

GCSE MARKING SCHEME

MATHEMATICS - LINEAR

NOVEMBER 2012

INTRODUCTION

The marking schemes which follow were those used by WJEC for the November 2012 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

PAPER 1 (Non calculator) Foundation Tier	Marks	FINAL MARK SCHEME Comments
1. (a) (i) 6 583	B1 B1	Comments
(ii) thirteen thousand four hundred and six		
1. (b) 182	B1	
1. (c) 309	B1	
1. (d) 72	B1	
1. (e) (i) 8740 (ii) 8700	B1 B1	
1. (f) 1, 2, 4, 8, 16	B2 9	B1 for any 3 correct factors with at most 1 incorrect number. <u>Allow 1×16, 2×8, 4×4 or repeats in a list.</u>
2. (a) 8 thousand(s) OR 8000 OR thousand(s)	B1	<u>B0 for 1000</u>
2. (b) 81	B1	Accept 9×9 OR 9 ² , but 9 gets B0
2. (c) Tom spends £14 on cards Each pack costs (£)14/10	M1 M1	Allow this M1 only for (£)15/10. Unsupported (£)1.50 gets 0
$= (\pounds)1.4(0)$ OR 140 (p)	A1	C.A.O.
2. (d) 25 (%)	B1	<u>¹/₄ OR .25 get B0.</u>
2. (e) $(74 \text{ OR } 75 \text{ OR } 74.6 \text{ OR } 70 \text{ OR 80}) \times 100$ = 7400 OR 7500 OR 7460 OR 7000 <u>OR 8000</u>	M1 A1	Good estimates F.T their estimates for simple calculations Answers only get M0, A0.
2. (f) 23	B1 9	Allsweis only get No, Ao.
3. (a) Profit = $20 \times 24 - 150$	M1	Correctly substituted shown by correct attempt to evaluate. Must show that the substitution is 20×24 then -150
= (£) 330	A1	$\frac{1}{100}$
3. (b) Outlay = $10 \times 24 - 180$ = (£) 60	M1 A1 4	For correct substitution with subtraction Allow embedded references to the correct answer.
4. (a) cone	B1	Circular based pyramid gets B0
octagon (square based) pyramid OR <u>rectagular based</u> pyramid	B1 B1	Triangular pyramid gets B0, but pyramid gets B1
4. (b) diameter tangent chord	B1 B1 B1	
4. (c) (i) All 3 lines of symmetry	B2	B1 any one of them and no incorrect lines OR 2 correct lines and up to 1 incorrect line.
(ii) BOTH lines of symmetry	B1 9	B0 if any incorrect lines are drawn
5. (a) Missing side segment = 6 Perimeter = $10+2+10+2+10+6+10+2+10+2$ = 64 (cm)	S1 M1 A1	This may be implied by some correct methods Attempt to add all sides of the shape C.A.O.
5. (b) Area = $3 \times 10 \times 2$ = 60 cm ²	M1 A1 U1	OR equivalent C.A.O. Independent of all other marks. Watch out as the area of the 'gap' is also 60.
	6	

