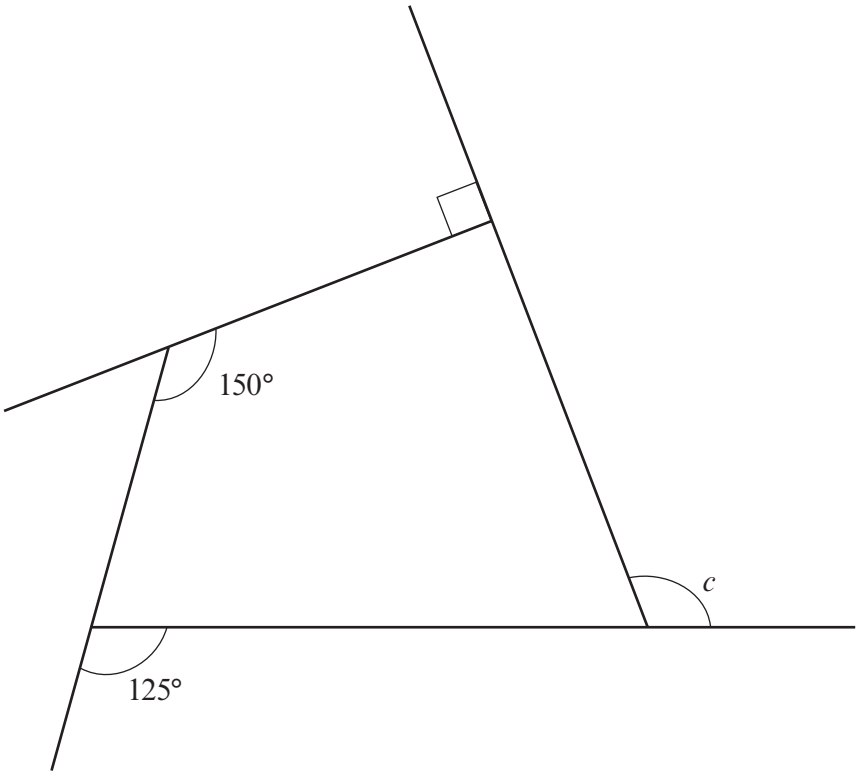


Diagram not drawn to scale

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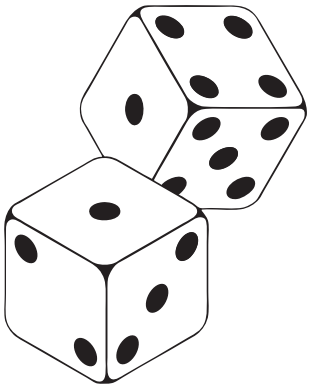
..... [3]

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8. Two fair dice are thrown.



The two numbers obtained are multiplied together to get the total score.
The table below shows some of the possible total scores.

Second dice							
	6	6	.....	.....	.....	.....	.....
	5	5	.....	.....	.....	.....	.....
	4	4	8	.....	.....	.....	.....
	3	3	6	.....	.....	.....	.....
	2	2	4	6	8	10	.....
	1	1	2	3	4	5	6
		1	2	3	4	5	6

First dice

(a) Complete the table to show all the possible total scores. [2]

(b) What is the probability of getting a total score of 20 or more?

.....

.....

[2]

(c) If the two dice are thrown 720 times, how many times would you expect to get a total score of 20 or more?

.....

.....

.....

[2]

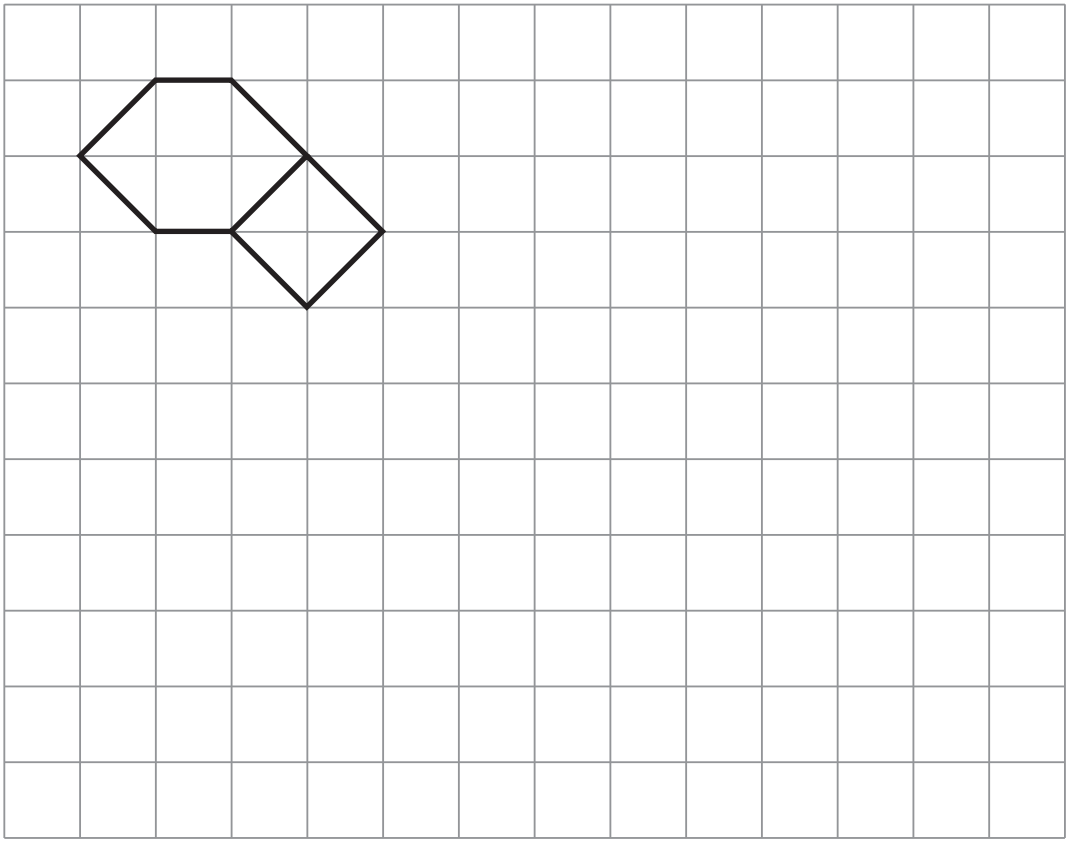
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9. Ben needs to tile his kitchen floor and decides to use the two types of tiles shown in the diagram.
By drawing more tiles in the diagram, show that the tiles will tessellate.

[2]



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Turn over.

Examiner only

10. *You will be assessed on the quality of written communication in this question.*

A chef needs to cook a 4·5 kilogram turkey.

The following rule is used to calculate the cooking time:

"Cook for 40 minutes per kilogram and then add an extra 25 minutes."

The chef wants the turkey to be ready at 1:30 p.m.

What is the latest time that the chef should begin cooking the turkey?



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.....

.....

[6]

