GCSE MARKING SCHEME

MATHEMATICS - LINEAR

SUMMER 2014

INTRODUCTION

The marking schemes which follow were those used by WJEC for the Summer 2014 examination in GCSE MATHEMATICS - LINEAR. 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.

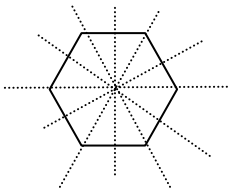
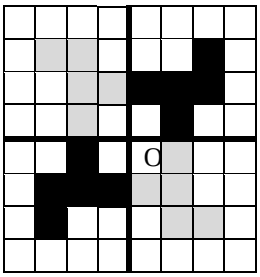
It is hoped that this information will be of assistance to centres but it is recognised at the same time that, without the benefit of participation in the examiners' conferences, teachers may have different views on certain matters of detail or interpretation.

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

PAPER 1 - FOUNDATION TIER

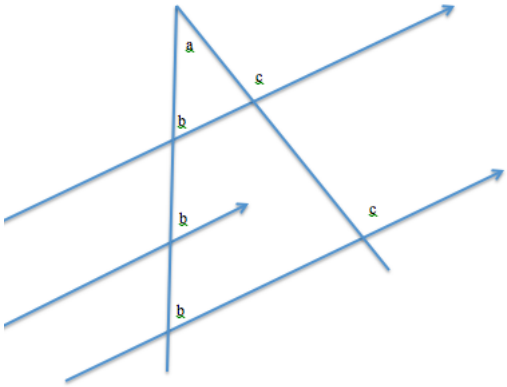
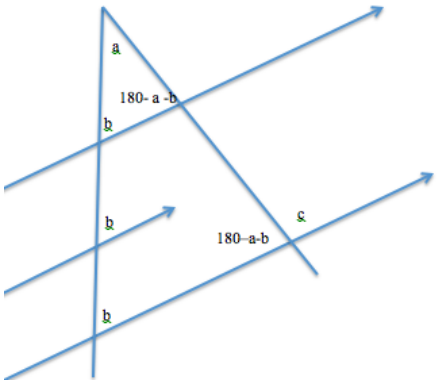
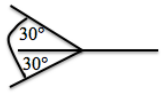
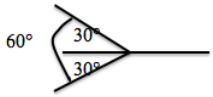
Summer 2014 Paper 1 (Non calculator) Foundation Tier	Marks	Comments
1. (a) (i) 3 411 002	B1	
1. (a) (ii) seventy two thousand **(no hundreds) (and)** sixty five	B1	
1. (b) (i) 17 and 63	B1	B0 for 40+40.
1. (b) (ii) 39	B1	
1. (b) (iii) 63	B1	
1. (b) (iv) 6	B1	Allow 48/8 = 6, 6×8=48 but B0 for 48/6 = 8
1. (b) (v) 81	B1	
1. (c) 12 or 16	B1	For 12, 16 or both. Allow 12×8 OR 16×6 **As always, B0 for a choice of answers with at least one answer incorrect**
1. (d) (i) 6570	B1	
1. (d) (ii) 6600	B1	
2. (a) (i) 7652	B1	
2. (a) (ii) 2576	B1	
2. (b) (i) **(0)**·06	B1	
2. (b) (ii) 2·92	B1	
2. (c) 2·9×100 OR 3×98 OR 3×100 = 290 OR 294 OR 300	M1 A1	Only these three estimates. **M1,A1 for unsupported answers of 290, 294 OR 300**
3. Hours = 20 × 15 (minutes) 20 × ¼ (hours) = 300 (minutes) = 5 (hours) Payment = 8 × 5 + 12 = (£) 52	✓ M1 A1 M1 A1	'hours' not required at this stage F.T. 'their time' (must be an attempt to convert to hours). **Special cases** Candidates who do 8×20+12 get SC1 for the (£)172 **Similarly SC1 for (£)132 from 8×15+12**
Look for • spelling • clarity of text explanations, • the use of £s, hours and minutes 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	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

Summer 2014 Paper 1 (Non calculator) Foundation Tier	Marks	Comments
4. (a) certain	B1	**(Welsh is sicr)**
4. (b) unlikely	B1	**(Welsh is annhebygol)**
4. (c) even chance	B1	Do not accept 'even' but B1 for 'evens'. **(Welsh is siawns deg)**
5. (a) (i) 39 (ii) 44	B1 B1	B0 for $6n+9$
5. (b) Divide the previous term by 4	B1	Accept ÷4. Accept × ¼. **Accept quarterly.** **Accept 'halve and halve again'** **B0 for dividing into quarters** B0 for $n/4$
5. (c) ($p= 3\times2 + 4\times3 - 6\times-1 =$) 6+12+6 = 24	M1 A1	Award only when a correct substitution is assured Unsupported 24 gets M1,A1. Any other unsupported answer gets M0,A0. SC1 for seeing $6+12-6 = 12$
5. (d) $4x$ **ISW**	B1	
All parts (a) – (b) marked at the same time **To be viewed with diagram** 6. (a) Missing inside segment = 2 Perimeter = 9+9+8×3+2×2 = 46 (cm) **To be viewed with diagram** (b) Area = 8×3+4×3×3 OR 8×9 – 2×3×2 (= 24 + 36) (= 72 – 12) = 60 cm^2	✓ S1 M1 A1 M1 A1 U1	**You must also check the diagram for any working.** **Must be seen in part (a).** Attempt to **add all sides** of the shape. **Use 42+2x for M1 where x stands for 'their 2'** **S1, M1 for methods that imply the '2', e.g. 9×2+8×2+4×3** C.A.O. Attempt to add all areas of the shape OR difference of areas C.A.O. Independent of all other marks.
7. A(−4, 2), B(−1, −5) and C(4, 3) plotted.	B3	B1 for each. Reversed coordinates get B0. **Condone missing letters or A, B and C used instead of dots, as long as the points are identifiable.** **Ignore triangles joining the points.**
8. (a) **Use overlay** $X\hat{Y}Z$ = 62° (±2°) $X\hat{Z}Y$ = 47° (±2°) Completed triangle.	 M1 M1 A1	 Dependent on at least one M1. SC2 for a 'reversed' triangle (see overlay).
8. (b) Obtuse (Aflem)	B1	Accept misspellings.
To be viewed with diagram 9. Volume = 20 × 15 × 10 (× ½) = 1500 (cm^3) = 1500/1000 = 1·5 litres	✓ M1 A1 M1 A1	 No need for the ½ for the M1. CAO FT 'their 1500'/1000 'litres' not required but A0 for incorrect units.
To be viewed with table 10. (a) (£) 8.40 and 10:35 **(a.m.)**	B2	B1 for each B0 for 10 minutes
To be viewed with table 10. (b) Taxi fare is **(£)**17 - **(£)**27 Tube tickets cost **(£)**20 Compares (£)17 with (£)20 Compares (£)27 with (£)20	✓ B1 B1 B1 B1	F.T. their figures Per person solutions **Taxi fare is (£)17 - (£)27 B1** **Divides any taxi fare by 5 B1** **Compares (£)3.40 with (£)4 B1** **Compares (£)5.40 with (£)4 B1** **2 taxis (Maximum 3 marks available)** **Taxi fare is (£)34 - (£)54 B1** **Tube tickets cost (£)20 B1** **Taxi (always) more than tube B1**

Summer 2014 Paper 1 (Non calculator) Foundation Tier	Marks	Comments	
11. (a) 	B2	B1 for 3 or more correct lines drawn AND no incorrect lines.	
11. (b) 	B2	B1 for each of 1st and 3rd quadrants	
12. (3/8) = 8)3.000 **(0).375 ISW**	M1 A1	Any valid method. Must show a division method being implemented **M0, A0 for unsupported (0).38**	
All parts (a) – (b) marked at the same time 13. (a) (62) **62** (63) **64** (52) **52** **53** (54) (42) (42) **43** (44) (32) (32) (33) **34**	B2	B1 for at least 3 correct entries	
(b) (i) $\frac{6}{16}$ I.S.W.	B2	F.T. their table B1 for a numerator of 6 in a fraction less than 1. B1 for a denominator of 16 in a fraction less than 1. **Penalise -1 once only for wrong notation, e.g. 6 out of 16 OR 6:16**	
(ii) $\frac{6}{16}$ of 400 = 150	M1 A1	F.T. their (b)**(i)** if a fraction less than 1**. (≠1/2)** M1,A0 for 8/16 of 400 if it is F.T. from their table 150 out of 400 gets the M1, A1 but 150/400 gets M1, A0. A0 if using an incorrect reduction of the fraction from (b)(i)	
To be viewed with diagram 14. (a) (x =) 180 – 53 – 53 = 74(°)	M1 A1		
To be viewed with diagram 14. (b) 360 – (112 + 67 + 78) OR 360 – 257 103(°) (y =) 77(°)	M1 A1 B1	y=103(°) as final answer gets M1,A1,B0 FT 180 – 'their 103'	**General principle** **257 –360 = 103 gets M1,A1** **257 –360 ≠ 103 gets M0,A0**

Questions 15 – 21 except 19(a) are common with the Higher Tier.
This Mark Scheme will be amended to match the Higher Tier throughout the conference.

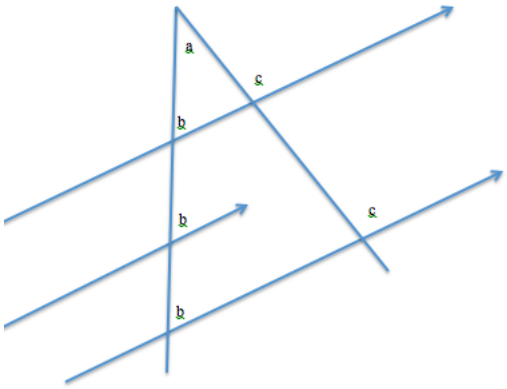
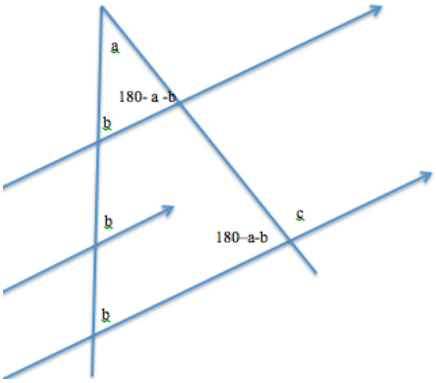
Summer 2014 Paper 1 (Non calculator) Foundation Tier	Marks	Comments
All parts (a) – (e) marked at the same time 15.(a) All points **plotted** correctly	B2	Intention: closer to the correct intersection than to any others B1 for indication of at least 3 correct points *Penalise joining point to point -1*
(b) Positive	B1	Do not accept descriptions
To be viewed with graph (c) Line of best fit with points above and below	B1	The line must be fit for purpose, it should not pass through the intersection of the axes *Ignore also joining point to point*
To be viewed with graph (d) Their estimate, from use of their line of best fit, or an answer in inclusive interval 390 ≤ 'their estimate' ≤ 410	B1	Accuracy to the nearest £10 FT for their incorrect line of best fit with accuracy to the nearest £10
(e) Explanation, that it doesn't tell you, e.g. 'only know how many attend, not how many spent money on ice cream', or 'don't know how many ice creams were sold'	E1	Ignore incorrect statements given with a correct response. Accept answers that state or imply, don't know: • how many ice cream sold, or • how many people bought ice cream Allow answers that state or imply, don't know: • different costs of ice cream (days or ice creams) e.g. accept 'different ice creams cost different amounts', 'don't know who bought what', 'sellers change prices on different days'
To be viewed with diagram 16. Area trapezium = ½ × 5 × (6 + 10) = 40 (cm^2) Triangle: ½ × 10 × x = 40 (x =) 8 (cm)	✓ M1 A1 M1 A1	For equating 'their 40' (any value) with ½ × 10 × x FT correct evaluation from 'their 40' (their value) *SC2 for an answer 8(cm) from* ***area of trapezium = 5 × (6 + 10) = 80*** *followed by* ***area of triangle =10 × x = 80,*** *or* *SC1 for a 2 stage method equating 10 × x with 5 × (6 + 10) with error in calculating x* *A full one stage method 10 × x = 5 × (6 + 10)* ***or equivalent*** *is correct* ***for 3 marks****.*
To be viewed with diagram 17. Class A has 12 girls Class B has 18 girls There are twice as many girls as boys in class B, or ⅓ of class B boys, or ⅔ of class B girls Class B has 9 boys	✓ B1 B1 B1 B1	FT 1½ × 'their 12' **correctly evaluated** (but NOT 1½ × 4) *Sight of 18 implies first B1, B1* OR Class B: Angle girls 240°±2° and angle boys 120°±2° This may be implied from their numbers of girls and boys in class B. *Note: ⅓ of 18 does not imply ⅓ of class B boys, hence B0* *'18 is ⅔', implies B1* CAO
18.(a) x/2 = 26 – 18 OR x + 18×2 = 26×2 x = 16	**M1** **A1**	OR alternative full correct method Mark final answer . *Accept embedded answer, e.g. 16/2 + 18 = 26*
18. (b) $y^3 + 4y$	B2	B1 for a correct term. **Mark final answer for B2.**
19. n (black) 2n + 1 or equivalent (white)	 B1 B2	Accept use of N B1 for 2n or equivalent *Penalise use of other letters -1 only*

Summer 2014 Paper 1 (Non calculator) Foundation Tier	Marks	Comments
To be viewed with diagram 20. An appropriate angle 180 – a – b or 180 –(a+b), or an appropriate b or c angle indicated on the diagram  	B1	Must be shown or stated OR 
(c =) 180 – (180 – a – b) **(c =)** a + b	M1 A1	Or equivalent rearrangement, e.g. a + b + 180 – c = 180 For answer only (c =) a + b without working or indication of any appropriate b or c angles award B0, M1 and A1. For answer (c =) a + b with working or indication of any appropriate b or c angles award B1, M1 and A1.
21. 12 sided shape: exterior angle 360/12 (= 30°) interior angle (180° - 30° =) 150(°) OR sketch showing one 30° exterior angles, e.g.  	B1 B1	OR M1 Interior 10× 180 ÷ 12 A1 = 150(°) OR B2 for interior angle found to be 150(°)
Gap is 360 – 150 – 150 OR sketch implying the sum of the 2 angles of 30° is the remaining exterior angle, e.g.  	M1	FT for use of 'their 150'
Appropriate 60(°) or sketch showing 60° e.g.  	A1	
Third shape: 3 (sides)	A1	CAO. Allow (equilateral) triangle ***If correct answer with sight of angles:*** Sight of 150(°) or 30(°) AND 60° followed by an answer 3 (sides) or triangle is awarded 5 marks or Sight of 150(°) or 30(°) followed by an answer 3 (sides) or triangle is awarded 4 marks only (as working is incomplete) or Sight of 360(°)/12 followed by an answer 3 (sides) or triangle is awarded 3 marks only (as working is incomplete) ***OR if no working or errors in calculations:*** *Award SC2 for an answer of **3 sides** or(equilateral) **triangle**.* *OR* *Award SC2 for a diagram of **a tessellation** of a number of sides of two 12-sided polygons showing a triangle.* *Award SC1 for a diagram of **an attempt at a tessellation** of a number of sides of two 12-sided polygons showing a triangle.*