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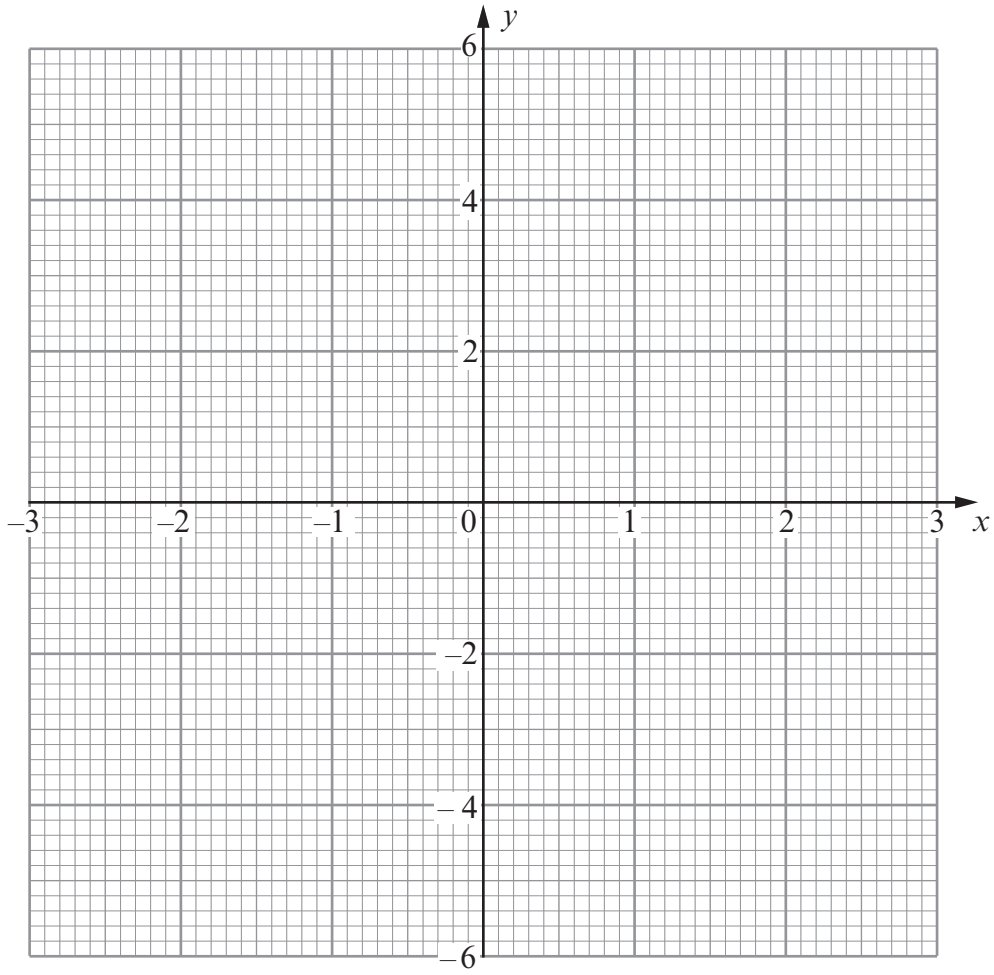
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Examiner only

11. The table shows the values of $y = x^2 - 3$ for values of x from –3 to 3.

x	–3	–2	–1	0	1	2	3
$y = x^2 - 3$	6	1	–2	–3	–2	1	6

(a) On the graph paper below, draw the graph of $y = x^2 - 3$ for values of x between –3 and 3. [2]



(b) Write down the x-values of the points where the graph cuts the x-axis.

.....

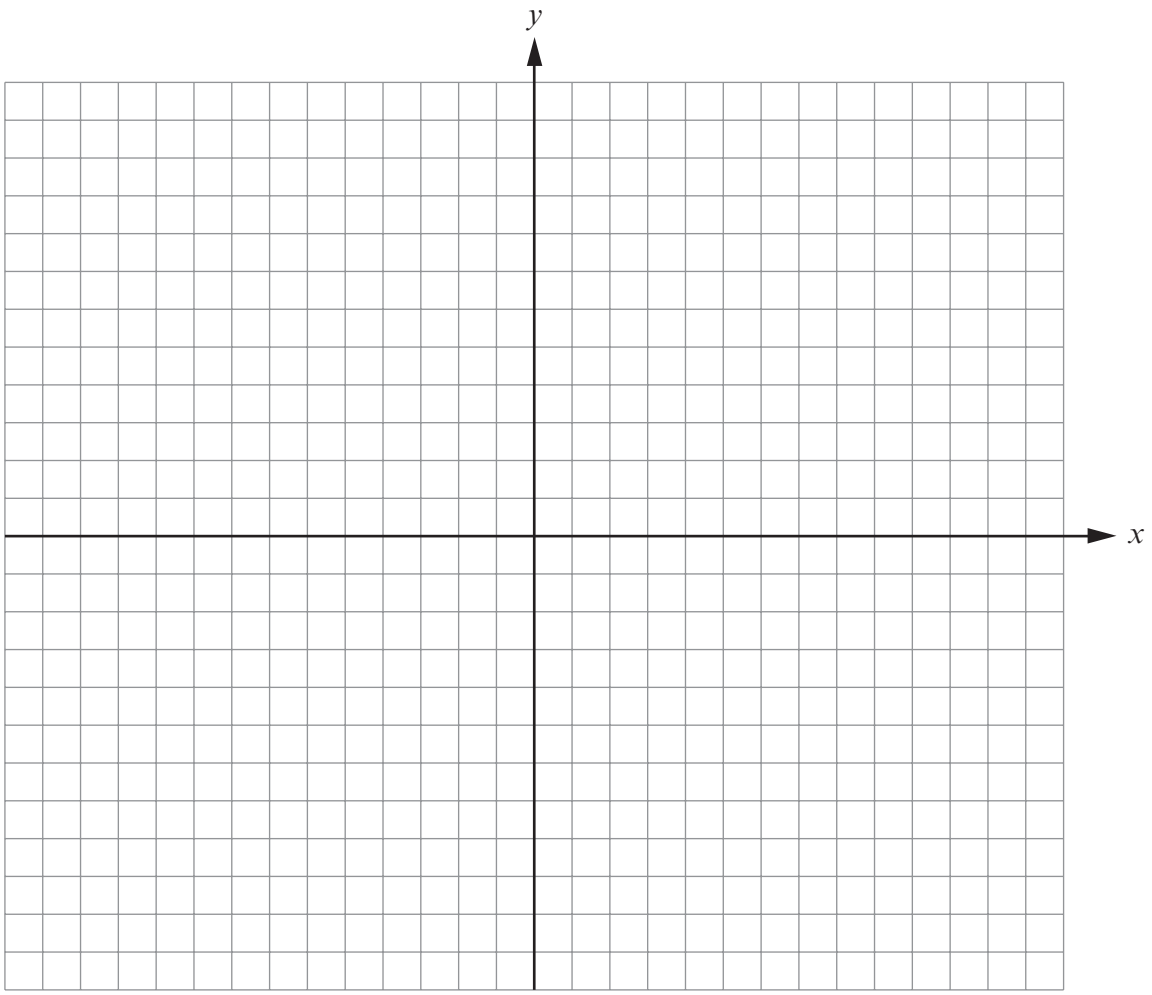
.....

[1]

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12. The coordinates of three vertices of a parallelogram are (5, –2), (–3, –2) and (–2, –6).



(a) Find the coordinates of a fourth vertex of the parallelogram.

.....

.....

(..... , ...)

[2]

(b) Find the coordinates of the mid point of a diagonal of your parallelogram.

.....

.....

(..... , ...)

[2]

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13. Two sets of rods of length 1, 2, 4, 8, 16 and 32 cm are available to make shapes.

1 cm	2 cm	4 cm	8 cm	16 cm	32 cm
1 cm	2 cm	4 cm	8 cm	16 cm	32 cm

Rods are joined end to end, with all parts of the rods forming part of the shape.

(a) Show how you could use some of these rods to make an equilateral triangle with sides of length 10 cm.

.....

.....

.....

[1]

(b) What would be the lengths of the sides of the **largest** possible equilateral triangle that could be made using these rods? You must state which rods are used and how the equilateral triangle is to be made.

.....

.....

.....

.....

.....

.....

[2]

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Turn over.

Examiner only

14. Write down the *n*th term of the following sequences.

(a) 6, 13, 20, 27, ...

.....

.....

[2]

(b) 26, 20, 14, 8, ...

.....

.....

[2]

15. *(a)* Divide £2680 in the ratio 5 : 3 : 2.

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[3]

(b) Write 1200 as a product of prime factors using index notation.

.....

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.....

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.....

.....

[3]

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GCSE MARKING SCHEME

METHODS IN MATHEMATICS (LINKED PAIR PILOT)

SUMMER 2012

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INTRODUCTION

The marking schemes which follow were those used by WJEC for the Summer 2012 examination in GCSE METHODS IN MATHEMATICS (LINKED PAIR PILOT). They were finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conferences were held shortly after the papers were taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conferences was to ensure that the marking schemes were interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conferences, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about these marking schemes.