PAPER 1 - HIGHER TIER

Summer 2014 Paper 1 Higher Tier	Marks	Comments
1(a) 3 values which could lead to simple calculations Correct evaluation for their figures	M1 A1	e.g. $\frac{43.3 \times 50}{200}$, $\frac{40 \times 49.8}{200}$ Do not accept $\frac{43 \times 49}{200}$ Accept decimals OR rounded or truncated answers (*Common responses include10 here)*
1(b) 2	B1	Accept other reasonable estimations, with answer given to no more than 2dp *Allow 2/1*
1(c)(i) 3.9528	B1	
1(c) (ii) 73200	B1	
1(d) 7/2 ×½ OR 7/2 ÷ 2 OR sight of 3/2 + ¼ 1¾ or 1.75 or 7/4 or single value equivalent	M1 A1	e.g. 1.5 + 0.25 CAO
2(a) All points **plotted** correctly	B2	Intention: closer to the correct intersection than to any others B1 for indication of at least 3 correct points *Penalise joining point to point -1*
2(b) Positive	B1	Do not accept descriptions
2(c) Line of best fit with points above and below	B1	The line must be fit for purpose, it should not pass through the intersection of the axes *Ignore also joining point to point*
2(d) Their estimate, from use of their line of best fit, or an answer in inclusive interval 390 ≤ 'their estimate' ≤ 410	B1	Accuracy to the nearest £10 FT for their incorrect line of best fit with accuracy to the nearest £10
2(e) Explanation, that it doesn't tell you, e.g. 'only know how many attend, not how many spent money on ice cream', or 'don't know how many ice creams were sold'	E1	Ignore incorrect statements given with a correct response. Accept answers that state or imply, don't know: • how many ice cream sold, or • how many people bought ice cream Allow answers that state or imply, don't know: • different costs of ice cream (days or ice creams) e.g. accept 'different ice creams cost different amounts', 'don't know who bought what', 'sellers change prices on different days'
3(a) (-1, 4) and (-7, -2) and (-1, 0)	B2	All 3 coordinates correct B1 for any 2 of these 3 coordinates correct *If no marks SC1for correct quadrilateral shown* *Coordinates can be given in any order in the answer space. No marks for reversed coordinates.* *However award SC1 for showing the correct points in the quadrilateral*
3(b) (2, 1) and (4, 5) and (-1, 5) and (7, 1)	B2	All 4 coordinates correct B1 for any 3 of these 4 coordinates correct *If no marks SC1for correct quadrilateral shown* *Coordinates can be given in any order in the answer space. No marks for reversed coordinates.* *However award SC1 for showing the correct points in the quadrilateral*

Summer 2014 Paper 1 Higher Tier	Marks	Comments
4. Area trapezium = ½ × 5 × (6 + 10) = 40 (cm^2) Triangle: ½ × 10 × x = 40 (x =) 8 (cm)	M1 A1 M1 A1	For equating 'their 40' (any value) with ½ × 10 × x FT correct evaluation from 'their 40' (their value) *SC2 for an answer 8(cm) from a two stage method:* *Area trapezium 5 × (6 + 10) = 80 followed by area triangle 10 × x = 80, or* *SC1 for a 2 stage method equating 10 × x with 5 × (6 + 10) with error in calculating x* *A full one stage method 10 × x = 5 × (6 + 10) is correct*
5. Class A has 12 girls Class B has 18 girls There are twice as many girls as boys in class B, or ⅓ of class B boys, or ⅔ of class B girls Class B has 9 boys	B1 B1 B1 B1	 FT 1½ × 'their 12' correctly evaluated (but NOT 1½ × 4) *Sight of 18 implies first B1, B1* OR Class B: Angle girls 240°±2° and angle boys 120°±2° This may be implied from their numbers of girls and boys in class B *Note: ⅓ of 18 does not imply ⅓ of class B boys, hence B0 '18 is ⅔', implies B1* CAO
6(a) 6x – 4x = 27 - 13 2x = 14 x = 7	B1 B1 B1	FT until 2nd error, then stop marking Must be simplified if possible for this final B1 mark
6(b) x/2 = 26 – 18 OR x + 18×2 = 26×2 x = 16	M1 A1	OR alternative full correct method Mark final answer *Accept embedded answer, e.g. 16/2 + 18 = 26*
6(c) y(y – 5)	B1	
6(d) $y^3 + 4y$	B2	B1 a correct term. Mark final answer
6(e) 5x < 36 or 5x < 30 + 6 x < 36/5 or x < 7.2 or x < $7^1/_5$	 B1 B1	 Do not accept '=' FT from 1 error only. Mark final answer *If '=' used but replaced by '<' to give final correct answer, allow B2*
7. n^2 or equivalent (black) 2n + 1 or equivalent (white)	 B1 B2 3	Accept use of N B1 for 2n or equivalent *Penalise use of other letters -1 only*

Summer 2014 Paper 1 Higher Tier	Marks	Comments
8. An appropriate angle 180 – a – b or 180 –(a+b), or an appropriate b or c angle indicated on the diagram  	B1	Must be shown or stated OR 
(c =) 180 – (180 – a – b) (c =) a + b	M1 A1	Or equivalent rearrangement, e.g. a + b + 180 – c = 180 For answer only (c =) a + b without (or incorrect) working or indication of any appropriate b or c angles award B0, M1 and A1. For answer (c =) a + b with working or indication of any appropriate b or c angles award B1, M1 and A1.
9(a) (Millet) 3 × 850/10 255(g)	M1 A1	CAO