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UNIT 1 (FOUNDATION TIER)

Methods Unit 1Foundation Tier Summer 2012		FINAL
1. 48 10 13 9 27 8	B1 B1 B1 B1 B1 B1 6	
2.(a) 13506 (b) seven million five hundred thousand (c) 9000 (d) 3687 (e) 100 × 5 or 100 × 5.1 or 98 × 5 = 500 or 510 or 490	B1 B1 B1 B1 M1 A1 6	 Accept seven and a half million. OR 9 thousand. Accept thousand(s) but not 1000(s). Award M1 A1 for unsupported answer of 490 - 510
3. (a) 19 (b) 455 (c) 504 (d)Any correct method for dividing 602 by 14 = 43 (e) 519 ×43 1557 20760 22317 (f) Changing 7/10 to 0.7(0) 6.62 (g) 9 ÷ 0.5 = 18 (18 + 1 =) 19 pylons	B1 B1 B1 M1 A1 M1 A1 M1 A1 M1 A1 B1 13	 Must be a complete correct algorithm that would lead to a correct answer Any correct method for the multiplication of 519 by 43 For either 1557 or 20760 (Apply 'one error' in other methods) CAO Place value errors get M0 A0 Or knowing value of 9 in 5.92 is 9/10 Award M1A1 for an answer of 18 FT "their 18" + 1
4. A at ½ B at 1 C at 0 D at or near ¼	B1 B1 B1 B1 4	 D should be nearer to ¼ than C or A
5. +3 -7 -1 + 0 + 2 + 6 -5	B3 3	Award B2 for finding at least 3 cards that make -2 Award B1 for finding any 2 cards that make -2
6. (a) 6y (b) 13a + 12b (c) 20 = 12 + m m = 8 (d) 30q + 2	B1 B2 B1 B1 B2 7	 Award B1 for either 13a or + 12b in an expression. If B2 awarded penalise -1 only for further incorrect working Award B1 for sight of 12 for 2p Accept embedded answers ISW. Award B1 for either 30q or 2 or both not in an expression. OR award B1 for 7q + 6q + 3 + 5q + 4q – 2 + 8q + 1 or equivalent
7. (a) 180 – 90 – 53 = 37 (°) (b) 360 – 85 – 115 – 84 = 76 (°) (c) 30(°) 360 – 90 – 30 – 125 = 115(°)	M1 A1 M1 A1 B1 M1 A1 7	Accept 90 - 53 *Alternative method 360 – 150 – 90 – 'their 55' M1* *= 65 A1 CAO* *(180 – 65 =)115 A1 FT their 65 if M1 awarded*

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Methods Unit 1Foundation Tier Summer 2012		FINAL
8. (a) 12 18 24 30 36 10 15 20 25 30 12 16 20 24 9 12 15 18 12	B2	Award B1 for 12 correct.
(b) 8/36 ISW	B2	FT their table. B1 for a numerator of 8 in a fraction <1. B1 for the 36 in a fraction <1. Do not penalize incorrect reduction of fractions.
(c) 8/36 × 720 = 160	M1 A1 6	FT their (b) × 720 (≠ ½) A0 here if there is incorrect reduction M1 A0 for 160/720 Notes Penalise -1 for use of words such as "8 out of 36", "8 in 36" OR "8:36". When fraction and wrong notation seen, DO NOT penalise wrong notation.
9. At least 3 additional given shapes tessellating correctly with at least one that meets given shapes At least 6 additional given shapes tessellating correctly	M1 A1 2	The additional shapes must consist of at least 1 square **and** 1 hexagon. Award A0 for any error in their tessellation.
10. 4.5 × 40 = 180 (Cooking time =) 180mins (or 3hrs) + 25 mins = 205 mins or 3 hours 25 mins (Chef begins cooking at) 10.05 (am) 4.5 × 40 = 180 + 25 will lose at least QWC1 Look for • spelling • clarity of labels • Use of correct notation for time • the use of simplified notation (watch for the use '=' being appropriate) QWC2: Candidates will be expected to • present work clearly, with words explaining process or steps AND • make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer QWC1: Candidates will be expected to • present work clearly, with words explaining process or steps OR • make few if any mistakes in mathematical form, spelling, punctuation and grammar in their final answer	B1 M1 A1 B1 Q W C 2 6	FT their 4.5 × 40 FT their cooking time QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. QWC1 Presents material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar OR evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar. QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar.
11. (a) plots Curve (b) x-values from their graph	P1 C1 B1 3	FT their plots. Must be a curve through the points. Polygon gets C0 For both x-values. FT their graph if at least 2 points of intersection
12.(a) (6, -6) or (-10,-6) or (4,2) (b) Method to find midpoint – on diagram or calculation shown (1.5,-4) or (-2.5, -4) or (1,-2)	B2 M1 A1 4	B1 for either coordinate correct OR B1 for a correct point plotted (with assumed scale from other points or default 1-1 scale) FT their parallelogram. Accept point plotted by the candidate as a method, hence M1 *If calculation method shown, then one correct coordinate implies M1.* *No method shown, one correct coordinate M0, A0*

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Methods Unit 1Foundation Tier Summer 2012		FINAL
13.(a) A suitable triangle shown or described (b) E.g.32+8+2, 32+8+2, 16+16+4+4 +1+1 (side length 42 cm)	B1 B2 3	Any use of subtraction ideas must be shown (justified) B1 for showing **selection** of rods that make a smaller equilateral triangle of side length >10 cm, OR for knowing sides are 42(cm)
14. (a) 7n - 1 (b) -6n + 32	B2 B2 4	B1 for 7n $\pm$ … B1 for -6n $\pm$ …
15. (a) 2680/10 (=268) with method to find 5, 3 or 2 shares 1340, 804, 536	M1 A2	A1 for any one of these correct *Unsupported answers, need sight of 2 of the 3 correct responses to imply the method* *Incorrect method seen implies M0, A0*
(b)Method to find prime factors, 2 correct before 2nd error 2, 2, 2, 2, 3, 5, 5 $2^4 \times 3 \times 5^2$	M1 A1 B1 6	 Ignore 1s for A1 but not for B1 FT provided an index>1 involved. Accept "." for multiply

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UNIT 1 (HIGHER TIER)

<table>
<tr><th>Methods Unit 1 Higher Tier Summer 2012</th><th></th><th>FINAL</th></tr>
<tr><td>1.(a) 16 or equivalent
(b) 180 or equivalent
(c) 71, 73 and 79
(d) Attempt to evaluate 11×11
121</td><td>B1
B1
B1
M1
A1
5</td><td>Accept a product of factors
Accept a product of factors

Not just sight of 11×11</td></tr>
<tr><td>2.(a) (6, -6) or (-10,-6) or (4,2)

(b) Method to find midpoint – on diagram or calculation shown

(1.5,-4) or (-2.5, -4) or (1,-2)</td><td>B2

M1

A1
4</td><td>B1 for either coordinate correct OR B1 for a correct point plotted (with assumed scale from other points or default 1-1 scale)
FT their parallelogram. Accept point plotted by the candidate as a method, hence M1
If calculation method shown, then one correct coordinate implies M1.
No method shown, one correct coordinate M0, A0</td></tr>
<tr><td>3.(a) A suitable triangle shown or described
(b) E.g.32+8+2, 32+8+2, 16+16+4+4 +1+1 (side length 42 cm)

(c) Strategy of working to find 4 equal sides
Explanation, could be by example;
e.g. 32, 32, 16+16, rods left only make 30, or similar</td><td>B1
B2

B1
E1
5</td><td>Any use of subtraction ideas must be shown (justified)
B1 for showing selection of rods that make a smaller equilateral triangle of side length >10 cm, OR for knowing sides are 42(cm)
Knowing that 4 equal sides are needed
Do not accept ‘can’t find 4 rods the same length’, B1, E0
Accept ‘not enough to make 4 numbers the same’, B1, E1</td></tr>
<tr><td>4.(a)
<table>
<tr><th></th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th><th>6</th></tr>
<tr><td>1</td><td>3</td><td>5</td><td>7</td><td>9</td><td>11</td><td>13</td></tr>
<tr><td>2</td><td>5</td><td>8</td><td>11</td><td>14</td><td>17</td><td>20</td></tr>
<tr><td>3</td><td>7</td><td>11</td><td>15</td><td>19</td><td>23</td><td>27</td></tr>
<tr><td>4</td><td>9</td><td>14</td><td>19</td><td>24</td><td>29</td><td>34</td></tr>
<tr><td>5</td><td>11</td><td>17</td><td>23</td><td>29</td><td>35</td><td>41</td></tr>
<tr><td>6</td><td>13</td><td>20</td><td>27</td><td>34</td><td>41</td><td>48</td></tr>
</table>
(b)(i) 8/36
(ii) 4/36
(iii) 28/36</td><td>B3

B1
B1
B1
6</td><td>B2 for any 20 to 26 correct entries,
B1 for any 10 to 19 correct entries
<u>FT for their completed table in (b) and ignore incorrect cancel</u>
ISW
ISW
ISW FT 1 – (i)</td></tr>
<tr><td>5.(a) 2680/10 (=268) with method to find 5, 3 or 2 shares
1340, 804, 536