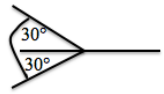
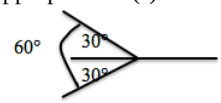
<table>
<tr><th>Summer 2014 Paper 1
Higher Tier</th><th>Marks</th><th>Comments</th></tr>
<tr><td>9(b)Attempt to find unit cost e.g. for 1kg
(For the 250g bag, 1kg costs) £1.96
(For the 300g bag, 1kg costs) £1.80
(For the 4kg bag, 1kg costs) £1.90</td><td>B1</td><td>OR for one correct costing for 5kg
e.g. (£)7(.)60 + 4×49(p) = (£)9(.)56
OR At least 2 combinations of bags to a total of 5kg</td></tr>
<tr><td>Considering buying 10 or more 300g bags</td><td>S1</td><td>OR any 2 correct costings for buying 5kg
OR stating any 3 possible combinations of bags to 5kg
<table>
<tr><th>250g</th><th>300g</th><th>4kg</th><th>Cost £</th></tr>
<tr><td>4</td><td>0</td><td>1</td><td>1.96 +7.60 = 9.56</td></tr>
<tr><td>20</td><td>0</td><td>0</td><td>9.80</td></tr>
<tr><td>14</td><td>5</td><td>0</td><td>6.86 + 2.70 = 9.56</td></tr>
<tr><td>8</td><td>10</td><td>0</td><td>3.92 + 5.40 = 9.32</td></tr>
<tr><td>2</td><td>15</td><td>0</td><td>0.98 + 8.10 = 9.08</td></tr>
</table></td></tr>
<tr><td>Working with or choice of 15 of the 300g bags, or 5000÷300 with an answer of 16(.666…), 17 or 16, or trials including 15 or 16 or 17 of the 300g bags</td><td>M1</td><td>OR equivalent, e.g. repeated additions or multiples,</td></tr>
<tr><td>(Cheapest way to buy 5kg is
15 (300g bags) at 54(p) + 2 (250g bag) at 49(p)
= (£)8(.)10 + 98(p))
= (£)9(.)08</td><td>A1</td><td></td></tr>
<tr><td>Look for
• correct units used
• spelling in at least 1 statement/sentence
• clarity of text explanations
• clearly linking working with size of bag

QWC2: Candidates will be expected to
• present work clearly, with words or quantities shown for clarity of 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 or quantities shown for clarity of process or steps
OR
• make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer</td><td>QWC 2</td><td>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>
</table>

Summer 2014 Paper 1 Higher Tier	Marks	Comments
10. 12 sided shape: exterior angle 360/12 (= 30°) interior angle (180° - 30° =) 150(°) OR sketch showing one 30° exterior angles, e.g.  	B1 B1	OR M1 Interior 10× 180 ÷ 12 A1 = 150(°) OR B2 for interior angle found to be 150(°)
Gap is 360 – 150 – 150 OR sketch implying the sum of the 2 angles of 30° is the remaining exterior angle, e.g.  	M1	FT for use of 'their 150'
Appropriate 60(°) or sketch showing 60° e.g.  	A1	
Third shape: 3 (sides)	A1	CAO. Allow (equilateral) triangle ***<u>If correct answer with sight of angles:</u>*** <u>Sight of 150(°) or 30(°) AND 60° followed by an answer 3 (sides) or triangle is awarded 5 marks</u> or <u>Sight of 150(°) or 30(°) followed by an answer 3 (sides) or triangle is awarded 4 marks only (as working is incomplete)</u> or <u>Sight of 360(°)/12 followed by an answer 3 (sides) or triangle is awarded 3 marks only (as working is incomplete)</u> ***<u>OR if no working or errors in calculations</u>:*** *Award SC2 for an answer of **3 sides** or(equilateral) **triangle**.* *OR* *Award SC2 for a diagram of **a tessellation** of a number of sides of two 12-sided polygons showing a triangle.* *Award SC1 for a diagram of **an attempt at a tessellation** of a number of sides of two 12-sided polygons showing a triangle.*
11. Equations 2b+3s = 2(.)04 and 4b + (1)s = 2(.)48 Method, equating coefficients or alternative First variable correct Method to find second variable Second variable correct	S1 M1 A1 m1 A1	Accept other variables Allow 1 slip, but not in equated coefficients FT their equations in 2 variables provided at least 1 equation is correct **Blackcurrant 54(p) or (£)0.54** **Soda water 32(p) or (£)0.32** *Do not accept trial & improvement, maximum mark S1*
12(a) 3(6 + x) + 2(2 – 3x) = 31 or equivalent -3x + 22 = 31 x = -3	M2 A1 A1	M1 for 2 of these 3 terms correct e.g. 3(6 + x) + 2(2 – 3x) = 31/6 , or for $\frac{3(6+x)}{6} + \frac{2(2-3x)}{6} = \frac{31}{6}$ or equivalent FT from M1 for A1 only CAO (Must be simplified)
12(b) 2(x + 3)(x + 1)	B2	B1 for 2(x + 3)(x + 3 – 2) or (2x + 6)(x + 1) or (x + 3)(2x + 2) or $2(x^2 + 4x + 3)$
13(a) 8×8 + ½× π×4^2 64 + 8π OR 8 (8 + π) (cm^2)	M1 A1	Accept with a value inserted for π ISW. Must be an expression in terms of π *If no marks, SC1 for final answer:* • *use of radius 8 giving 64 + 32π, or* • *full circle included giving 64 + 16π*
13(b) 1	B1	
13(c) 5×10^{-5}	B2	B1 for 0.00005 or 0.5×10^{-4} or 0.05×10^{-3} or similar form

Summer 2014 Paper 1 Higher Tier	Marks	Comments
14(a)(i) 2950 (miles) 3050 (miles) 79.5(hours) or 79 ½ (hours) or 79 h 30 min 80.5(hours) or 80½(hours) or 80 h 30 min	B2	All 4 correct entries B1 for any 2 correct entries Do not accept 79.3 or 80.3 as 2 correct entries, allow this as equivalent to counting 1 correct entry
14(a)(ii) 3050 ÷ 79.5	B1	FT their greatest distance divided by their least time, provided distance >3000 and time < 80 Accept sight of $\frac{3050}{79.5}$
14(b) $(59 + x) \div (2 + y)$ or $\frac{59 + x}{2 + y}$ (mph) or equivalent unsimplified	B2	OR equivalent with use of minutes, e.g. $\frac{59 + x}{120 + 60y}$ B1 for intention clear but any necessary brackets omitted, or for $\frac{59.5+x}{2 + y}$ or $\frac{60 + x}{2 + y}$ or $\frac{59.5 + x}{120 + 60y}$ or $\frac{60 +x}{120 + 60y}$ *SC1 for sight of 59.5 AND x – 0.5, or for sight of 59+x.*
15. Volume scale factor ×27 Length scale factor ×3 Number of larger pebbles needed (15/3 =) 5	B1 B1 B1	Allow for sight of 54/2 or 27 provided **not** connected to irrelevant working Accept $\sqrt[3]{27}$. Allow for sight of 3 provided **not** connected to irrelevant working Award of the 2nd B1 implies also the 1st B1 *SC2 only for an answer of 5 without relevant working*
16(a)(i) 0.021	B1	
16(a)(ii) 0.05	B2	B1 for 1/20
16(b) $0.1\dot{2}$	B2	Accept 0.1212… . or dots as for recurring notation Otherwise B1 for 0.12(1…)
16(c) $35\sqrt{2}$	B2	B1 for $\sqrt{70} = \sqrt{2} \times \sqrt{35}$ seen or implied, OR $7\sqrt{5}\sqrt{10}$ or $5\sqrt{7}\sqrt{14}$
17(a) $y \propto 1/x$ OR $y = k/x$ $50 = k/2$ $y = 100/x$	B1 M1 A1	 FT non linear only Maybe implied in part (b)
17(b) x: ½ | 2 | **8** y: **200** | 50 | 12.5	B2	FT their non linear expression B1 for each value
18(a) Axis labelled frequency density with a uniform scale from 0 to 5(minimum) Frequency densities 1.8, 2.2, 5, 0.6, 0.2 Correct histogram	B1 M2 A1	Do not accept a scale using less than half the paper or for scales to ≥100 FT for their uniform scale M1 for any 3 correct frequency densities
18(b) Explanation: • Median is in the group $40<t\leq60$ • Estimate so we don't know, or • (Estimate of the) median is 44, or • It (may be) is nearer 40 than 60	 E1 E1	Each E mark is independent. Accept 'median is in same group' Accept 'median could be towards the lower end of the median group'.
19. Idea that need to find P(not strawberry, strawberry) **and** P(strawberry, not strawberry) **and** P(strawberry, strawberry) OR P(not strawberry, not strawberry) then subtract from 1 $\frac{15}{20}\times\frac{5}{19} + \frac{5}{20}\times\frac{15}{19} + \frac{5}{20}\times\frac{4}{19}$ OR $1 - \frac{15}{20}\times\frac{14}{19}$ $\frac{75}{380} + \frac{75}{380} + \frac{20}{380}$ OR $1 - \frac{210}{380}$ OR equivalent $\frac{170}{380}$ $(= \frac{17}{38})$	S1 M1 A1 A1	Allow selection with replacement for S1 only