(b)(i) Method to find prime factors, 2 correct before 2nd error
2, 2, 2, 2, 3, 5, 5
$2^4 \times 3 \times 5^2$
(ii) 3
(c) 0.1313… or $0.1\dot{3}\dot{}$

(d) 0.005</td><td>M1
A2

M1
A1
B1
B1
B2

B1
10</td><td>
A1 for any one of these correct
Unsupported answers, need sight of 2 of the 3 correct responses to imply the method
Incorrect method seen implies M0, A0
Ignore 1s for A1 but not for B1

FT provided an index>1 involved. Accept ”.” for multiply
FT from their (i)
B1 for 0.13 or 0.13… or $0.13\dot{}$ as an answer or seen in working</td></tr>
</table>

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Methods Unit 1 Higher Tier Summer 2012		FINAL
6.(a)(i) $7n - 1$ (ii) $-6n + 32$ (b) Total number of tiles $4n^2$ or equivalent (Number of tiles) shaded $2n^2 + 1$ **and** (Number of) white $2n^2 - 1$ or equivalents Candidates without algebraic generalisations may be awarded QWC2 provided their process steps lead to a statement Look for • spelling • clarity of labels • the use of simplified notation, e.g. n^2 rather than n×n, and watch for the use '=' being appropriate QWC2: Candidates will be expected to • present work clearly, with words explaining process or steps AND • make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer QWC1: Candidates will be expected to • present work clearly, with words explaining process or steps OR • make few if any mistakes in mathematical form, spelling, punctuation and grammar in their final answer	B2 B2 B2 B3 Q W C 2 <

Methods Unit 1 Higher Tier Summer 2012		FINAL
9. $3A = 4\Pi r^2$ $\frac{3A}{4\Pi} = r^2$ $r = \sqrt{(3A/4\Pi)}$	B1 B1 B1 3	*FT until 2nd error* Accept multiplication signs shown throughout
10.(a) A and D selected Gradients are both 3 or gradients are the same (b) A and E selected	B1 E1 B1 3	 Depends on B1 being awarded. Accept 'slope' or similar. m = 3 or 'both 3x' is insufficient, needs interpretation
11.(a) -7 and 5 (b) All plots correct All their 8 plots joined with a curved line (c) -3 and 1.5 ($\pm$0.1) (d) y = 6 seen or implied 2.1 ($\pm$0.1) **and** -3.6 ($\pm$0.1)	B2 B2 B1 B2 M1 A1 9	B1 for each correct answer FT from (a). B1 for any 5 correct plots FT from (a) FT from (b). B1 for each correct answer FT from (b).
12. $30 \times 80 = 25 \times CE$ OR $30 \times (30 + 50) = 25 \times CE$ $CE = 96$ (cm) $DE = 96 - 25$ $= 71$ (cm)	M1 A1 m1 A1 4	
13.(a) 0.25 (b) $4(x - 20)(x + 20)$ (c) 27 (d) $10 + 15\sqrt{2} - 2\sqrt{2} - 6$ $= 4 + 13\sqrt{2}$	B2 B3 B1 B2 B1 9	B1 for 2 correct steps, following through 1 error: reciprocal, cube root, square. B1 for an answer of 1/4 B2 for $(2x - 40)(2x + 40)$ or other correct partially factorised including a correct pair of brackets B1 for $4(x \ldots 20)(x \ldots 20)$ or $(2x \ldots 40)(2x \ldots 40)$ B1 for any 3 of the 4 terms correct CAO. Mark final answer
14.(a) Correct region shaded (b) Correct region shaded (c) Correct region shaded	B1 B1 B1 3	Intersection of the two regions A and B indicated Outside A and B but within rectangle indicated A together with outside B indicated
15. Sight of numbers (on the cards): 1, 2, 5, 7, 10, 14, 35, 70 (a) Strategy, need to find P(even, odd) and P(odd, even) 4/8×4/7 seen 4/8×4/7 + 4/8×4/7 OR 2× 4/8×4/7 = 32/56 or equivalent (b) Strategy, e.g. 1 – P(no even) 1 - P(no even) = 1 - 4/8×3/7 = 44/56 or equivalent	B1 S1 M1 M1 A1 S1 M1 A1 8	FT in (a) and (b) from incorrect factors, provided all unique and at least four numbers are correct factors of 70 OR **full** alternative Mark final answer Or equivalent complete strategy Or other full method Mark final answer
16.(a) $(x - 8)^2 + 2$ (b) Attempt to use common denominator $\frac{3(2x+3) - 4(3x-2) + 2}{(12)}$ or equivalent $\frac{6x + 9 - 12x + 8 + 2}{12}$ or equivalent $= \frac{19 - 6x}{12}$ with statement (c) $\frac{(2x + 7)(x - 1)}{5(2x + 7)}$ $\frac{x - 1}{5}$	B2 B1 M2 A1 A1 B2 B1 B1 11	B1 for a= -8, B1 for b = 2, only award B2 for $(x - 8)^2 + 2$ M1 for 2 of the three terms correct. May be expressed as separate fractions, or working without consideration of the denominator Convincing step. FT from 1 error, i.e. A1. Denominator must be seen Must follow from correct working Accept LHS=RHS or writing $(19 - 6x)/12 = (19 - 6x)/12$ B1 for $(2x \ldots 7)(x \ldots 1)$ CAO. Mark final answer

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Surname	Centre Number	Candidate Number
Other Names		0

GCSE LINKED PAIR PILOT

4363/01

METHODS IN MATHEMATICS

UNIT 1: METHODS (NON-CALCULATOR)
FOUNDATION TIER

A.M. WEDNESDAY, 11 January 2012

$1\frac{1}{2}$ hours

CALCULATORS ARE NOT TO BE USED FOR THIS PAPER

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

Take π as 3·14.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question **10**.

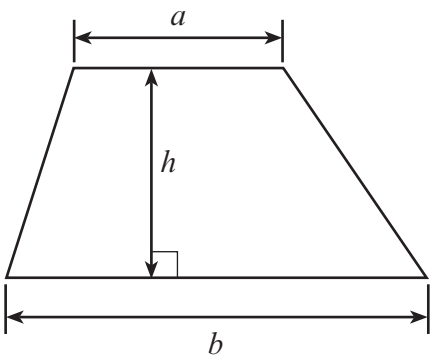
For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1	**4**	
2	**2**	
3	**6**	
4	**5**	
5	**3**	
6	**5**	
7	**12**	
8	**8**	
9	**6**	
10	**8**	
11	**6**	
12	**5**	
13	**5**	
14	**2**	
15	**3**	
TOTAL MARK		

4363 010001

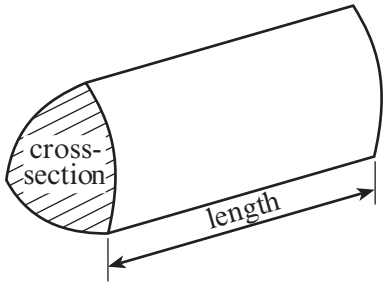
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Formula List

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



Volume of prism = area of cross-section × length



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Examiner only

1. In this question you may **only** use the numbers in the following table.

18	13
5	15
21	10

(a) Write down two numbers that add up to 33.

.....

.....

..... [1]

(b) Write down a factor of 20.

..... [1]

(c) Write down a prime number.

..... [1]

(d) Write down a multiple of 7.

..... [1]

2. What is the difference in the values of the 6 in the numbers 4652 and 71 846?

.....

.....

..... [2]

4363 010003

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Examiner only

3. Calculate each of the following.

(a) 700 – 432

.....

.....

.....

[1]

(b) 29 × 6

.....

.....

.....

[1]

(c) 161 ÷ 7

.....

.....

.....

[1]

(d) 463 × 27

.....

.....

.....

.....

.....

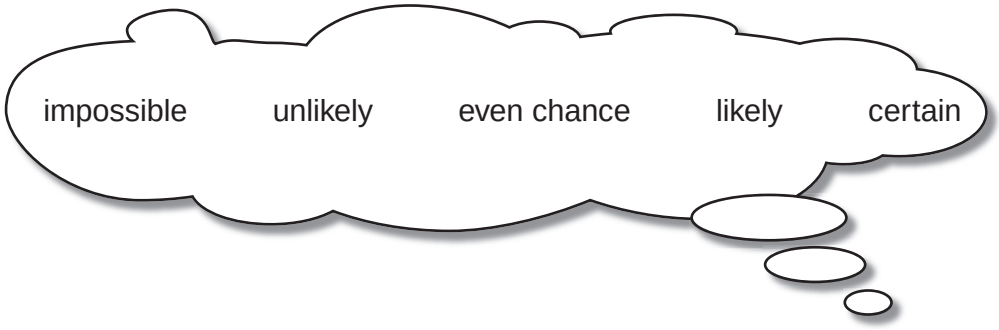
.....

[3]

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4. *(a)* From the list below, choose **one** expression to describe the probability of each of the events happening.



(i) Obtaining an 8 on a fair dice numbered 1 to 6.

.....

[1]

(ii) There will be a sunny day in Swansea in July.

.....

[1]

(iii) A person chosen at random from the audience at a concert has their birthday on the 10th April.

.....

[1]

(b) The 26 letters of the English alphabet are put into a box. One is picked out at random. What is the probability that it is the letter F?

.....

.....

[1]

(c) For lunch, Sam either has a cooked meal or has sandwiches. The probability that Sam has a cooked meal for lunch is $\frac{11}{17}$. What is the probability that he has sandwiches for lunch?

.....

.....

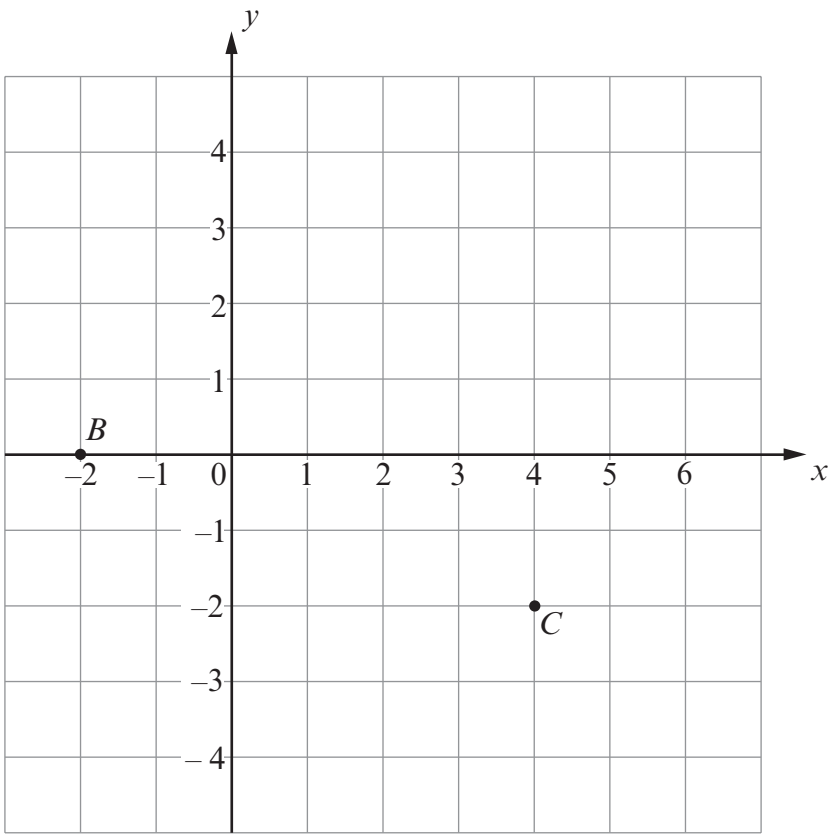
[1]

4363 010005

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5. On the grid below, plot point A with coordinates (2, 4).



Write down the coordinates of the points B and C, shown in the grid.

The coordinates of B are (..... , ...)

The coordinates of C are (..... , ...)

[3]

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Examiner only

6. The table below shows the scores in the final of the Langford Bay Golf Championship.
The player with the lowest score wins the championship.

Name	Score
A. Jenkins	–2
H. Smith	8
J. Evans	1
L. Hakami	–3
F. Loxley	–7
P.J. Ames	5
G. Francis	–1



(a) The table below lists some of the names and scores of the players in order from 1st place to 7th place.
Complete the table.

[3]

Position	Name	Score
1st		
2nd	L. Hakami	–3
3rd		
4th		
5th	J. Evans	1
6th	P.J. Ames	5
7th		

(b) What was the difference between the scores of the players in 2nd and 6th places?

.....

.....

[1]

(c) Which two players had a difference in their score of 5?

.....

.....

[1]

Turn over.

4363 010007

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Examiner only

7. *(a)* Write down the next term in the sequence.

4, 13, 22, 31, ...

[1]

(b) Give the next term in the sequence **and** write in words the rule for finding the next term in the sequence.

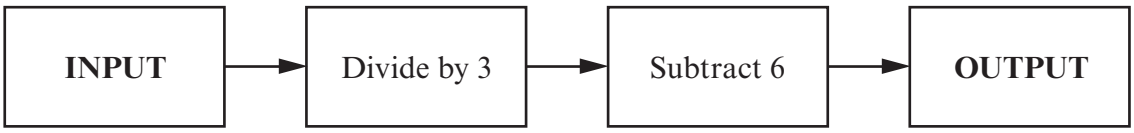
240, 120, 60, 30, ...

Rule: .....

.....

[2]

(c) For the number machine below,



find the value of the **OUTPUT** when the **INPUT** is 21.

.....

.....

[1]

(d) Simplify $8a + a + 4a$.

.....

[1]

(e) Simplify $4x + 7 + 9x - 1$.

.....

.....

[2]

(f) Simplify $2m + 3m - 2n$.

.....

[1]

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(g) Given that $m = 3n + 2p$, find the value of m when n is 10 and p is 7.

.....

.....

.....

[2]

(h) Christina decides to run a 10 mile race but usually measures her distance in kilometres.



The following rule is used to change from kilometres to miles.

Number of miles = 5 × Number of kilometres ÷ 8

Calculate the number of kilometres that Christina will run in the 10 mile race.

.....

.....

.....

.....

[2]

4363 010009

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8. *(a)* Find the size of the angles marked *a* and *b* in the diagram below.

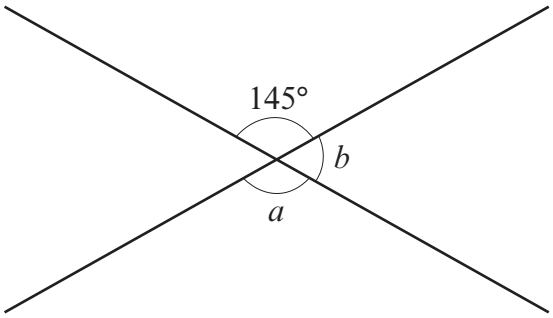


Diagram not drawn to scale

.....

.....

$a =$ ..... ° $b =$ ..... °

[3]

(b) Find the size of the angles marked *c* in the diagram below.

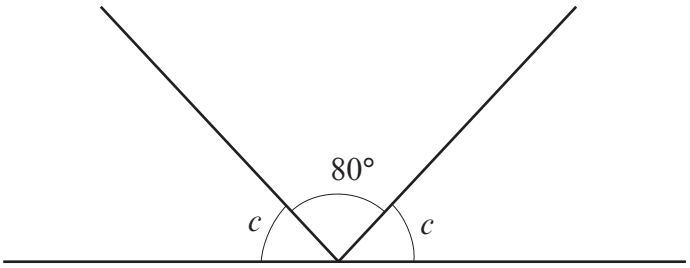


Diagram not drawn to scale

.....

.....

$c =$ ..... °

[2]

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(c) Find the size of the angle marked d in the diagram below.

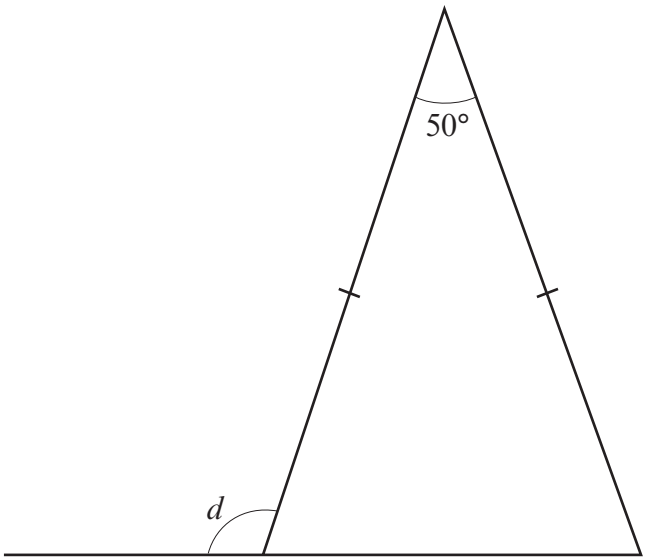


Diagram not drawn to scale

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.....