Summer 2014 Paper 2 (Calculator allowed) Foundation Tier	Marks	Comments
1. **Parts (a) & (b) marked at the same time** (a) 7.44 (butter) 3.44 (sugar) 3 (packs) (£4.62) (currants) 15.5(0) (b) (10% =) (£) 1.55 (20% =) (£) 1.55×2 (£) 3.1(0) ISW	 B1 B1 B1 B1 M1 A1	 For the 3 F.T. unless both 7.44 AND 3.44 are incorrect An answer of 15.5 only gets 4 only if ALL answers are correct F.T. their total Any complete correct method for finding 20%. If (£)3.1(0) not given then (£) 12.4(0) gains M1 A1 3.1% OR 3.1p OR £3.1p get M1,A0 but condone £3.1
2. 170 km 170 m 170 mm (170 cm) (28 kg) 28 g 28 mg 280 g 60 cm^3 600 ml (60 litres) 6000 litres (18 m^2) 18 cm^2 18 mm^2 18 cm^3	✓ B1 B1 B1 B1	Tick marked question
To be viewed with diagram **Parts (a) & (b) marked at the same time** 3. (a) Pointer showing 320g 3. (b) Reading 620 (g) One cube weighs (620–320)/5 = 60 (g) Look for • spelling • clarity of text explanations, • the use of notation (watch for the use of '=', g) 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	 B2 ✓ B1 M1 A1 QWC 2	 B1 if calculation shown and F.T. their pointer. OR **B1 for sight of 320 in the working but nothing on their diagram** OR 260 shown on their diagram. Pointer drawn takes precedence over written value(s) Pointer nearer correct mark than the ones each side of it Complete method, subtraction and division FT 'their 620 and 320' Allow B1, SC1 for 620/5 = 124 (g) **Unsupported 124 (g) gets M0,A0** 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.

Summer 2014 Paper 2 (Calculator allowed) Foundation Tier	Marks	Comments
To be viewed with diagram 4. (a) Evidence of square counting 57 – 63 inclusive 456 – 504 inclusive (m^2)	M1 A1 B1	Inside the shape. Condone answers like 60^2 here. F.T. 'their number of squares' × 8 Unsupported answers in the range 456 – 504 inclusive get all 3 marks, **Mark final answer** 57 456 58 464 59 472 60 480 61 488 62 496 63 504
To be viewed with diagram 4. (b) Lines Arc	B1 B1	F.T. correct curvature up to the start of 'their line' **Maximum of B1 if extra parts drawn**
5. (a) radius chord	B1 B1	
To be viewed with diagram 5. (b) (i) **141 (mm) to 145 (mm) inclusive**	B1	
To be viewed with diagram 5. (b) (ii) Perpendicular through C	B1	**Allow from the leftmost 'e' in 'millimetres' to the 'e' in 'the' in 'the length' inclusive.** **Welsh: from the first 'm' to the 'a' in milimetrau**
To be viewed with diagram **Parts (a) to (e) marked at the same time** 6. (a) (Day) 2 (b) 3 (days) (c) 2 (days) (d) 17.5 (mm) **OR 17½ (mm)** (e) 3·5 (mm)	 B1 B1 B1 B1 B1	 Allow 'on day 1, day 2 and day 4' Allow 'on day 1 and day' 4
7. (a) $\frac{8}{20}$ $\frac{1}{4}$ $\frac{2}{5}$ $\frac{10}{40}$ $\frac{5}{20}$	B2	B1 for either one correct AND none incorrect OR for both correct and 1 incorrect
7. (b) 3 shaded sectors	B1	
7. (c) $\frac{5}{6} - \frac{2}{6}$ (= 3/6) = 1/2	M1 A1	Or equivalent correct method Must be ½. Unsupported 3/6 gets M1, A0 M1, A1 for (0).5
8. (a) (i) 1	B1	
8. (a) (ii) −4	B1	
8. (b) 87/100 × 58 = 50.46	M1 A1	Any correct method for finding 87%. 50.46% gets M1, A0, but M1, A1 for £50.46 Unsupported 50.4 OR 50.5 gets M1, A0 **50.46 seen then with further rounding still gets M1,A1**
8. (c) (i) 1.6	B2	B1 for 1.55(44819 ...). All places given must be correct rounded or truncated. B1 for 1.5
8. (c) (ii) 14.1	B2	B1 for 14.10(10627 ...) All places given must be correct rounded or truncated.

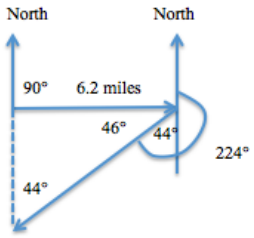
Summer 2014 Paper 2 (Calculator allowed) Foundation Tier	Marks	Comments	
9. (a) (i) Add 7 to the previous term	B1	Accept +7, 'goes up in 7s', 'a gap of 7' B0 for n+7 OR 7n–5	
9. (a) (ii) Multiply the previous term by –3	B1	Accept ×–3. B0 for –3n OR n × –3 **B1 for 'multiply by 3 and change the sign'.**	
9. (b) (i) 100t (p)	B1	Accept t×100, 100×t, t100, and e.g. t×100 =t Condone change of letters. Ignore £ or p. **B1 for 100*tp* but B0 for 100*p***	
9. (b) (ii) h – 3 (cm)	B1	Condone change of letters. Allow h = h–3 Ignore cm	
9. (b) (iii) $8w$ (kg)	B1	Accept 8×w, w8, w×8, and e.g. 8w = w Condone change of letters. Ignore kg. B0 for 8000w, B1 for 8000w g	
9. (c) (i) (x=) 5	B1	Accept embedded answers such as 3×5 = 15 but B0 for 3×5 only. **B0 for x = 3×5 = 15**	
9. (c) (ii) (x=) 11	B1	Accept embedded answers such as 11 + 5 = 16. B0 for 11 + 5 = 16x OR 11x **OR B0 for only 11 + 5**	
Parts (a) & (b) marked at the same time 10. (a) (i) 23 (years) (a) (ii) 23 (years) The 24 becomes 23 and the 47 becomes 46 O R Both ends are 1 less (b) Sum of the numbers (272) Sum/8 = 34 (years)	 B1 B1 E1 M1 M1 A1	 Comes from 47 – 24 F.T. 'their (a)(i)' 46 –23 = 23 gets the B1 and E1 B1, E1 for a list of the ages (each 1 less) and correct answer **E0 for 'they are the same people'** For attempt to add the numbers For dividing a number in the range 220 – 320 inclusive by 8. C.A.O.	Notes In part (a)(ii) accept For example, 23 because everyone would be 1 year younger OR 23 because the difference in their ages hasn't changed
11. **Parts (a) & (b) marked at the same time** (a) 11·8 (cm) 11·8 × 10 = 118 (km) **To be viewed with diagram** (b) **Use Overlay** Bearing 097º from A Bearing 342º from B Point (X)	 B1 M1 A1 M1 M1 A1	 Allow 11·6 – 12·0 inclusive (Ignore km here) FT 'their 11·8'×10 km not required but A0 for incorrect units Unsupported answers within 116–120 inc get B1,M1,A1. Unsupported answers outside 116–120 inclusive get 0. Allow ±2° Allow ±2° F.T. if at least M1 awarded. Unambiguous dots within the boundaries of the overlay can get the M1s. One unambiguous dot within the 'box' gets all 3 marks. Watch out for line segments. An unambiguous point of intersection does not require X.	
Parts (a) & (b) marked at the same time 12. (a) (Number of dollars =) 1200 × 1.52 = (**$**) 1824 ISW (b) (1824 – 1649) ÷ 1.52 OR 175 ÷ 1.52 = (£)115.13 ISW	 M1 A1 M1 A1	 $ not required but £ gets A0. F.T. 'their ($)1824' £ not required but $ gets A0. Accept (£)115 but A0 for (£)115.1	