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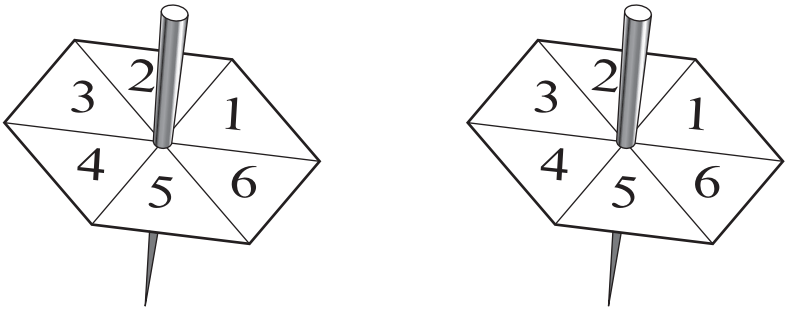
$d =$ ..... °

[3]

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9. The following two spinners are spun.



Kevin adds together the two numbers obtained to get a total score.
The table below shows some of the possible total scores.

Second spinner							
	6	7	.....	.....	.....	.....	.....
	5	6	.....	.....	.....	.....	.....
	4	5	6	.....	.....	.....	.....
	3	4	5	.....	.....	.....	.....
	2	3	4	5	6	7	.....
	1	2	3	4	5	6	7
		1	2	3	4	5	6

First spinner

(a) Complete the table to show **all** the possible total scores.

[2]

(b) What is the probability of getting a total score of 9?

.....

.....

[2]

(c) If Kevin spins the two spinners 180 times, how many times would he expect to get a total score of 9?

.....

.....

.....

[2]

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Examiner only

10. *You will be assessed on the quality of your written communication in this question.*

A supermarket sells Jam Tarts in two sizes of box.

Regular size	Box of 6	£1.30
Jumbo size	Box of 15	£3

The supermarket has a special offer.

Buy any box
&
get a 2nd box of the same size
or of a smaller size for ½ price!

Mrs Jones needs 70 Jam Tarts for the local church coffee morning.
Explain clearly, which is the cheapest way for her to buy the Jam Tarts and how much would they cost.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

[8]

Turn over.

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11. During a primary school activity day, children could take part in any of three different activites. 80 children played football, 95 children played rounders and 30 children danced.

40 children played football and rounders.
12 children played rounders and danced.
20 children played football and danced.

3 children took part in all three activities.

Draw a Venn diagram to show the above information and find the total number of children who took part in the activity day.

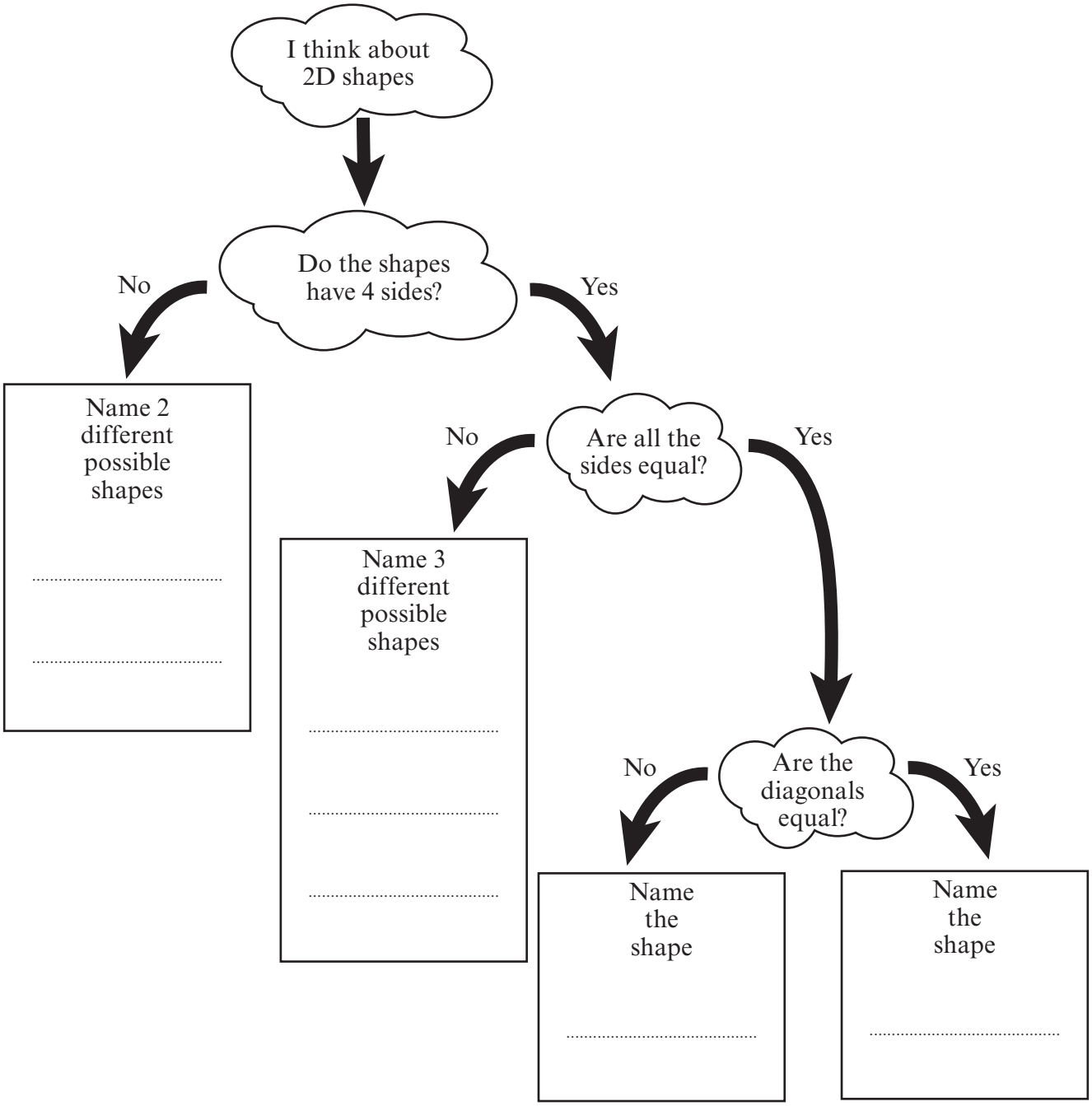
The total number of children who took part in the activity day = ...

[6]

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12. Fill in the answers in the shape sorter below.



[5]

Turn over.

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Examiner only

13.

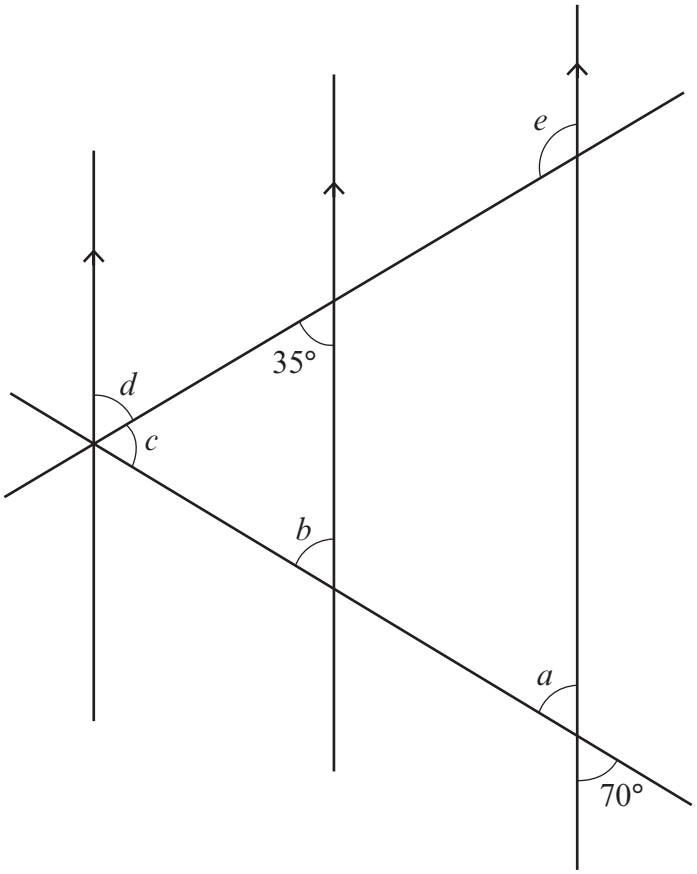


Diagram not drawn to scale

Find the size of the angles marked *a, b, c, d* and *e*.