Summer 2014 Paper 2 (Calculator allowed) Foundation Tier	Marks	Comments
Use Overlay 13. (a) Arcs to show 60º or 120º Arcs to bisect the 60º Line to show angle of 30º	M1 **m1** A1	We need to watch out for the case where there is no arc on the line. Candidates could have used the length of the line to set their compass length and placed the compass point at the end of the line. In this case there will only be arcs above the line. If not drawn at A – mark as if at A and penalise –1
Use Overlay 13. (b) Correct intersecting arcs Perpendicular line	M1 A1	There must be 2 pairs of intersecting arcs for M1. (Some candidates draw 1 pair of arcs and join up the intersection of these to the midpoint of the line (found by measurement?) which is incorrect M0,A0). 2 arcs drawn with radius 0.5PQ and centred at P and Q is incorrect and gets 0 marks.
14.(a) Correct reflection	B2	B1 for the sight of the line y = 1, or a reflection in any horizontal line B0 if more than one triangle drawn, unless all are reflections in a horizontal line
Use overlay 14.(b) Correct enlargement Correct position	B2 B1	B1 for any two adjacent lines correct Intention of correct placement, i.e. with appropriate rays seen, or correct positioning of at least two vertices *Penalise consistent incorrect scale factor -1*
To be viewed with diagram 15.(a) (maximum width is 2 × 45 =) 90 (m) **AND** (minimum length is ¾ × 120 =) 90 (m) (maximum area is 90 × 120 =) 10800 (m^2) **AND** (minimum area is 45 × 90 =) 4050 (m^2) 4050 × 1.5 = 6075 (m^2 <10800 m^2) **OR** 100×10800/4050 = 266.6(6…% >150%) **OR** 100 ×(10800 – 4050)/4050 = 166.6(6..% >50%) **OR** similar appropriate check against Susan's statement, e.g. 2×4050 = 8100 (<10800m^2) Conclusion that Susan **is correct** based on calculations, e.g. 'it is at least 50% greater, in fact it is (much) more' following from an appropriate calculation, or '6075 (m^2) <10800 (m^2)', or '100×(10800 – 4050)/4050 = 166.6(6..)% >50%, or '100×10800/4050 = 266.6(6…%) >150(%)', or 'Twice 4050 is less than 10800'	✓ B1 B1 B1 E1	Sight of 90(m) TWICE if unlabelled (max width & min length) Both areas correct FT 'their 2×45' × 120 correctly evaluated **AND** 45 × 'their ¾ ×120' correctly evaluated *If neither of the previous B1s awarded, then award SC1 for sight of 90(m) and one correct (FT) area* The award of this mark requires a correct evaluation of the candidate's check. Must show **correct** evaluation FT 'their 4050'× 1.5 correctly evaluated, or 100× 'their max area' / 'their min area' correctly evaluated, or similar appropriate check. *Do not accept 50% of 10800 or 5400, B0, unless applied appropriately. Allow FT from this type of comparison. However, sight of 4050<5400 is an appropriate comparison, hence B1 (and may also gain E1)* Allow 'is correct' implied, do not accept 'not correct' Accept that there may be errors in calculations, but that it is a conclusion based on attempting to work with area *Watch for incorrect conclusion following correct working.* FT appropriate conclusion based on their working provided the candidate has attempted to work with **area**. No working shown, then E0 *Alternative:* *2×4/3 B2* *= 8/3 B1* *Appropriate conclusion E1* ***Allow responses that clearly engage with the concept that doubling the width will result is an area that is at least 50% greater.***

Summer 2014 Paper 2 (Calculator allowed) Foundation Tier	Marks	Comments
16. Taxable income (52250 – 9205=) (£)43045 40% tax to be paid on (£)10790 0.2 × 32255 (=6451) 0.4 × 10790 (=4316) (£) 6451 AND (£)4316 Claudia's tax should be (£)10767	B1 B1 M1 M1 A1 A1	 FT 'taxable income' – 32255, i.e. 'their 52250 -9205' – 32255 correctly evaluated FT 0.4 × ('their 43045' – 32255) provided 'their 43045' > 32255, also FT (52250 – 32255 =) giving 0.4 × 19995 (=7998) FT sum of 'their 6451' + 'their 4316' provided at least 1 of these values is correct and M2 awarded *(Note: 6451 + 7998 = 14449)*
17.(a) 246/365 ISW	B1	Allow 247/366
17.(b) Total for 12 months (= 12 × 4 =) 48(°C) 11 months 48 - 26 (=22) ÷ 11 = 2(°C)	B1 M1 m1 A1	 FT 'their 12×4' *Award B4 for an unsupported answer of 2(°C)* *Sight of 48 – 26/12 is B1 only,* *Sight of (48-26)/12 is B1, M1 only*
17.(c) Mid points -1, -3, -5, -7, -9, -11 -11×1 + -9×3 + -7×5 + -5×8 + -3×4 + -1×10 (Σfx = -135) their Σfx/31 -4.3548…(°C) rounded or truncated to 1 or more d.p.	B1 M1 m1 A1	Sight of any 3 correct values, with no incorrect values FT their mid points from within appropriate groups, or at bounds of the groups FT their Σfx/31 correctly evaluated. Must be negative. Accept -4, -4.4 or -4.3 only from correct working Award B4 unsupported -4.35 Omitted negative sign, penalise -1 only, then follow mark scheme as above.
17.(d) Any correct 10% of a value seen in working 251850 – 0.10 × 251850 (= 251850 – **25185**) 226665 – 0.10 × 226665 (= 226665 – **22666.5**) 47851.5(0 Russian roubles)	B1 M1 A2	OR **B1and M1 for 251850 × 0.90^2** **B1 and M0 for 251850 × 0.90** Two different 10% OR sight of 0.10 × 251850 AND 0.10 × 226665 (25185 AND 22666.5) Accept 47851 or 47852 (roubles) A1 for 203998.5(0), 203998 or 203999 (roubles) *Appreciate: B1 and SC1 for 304738.5(0) and 52888.5(0)* *Simple interest, accept a correct 20% for B1 only (50370)*

Summer 2014 Paper 2 Higher Tier	Marks	Comments
1(a) Correct reflection	B2	B1 for the sight of the line y = 1, or a reflection in any horizontal line B0 if more than one triangle drawn, unless all are reflections in a horizontal line
1(b) Correct enlargement Correct position	B2 B1	B1 for any two adjacent lines correct Intention of correct placement, i.e. with appropriate rays seen, or correct positioning of at least two vertices *Penalise consistent incorrect scale factor -1*
2(a) (maximum width is 2 × 45 =) 90 (m) **AND** (minimum length is ¾ × 120 =) 90 (m) (maximum area is 90 × 120 =) 10800 (m^2) **AND** (minimum area is 45 × 90 =) 4050 (m^2) 4050 × 1.5 = 6075 (m^2 <10800 m^2) **OR** 100×10800/4050 = 266.6(6…% >150%) **OR** 100 ×(10800 – 4050)/4050 = 166.6(6..% >50%) **OR** similar appropriate check against Susan's statement, e.g. 2×4050 = 8100 (<10800m^2) Conclusion that Susan **is correct** based on calculations, e.g. 'it is at least 50% greater, in fact it is (much) more' following from an appropriate calculation, or '6075 (m^2) <10800 (m^2)', or '100×(10800 – 4050)/4050 = 166.6(6..)% >50%, or '100×10800/4050 = 266.6(6…%) >150(%)', or 'Twice 4050 is less than 10800' Look for • spelling • clarity of text explanations, • the use of notation (watch for the use of '=', m, m^2 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 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 B1 B1 E1 QWC 2	Sight of 90(m) TWICE if unlabelled (max width & min length) Both areas correct FT 'their 2×45' × 120 correctly evaluated **AND** 45 × 'their ¾ ×120' correctly evaluated *If neither of the previous B1s awarded, then award SC1 for sight of 90(m) and one correct (FT) area* The award of this mark requires a correct evaluation of the candidate's check. Must show **correct** evaluation FT 'their 4050'× 1.5 correctly evaluated, or 100× 'their max area' / 'their min area' correctly evaluated, or similar appropriate check. *Do not accept 50% of 10800 or 5400, B0, unless applied appropriately. Allow FT from this type of comparison. However, sight of 4050<5400 is an appropriate comparison, hence B1 (and may also gain E1)* Allow 'is correct' implied, do not accept 'not correct' Accept that there may be errors in calculations, but that it is a conclusion based on attempting to work with area *Watch for incorrect conclusion following correct working.* FT appropriate conclusion based on their working provided the candidate has attempted to work with **area**. No working shown, then E0 *Alternative:* *2×4/3* *B2* *= 8/3* *B1* *Appropriate conclusion* *E1* *Allow responses that clearly engage with the concept that doubling the width will result is an area that is at least 50% greater.* 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.
2(b) (×)2.67	B2	Must be to 2decimal places B1 for sight of 10800/4050 or 2.6(66…) or 2.7 or 2⅔ or $^8/_3$ For B2, FT '100 ×their max area / their min area' (%) expressed as a decimal to 2 decimal places, or for B1, FT if truncated, unrounded or given as a fraction

Summer 2014 Paper 2 Higher Tier	Marks	Comments
3(a) 246/365 ISW	B1	Allow 247/366, 246.25/365.25
3(b) (Total for 12 months $12 \times 4 =$) 48(°C) 48 - 26 (=22) ÷ 11 = 2(°C)	B1 M1 m1 A1	 FT 'their 12×4' *Award B4 for an unsupported answer of 2(°C)* *Sight of 48 – 26/12 is B1 only,* *Sight of (48-26)/12 is B1, M1 only*
3(c) Mid points -1, -3, -5, -7, -9, -11 $-11\times1 + -9\times3 + -7\times5 + -5\times8 + -3\times4 + -1\times10$ ($\Sigma fx = -135$) their $\Sigma fx/31$ -4.3548…(°C) rounded or truncated to 1 or more d.p.	B1 M1 m1 A1	Sight of any 3 correct values, with no incorrect values FT their mid points from within appropriate groups, or at bounds of the groups FT their $\Sigma fx/31$ correctly evaluated. Must be negative. Accept -4, -4.4 or -4.3 only from correct working Award all 4 marks for unsupported -4.35 Omitted negative sign, penalise -1 only, then follow mark scheme as above
3(d)(i) Any correct 10% of a value seen in working 251850 – 0.10 × 251850 (= 251850 – **25185**) 226665 – 0.10 × 226665 (= 226665 – **22666.5**) 47851.5(0 Russian roubles)	B1 M1 A2	OR **B1and M1 for 251850×0.90^2** **B1 and M0 for 251850×0.90** Two different 10% OR sight of 0.10×251850 AND 0.10×226665 (25185 AND 22666.5) Accept 47851 or 47852 (roubles) A1 for 203998.5(0), 203998 or 203999 (roubles) *Appreciate: B1 and SC1 for 304738.5(0) and 52888.5(0)* *Simple interest, accept a correct 20% for B1 only (50370)*
3(d)(ii) Boris's car cost 251850/50.37 (£)5000 Angharad paid (£)250 (more)	 M1 A1 B1	*Treat use of 203998.5, 203998 or 203999 as MR-1* FT 5250 – 'their 5000' correctly evaluated provided M1 previously awarded OR (Angharad's car $5250 \times 50.37 = 264442.5$ roubles) AND Difference 264442.5 – 251850 =) **12592.5** (roubles) B1 (Difference, Angharad paid) 12592.5 ÷ 50.37 M1 (£)250 (more) A1 *For the M1 A1, FT 'their 12592.5' provided appropriate calculations are shown in the first 2 stages*
4(a) 5 and 14	B2	B1 for each
4(b) Plots correct, allowing one error or the 2 omissions (x=-1 and x=2) All 6 points correct & joined with a curve	B1 B1	FT from (a) FT from (a). Need to have all 6 plots no omissions
4(c) Sight of y = 10 including the intersection, or marking the intersection and y = 10 with a point, or a vertical line to the point of intersection with y = 10	B1	FT their graph. Unambiguous answer **on the graph**
5. Taxable income (52250 – 9205=) (£)43045 40% tax to be paid on (£)10790 0.2×32255 (=6451) 0.4×10790 (=4316) (£) 6451 AND (£)4316 Claudia's tax should be (£)10767	B1 B1 M1 M1 A1 A1	 FT 'taxable income' – 32255, i.e. 'their 52250 -9205' – 32255 correctly evaluated FT 0.4 × ('their 43045' – 32255) provided 'their 43045' > 32255, also FT (52250 – 32255 =) giving 0.4×19995 (=7998) FT sum of 'their 6451' + 'their 4316' provided at least 1 of these values is correct and M2 awarded *(Note: 6451 + 7998 = 14449)*
6. Correct region shaded (major segment)	B3	Mark intention. B1 for line, B1 for any arc radius 4cm centre B, B1 for shading (FT from a circle centre B and a straight line crossing AB)