.....

.....

.....

a = ... °

b = ... °

c = ... °

d = ... °

e = ... °

[5]

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14. A die has previously been used and shown to be fair.
This fair die is thrown a further 60 times; a six is scored on the die on 15 of these throws.
Giving a reason for your answer, write down the probability that a six is scored on the next throw.

.....

.....

.....

.....

[2]

15. *(a)* Find the highest common factor of 30 and 75.

.....

.....

.....

.....

.....

[1]

(b) Find the lowest common multiple of 6 and 21.

.....

.....

.....

[2]

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GCSE MARKING SCHEME

METHODS IN MATHEMATICS (LINKED PAIR PILOT)

JANUARY 2012

INTRODUCTION

The marking schemes which follow were those used by WJEC for the January 2012 examination in GCSE METHODS IN MATHEMATICS. They were finalised after detailed discussion at examiners' conferences by all the examiners involved in the assessment. The conferences were held shortly after the papers were taken so that reference could be made to the full range of candidates' responses, with photocopied scripts forming the basis of discussion. The aim of the conferences was to ensure that the marking schemes were interpreted and applied in the same way by all examiners.

It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conferences, teachers may have different views on certain matters of detail or interpretation.

WJEC regrets that it cannot enter into any discussion or correspondence about these marking schemes.

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Unit 1 – Foundation Tier

<table>
<tr><th>Methods Unit 1 Foundation Tier January 2012</th><th>Mark</th><th>Comment</th></tr>
<tr><td>1. (a) 18 & 15
(b) 5 and/or 10
(c) 5 and/or 13
(d) 21</td><td>
B1
B1
B1
B1
4</td><td>Any incorrect answer(s) award B0 throughout
Eg If answers of 5 & 15 in part (b) award B0

Accept 3 × 7</td></tr>
<tr><td>2. 594</td><td>B2

2</td><td>B1 for sight of 600 or 6 OR B1 for 100 times as much.</td></tr>
<tr><td>3. (a) 268
(b) 174
(c) 23
(d) 463
× 27
3241
9260
12501</td><td>B1
B1
B1
M1

A1

A1

6</td><td>

For either 3241 or 9260 (Apply ‘one error’ in other methods)

CAO
Place value errors get M0 A0</td></tr>
<tr><td>4 (a) (i) impossible
(ii) likely
(iii) unlikely
(b) 1/26
(c) 6/17</td><td>B1
B1
B1
B1
B1
5</td><td>

Penalise consistent use of incorrect notation e.g. 1 in 26 once only in parts (b) & (c)</td></tr>
<tr><td>5. A plotted at (2, 4)
B(-2, 0)
C(4, -2)</td><td>B1
B1
B1

3</td><td>Reversed coordinates B0 throughout
Penalise -1 once only for incorrect coordinate notation e.g. (-2x, 0y)</td></tr>
<tr><td>6. (a)
<table>
<tr><th>Position</th><th>Name</th><th>Score</th></tr>
<tr><td>1st</td><td>F. Loxley</td><td>-7</td></tr>
<tr><td>2nd</td><td></td><td></td></tr>
<tr><td>3rd</td><td>A. Jenkins</td><td>-2</td></tr>
<tr><td>4th</td><td>G. Francis</td><td>-1</td></tr>
<tr><td>5th</td><td></td><td></td></tr>
<tr><td>6th</td><td></td><td></td></tr>
<tr><td>7th</td><td>H. Smith</td><td>8</td></tr>
</table>
(b) 8
(c) A. Jenkins & F. Loxley</td><td>B3

B1
B1
5</td><td>B2 for 2 or 3 correct
B1 for 1 correct.

Accept -8
Accept -2 and -7 OR 1st and 3rd.</td></tr>
<tr><td>7. (a) 40
(b) 15
Halving or dividing the previous term by two
(c) 1
(d) 13a
(e) 13x + 6

(f) 5m – 2n
(g) 30 or 14 seen
= 44
(h) 10 × 8 ÷ 5
= 16</td><td>B1
B1
B1
B1
B1
B2

B1
B1
B1
M1
A1
12</td><td>

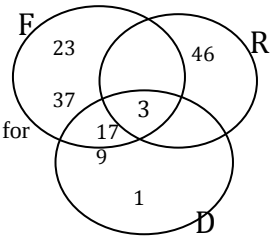
Accept “divide by 2” OR “ ÷ 2”

Award B1 for either 13x or + 6 within an expression

CAO</td></tr>
</table>

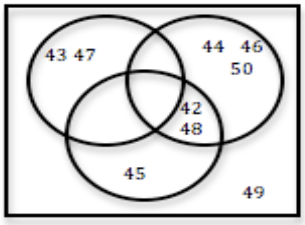
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Methods Unit 1 Foundation Tier January 2012	Mark	Comment
8. (a) a = 145(°) b = 180 – 145 = 35(°) (b) c = (180 – 80) ÷ 2 = 50(°) (c) (180 – 50) ÷ 2 65(°) d = 115(°)	B1 M1 A1 M1 A1 M1 A1 A1 8	 Accept (360 – 290) ÷ 2 FT 50 + "their 65" OR 180 – "their 65". "Their 65" may be on the diagram
9. (a) 8 9 10 11 12 7 8 9 10 11 7 8 9 10 6 7 8 9 8 (b) 4/36 ISW (c) 4/36 × 180 = 20	B2 B2 M1 A1 6	Award B1 for 12 correct. FT their table. B1 for a numerator of 4 in a fraction <1. B1 for the 36 in a fraction <1. Do not penalize incorrect reduction of fractions. FT their (b) × 180 (≠ ½) A0 here if there is incorrect reduction M1 A0 for 20/180 <u>Notes</u> Penalise -1 for use of words such as "4 out of 36", "4 in 36" OR "4:36". When fraction and wrong notation seen, DO NOT penalise wrong notation.
10. An attempt to buy box of jam tarts with getting the 2nd at half price A method allowing at least 70 to be bought Cost of their method of buying at least 70 Method to get (cheapest) of 4 Jumbo + 2 Regular Cost = 3 + £1.50 + 3 + 1.50 + 1.30 + 0.65 = £10.95 (and implied as cheapest) Look for • Correct units used • Spelling in at least 1 statement/sentence • Clarity of text explanations • Correct terminology • the use of simplified notation (watch for the use '=' being appropriate) • Clearly linking work with amount of boxes bought QWC2: Candidates would be expected to • clearly show how they arrived at their solution and show correct units AND • have few errors in spelling, punctuation and grammar QWC1: Candidates would be expected to • clearly show how they arrived at their solution and show correct units OR • have few errors in spelling, punctuation and grammar	S1 M1 A1 M1 M1 A1 QWC 2 <

Methods Unit 1 Foundation Tier January 2012	Mark	Comment
11. Three circles with the number 3 in the correct place 37 correct for football & rounders only 9 correct for rounders & dance only 17 correct for football & dance only 23 46 1 (any 2 correct) & correct labeling 136 children	B1 B1 B1 B1 B1 B1 6	 Accept F, R, D for labels CAO
12. Left box: any triangles or polygons with ≥5 sides (including a circle) Next box: any 3 quadrilaterals, not rhombus or square Next: Rhombus Far right: Square	B1 B2 B1 B1 5	Needs 2 answers for B1. (Accept e.g. isosceles triangle & right-angled triangle as different). **All boxes** - do not accept 'polygon' or 'quadrilateral' B1 for any 2 correct answers CAO. Do not accept 'diamond' CAO
13. a = 70 b = 70 c = 75 d = 35 e = 145	B1 B1 B1 B1 B1 5	 FT 145 – b FT 110 - c
14. 1/6 Explanation related to FAIR or relative frequency, e.g. '6 sides have equal/same probability/chance'	B1 E1 2	OR e.g. 115/660 OR 1015/6060 OR other suitable approximation to 0.166666 With a response of 1/6, accept 'there are 6 faces on a dice', or 'previous results have no impact on fairness'
15.(a) 15 (b) 2×3 and 3×7 OR other method 42	B1 M1 A1 3	CAO Or sight of 2×3×7 CAO