Summer 2014 Paper 2 Higher Tier	Marks	Comments
7(a) $y = 3x + 6$	B2	B1 for $y = {}^{6}/_{2}\ x + 6$ or equivalent, or for m = 3 (must be clear that this is the gradient), or for c = 6 (must be clear that this is the intercept)
7(b) Correct straight line drawn (gradient -2, passing through (0,-1))	B2	B1 for any straight line drawn with gradient -2, or a straight line passing through (0, -1) with either gradient 2 or with a negative gradient
8(a) 78	B1	
8(b) 0, 5, 25, 49, 83, 113, 120	B2	B1 for any three correct values, OR FT cumulative from 1 error finding 3 further cumulative values accurately
8(c) 3 unique vertical plots correct at upper bounds All plots correct and joined, including to zero at t=2.5	 M1 A1	Only FT their <u>cumulative table</u> to (c) and (d) Accuracy of plotting: time on the grid line, cumulative frequency within the appropriate square with 1st & last plots on the grid lines *Ignore bars only if intention clear that line or curve is being used in (d)*
8(d) (i) Median from cumulative graph (10.8 minutes)	B1	FT from their cumulative graph in (c)
8(d)(ii) Attempt, (using the reading on the horizontal) UQ - LQ (5 minutes)	M1 A1	*If (b) is not cumulative then do not FT to (c) &(d)*
9. Appropriate 46° or appropriate 44° seen or implied, e.g.  Distance = 6.2 × tan46° OR Distance = 6.2 ÷ tan44° = 6.4(2… miles)	B1 M2 A1	At least 1 relevant angle 44° or 46° seen or implied Sight of 224° is insufficient Do not FT for an angle of 45° as this is a simplified problem FT for M1 only, their 44° or their46° provided it is <90° M1 for tan46° = distance/6.2 or tan44° = 6.2/distance CAO *Unsupported answers gets no marks*
10(a) (x – 6)(x + 2) x = 6 AND x = -2	B2 B1	B1 for (x + 6)(x – 2) OR (x – 6)(x – 2) **STRICTLY** FT their pair of brackets
10(b)(i) 5n -1	B2	Accept 5N – 1. *Allow 'n(th) = 5n -1'* B1 for 5n *Penalise incorrect letter -1 only*
10(b)(ii) $n^2 + 1$	B1	CAO. Accept n×n + 1 *Do not penalise change of letter*
11(a)(i) Using 0.6 ×… = 0.18 or sight of 0.18÷0.6 or 0.18/0.6 P(drink) = 0.3	M1 A1	
11(a)(ii) Tree completed correctly (0.4, 0.3, 0.7, 0.3, 0.7 on appropriate branches)	B2	FT their '0.3', this could be 0.18 and 0.82 on second pairs of branches B1 for 0.4 with at least one other pair of branches total of 1
11(b) 0.4 × 0.7 = 0.28	M1 A1	FT attempt to multiply appropriate probabilities, provided no probability >1 FT for correct evaluation, provided not >1
12(a) (x + 3)(2x + 3) + x(x + 3) = 70 $2x^2 + 6x + 3x + 9 + x^2 + 3x = 70$ Convincing lead to $3x^2 + 12x – 61 = 0$	M1 A1 A1	 Accept $3x^2 + 12x = 61$

Summer 2014 Paper 2 Higher Tier	Marks	Comments
12(b) $x = \{ -12 \pm\sqrt{(12^2 - 4 \times 3 \times -61)}\} / (2 \times 3)$ $= \{-12 \pm\sqrt{876}\ \} /6$ $x = 2.93(288\ldots)$ (and $x = -6.9328\ldots$) Parallel side is 5.93 (cm)	M1 A1 A1 B1	Allow one slip in the substitution, but with correct formula Ignore if negative answer is also given. Allow rounded or truncated for A1, but 2 d.p. accuracy is required then for B1 Must be to 2d.p. From 2 d.p value of x. FT their positive x + 3 evaluated to 2d.p. provided at least M1 awarded. B0 if negative response also given
13. Strategy: Use of right angled triangle (OAM or OMB) with either AM or MB = 10.4(cm) Sight of OM = radius – 1.5 or equivalent OR $\text{Radius}^2 = OM^2 + 10.4^2$ $R^2 = 10.4^2 + (R - 1.5)^2$ OR $(OM+1.5)^2 = 10.4^2 + OM^2$ $R^2 = 108.16 + R^2 - 1.5R - 1.5R + 2.25$ OR $OM^2 + 3OM + 2.25 = 108.16 + OM^2$ $3R = 110.41$ OR $3OM = 105.91$ or $OM = 35.3033\ldots$ $R = 36.8(033\ldots$ cm) or 37(cm)	S1 B1 M1 M1 A1 A1	 Allow 1 slip FT from their 1 slip CAO *Alernative:* Strategy: Use of triangle MAP or PMB with 1.5cm and 10.4cm S1 Tan MPA(MPB) = 10.4/1.5 leading to $81.792\ldots°$ B1 (FT provided tanP=10.4/1.5 seen) $180 - 2\times81.792\ldots°$ $(=16.41\ldots.°)$ M1 (Allow FT from 1 slip) $\sin 16.41\ldots.° = 10.4/\text{radius}$ M1 $\text{Radius} = 10.4/\sin16.41\ldots°$ A1 Radius 36.8(033… cm) or 37(cm) A1 CAO Also allow application of other circle theorem
14. $\cos PBA = \frac{6.2^2 + 5.8^2 - 8.6^2}{2 \times 6.2 \times 5.8}$ 91.4978…(°) $\sin QBC = \frac{\sin 72° \times 4.1}{7.5}$ 31.326…(°) Angle PBQ = 57(°)	M2 A1 M2 A1 B1	M1 for $8.6^2=6.2^2+5.8^2- 2 \times 6.2 \times 5.8 \times \cos PBA$ Rounded or truncated M1 for $\frac{\sin QBC}{4.1} = \frac{\sin 72°}{7.5}$ or $\frac{4.1}{\sin QBC} = \frac{7.5}{\sin 72°}$ Rounded or truncated Do not FT from premature rounding or truncation. Do not accept 58(°) or 57.2(°), must be correct and whole FT provided at least M1 for each of cosine and sine rule awarded
15(a) 0	B1	
15(b) **Tangent** drawn at t = 3.5 Method, difference y / difference x Evaluated estimated answer from their reasonable **tangent**	B1 M1 A1	 The values used must be correct, do not allow 27/3.5 May not be from a tangent, but must be from use of differences, e.g. curve used to form a 'right-angled triangle' (Approximately 3.3 (m/min^2)
15(c)(i) Finding v values: (0,) 14, 29, 26, 30 Split into 4 areas and attempt to sum Correct substitution into trapezium rule 168 (metres)	B1 M1 M1 A1	Sight of (0,) 14, 29, 26, 30 Sight of the sum of 4 products or an attempt substitution of their 5 values in the trapezium rule Or equivalent. (14 + 43 + 55 + 56) or (0+28+ 58+52+30) FT their values for v provided at least 3 values are correct, OR 2 areas correct in sum of 4 possible
15(c)(ii) 0.168(km)	B1	FT their (i)/1000 evaluated correctly

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