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Unit 1 – Higher Tier

Methods Unit 1 Higher Tier January 2012	Mark	Comment
1. Left box: any triangles or polygons with $\geq$5 sides (including a circle) Next box: any 3 quadrilaterals, not rhombus or square Next: Rhombus Far right: Square	B1 B2 B1 B1 5	Needs 2 answers for B1. (Accept e.g. isosceles triangle & right-angled triangle as different). All boxes - do not accept 'polygon' or 'quadrilateral' B1 for any 2 correct answers CAO. Do not accept 'diamond' CAO
2.(a) Attempt at method 3÷8 = 0.375 (b) Numerator 0.0036 Multiplying numerator and denominator by suitable multiple of 10 (if correct 10000) – for eliminating decimals 1/10000 (c) 420	M1 A1 B1 B1 B1 B2 7	Sight of digits 375 CAO OR 0.03/300, or 0.12/1200 FT depending on their numerator. OR 36/360000, or 3/30000, or 12/120000 CAO B1 for sight of 70 with intention to multiply by 6, OR (78-8)×6, OR 2 trials substituted and correctly evaluated
3. a = 70 b = 70 c = 75 d = 35 e = 145	B1 B1 B1 B1 B1 5	 FT 145 – b FT 110 - c
4.(a) (24 + 8)/16 = 2 (b) -28x – 85y (c)(i) 5, 16, 33 (ii) 320 (d) $(3a + 2)^7$	M1 A1 B2 B2 B1 B1 8	Allow 1 error with a sign CAO. (an answer of -2 implies M1) B1 for each term. Do not ignore further work if B2 then -1 B1 for 2 correct terms in the correct position, or for 0, 5, 16
5.(a)(i) The numbers 42 to 50 placed correctly  (ii) 2/9 7/9 0 (b) 1/6 Explanation related to FAIR or relative frequency, e.g. '6 sides have equal/same probability/chance'	B3 B1 B1 B1 B1 E1 8	B2 for 7 or 8 numbers placed correctly, the other 2 or 1 number(s) respectively omitted or incorrectly placed, OR B1 for 5 or 6 numbers placed correctly, the other 4 or 3 numbers respectively omitted or incorrectly placed *In (a)(ii) and (b) ignore incorrect cancelling.* Or FT their Venn diagram FT 1 – 1st answer OR e.g. 115/660 OR 1015/6060 OR other suitable approximation to 0.166666 With a response of 1/6, accept 'there are 6 faces on a dice', or 'previous results have no impact on fairness'
6.(a) 15 (b) 2×3 and 3×7 OR other method 42 (c) $\sqrt{(8 \times 8)}$ 8	B1 M1 A1 M2 A1 6	CAO Or sight of 2×3×7 CAO M1 for each CAO

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Methods Unit 1 Higher Tier January 2012	Mark	Comment
7. Idea × 16 for Saturday and Sunday 8x + 16(x + 2) + 16(x + 3) or equivalent 8x + 16x + 32 + 16x + 48 or equivalent 40x + 80 or 40(x +2) or other correctly factorised expression	B1 B1 B1 B1 4	*FT until 2nd error* Not giving double rate for Sat / Sunday is1 error
8. Square 90° Octagon: 360÷8 Exterior 45° Interior 135° Gap shown to be either 90+45 OR 360 – 135 – 90 Suitable explanation of filling the gap, e.g. 'no gaps', 'fit perfectly together', 'fit together' Confusion between interior and exterior angles will affect the QWC mark, giving a maximum QWC1. If no calculation, still could be QWC2 if sufficient text (e.g. 2 short meaningful sentences, or one long clear meaningful sentence) Do not penalise no ruler in a sketch QWC2: Candidates will be expected to • present work clearly, with words explaining process or steps **AND** • make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer QWC1: Candidates will be expected to • present work clearly, with words explaining process or steps **OR** • make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer	B1 M1 A1 A1 B1 E1 QWC 2 8	Or alternative methods At least 1 of the exterior or interior maybe implied FT 180 – their exterior, or equivalent Or equivalent Conclusions must be stated not just implied. Must imply 'Yes' *If no calculations shown:* *SC2 for at least another 2 rows drawn, e.g. hexagons above and hexagons below, with squares OR* *SC1 for at least another 1 row drawn, OR appropriate cuts with 'fill in' described or shown, to continue the pattern or complete a rectangle.* *THEN E mark if appropriate* QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar OR evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar. QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar.
9.(a) ax – bx = h + g x(a – b) = h + g x = (h + g)/(a – b) (b) (x + 4)(x – 4) (c) (x – 3)(x -5) (d) $n^2 + 3$ (e) (2x +3)(x + 4) = -3 $2x^2 + 8x + 3x + 12$ $2x^2 + 11x + 15 = 0$ (2x + 5)(x + 3) = 0 x = -5/2 AND x = -3	B1 B1 B1 B1 B2 B2 S1 B1 B1 M1 A1 13	Collect x terms FT until 2nd error Factorise Division ISW B1 for (x ..3)(x .. 5) or x(x-5) -3(x-5) or equivalent. If B2 penalise 'solving' -1 B1 for n^2 + … (not 0) OR second difference of 2 with n^2 *Alternative:* *Correct interpretation of the information* *At least 2 suitable trial with product evaluated, 1 above & 1 below* *First value found* *At least 2 suitable trials, 1 above & 1 below* *Second value found with confirmation*

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Methods Unit 1 Higher Tier January 2012	Mark	Comment
10.(a) 2.4×10^6	B2	B1 for 2.38×10^6 OR 2 400 000 or equivalent to 2400000 (may be incorrect standard form)
(b)(i) Idea of 2×5 OR 2 and 5 both found as factors	M1	
$2^6 \times 5^6$	A1	
(ii) E.g. "there is an even number of each of the prime factors", OR "all prime factors have even powers", OR " 1 million = 1000 × 1000", OR "$10^6 = 10^3 \times 10^3$", '10^6 is an even power'	E1	Accept $\sqrt{1000000} = 1000$. Do not accept 'all powers even' without working. Accept inaccurate notation if intention clear, e.g. square and square root used inaccurately
	5	
11. 180 – 85 OR 180 – 130	M1	Or statement that opposite angle cyclic quad 180°
a = 95°	A1	
b = 50°	A1	No FT
	3	For reversed answers award SC2
12.(a) 0.3 indicated for no soup	B1	In working or on tree
Idea 0.7 ×… = 0.28	M1	
P(buys a sandwich) = 0.4	A1	In working or on tree
Second branches 0.4 0.6 0.4 0.6	B1	FT their P(buys sandwich) if M1 awarded
(b) 0.3 × 0.6	M1	FT their 0.6 from (a)
= 0.18	A1	
	6	
13. B A D C E F	B4	B3 for any 4 or 5 unambiguously correct, OR B2 for any 2 or 3 unambiguously correct, OR
	4	B1 for any 1 unambiguously correct, OR
14.(a) $1/1000^{2/3}$ OR 10^{-2} or similar first step	M1	
$1/10^2$ OR 1/100 or similar second step	M1	Needs reciprocal. First M1 mark maybe implied.
0.01	A1	CAO
(b)(i) a = 7	B1	Accept embedded answers
$x^2 + 14x + 49$ (-2) OR method to find b	M1	
b = -2	A1	Accept embedded answers
(ii) $(x + 7)^2 - 2 = 0$	B1	Use of completing the from (i)
$(x + 7)^2 = 2$	M1	
$x + 7 = (\pm)\sqrt{2}$	M1	
$x = \pm\sqrt{2} - 7$	A1	Must show $\pm$
	10	
15. m = -9/3 (=-3)	B1	
c = 9	B1	
Equation y = -3x + 9	B1	FT their m and c
Use of x = 1 OR alternative method to find y coord.	M1	FT
y = 6	A1	FT
Perpendicular gradient -1/m (= 1/3)	B1	FT from their m
Method to find perpendicular equation	M1	FT their -1/m and y coordinate.
x – 3y +17 = 0 or equivalent	A1	Accept unsimplified forms. Ignore further incorrect working once a correct equation is seen
	8	

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