PAPER 1 (Non calculator) Foundation Tier	Marks	FINAL MARK SCHEME Comments
6. Finding the costs per pupil of tickets, bus and lunch Cost of ticket per pupil = $915/98 = (OR \ 900/100)$ $= (\pounds)9$ Cost of bus per pupil = $290/98 = (OR \ 300/100)$ $= (\pounds)3$ Total cost per pupil = $\pounds9 + \pounds3 + \pounds3.95 = \pounds15.95$	M1 A1 M1 A1	Allow any method that implies estimating <u>Allow unsupported answers in the range 7-11 incl.</u> <u>But if working shown then mark it.</u> Allow any method that implies estimating <u>Allow unsupported answers in the range 2-4 incl.</u> <u>But if working shown then mark it.</u> F.T. if both Ms awarded
$= (\pounds)^{16} (\text{to nearest } \pounds)$ $= (\pounds)^{16} (\text{to nearest } \pounds)$ $\frac{OR}{\text{Finding the TOTAL cost of tickets, bus and lunches /98}}{\text{Total cost of lunches} = (\pounds)^{3.95 \times 98} = (OR \ \pounds4 \times 100)$	M1	Allow any method that implies estimating
$= (\pounds)400$ Total for the trip = 400 + 915 + 290 = (OR 400+900+300) =(\pounds) 1600	A1 A1	Allow estimated answers F.T. if M awarded
Cost per pupil = $(1605 \text{ OR } 1600)/100$ = (\pounds) 16 (to nearest £) <u>NOTE:</u> 98 ~ 100 (£)3.95 ~ (£)4 (£)915 ~ (£) 900 (£)290 ~ (£)300	M1 A1	Allow any method that implies estimating If no marks then SC1 for any 3 of these estimates
 <u>QWC</u> Look for Spelling Clarity of text explanations The use of notation – watch for '=','£', 'p' being used appropriately. QWC2: Candidates will be expected to present work clearly, with words explaining their processes 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 their processes or steps OR make few if any mistakes in mathematical form, 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 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 and grammar.

PAPER 1 (Non calculator)	Marks	FINAL MARK SCHEME
Foundation Tier		Comments
7. Torontodown 5	B1	<u>If given as -5 then B0, but allow B1 if Moscow is given</u> as -4
Glasgow –4	B1	
Moscow down 4	B1	
Reykjavik –7	B1	
	4	
8. (a) Overlay		
Plots	P1	
Line	L1	A valid attempt at drawing a line/curve through the
		<u>points</u>
8. (b) Any correct strategy, e.g. 2 times value at 20	M1	Any correct method using graph or table.
kilometres per litre		
$56 \times 2 = 112$	A1	F.T. their graph.
		Unsupported answers in the range 108 – 116 <u>inclusive</u> get
	4	M1, A1.
(0, (0), 5, 2, (1, 1))	4 B2	B1 for at least 4 correct entries
9. (a) 5 3 (1 1) 3 1 (1 3)	B2	Negative numbers are errors in this table, but follow
$(1 \ 1) \ 3 \ 5$		through, if needed in part (b)
$(1 \ 1) \ 5 \ 5$ $(1 \ 3) \ 5 \ 7$		through, if needed in part (b)
$(h) = \frac{7}{2} (cf 220)$	M1	F.T. their table. F.T. 'their 7/16' if a fraction less than 1
(b) $\frac{7}{16}$ (of 320)		Sight of bone fide 140 in later working OR 140/320 gets
= 140	A1	M1, A1. Accept words '7 out of 16', or '70 out of 160'
		here.
	M1	
Cost = $320 \times 50(p)$ OR Prizes = $140 \times 80 (p)$	A1	For either method and accuracy for cost OR prizes. F.T. 'their 140' provided it is clearly identifiable.
(£) 160 or 16000 (p) OR (£)112 or 11200 (p)	AI	A0 for £16000 OR 160p OR 112p OR £11200
	M1	F.T. full method (ignore units for the M1).
$\frac{320 \times 50(p) - \text{their } 140 \times 80(p)}{= \text{\pounds}48 \text{ OR } 4800p}$	A1	Rounded up or down figure if <u>their 140</u> is not a whole
= ±48 OK 4800p		number
	8	
10. (a) Base angle = 66	B1	<u>x = 66 with no working gets B1M0A0</u>
x = 180 - 66 - 66 OR 114 - 66	M1	F.T. their 180 – 114
= 48	A1	
10. (b) $(180 - 106) = 74$	B1	For finding 4 th angle. Also look in their diagram.
10. (0) (100 100) - / -		74 on its own gets this B1, even as $y = 74$
360 - 114 - 53 - 74	M1	Angle sum of quadrilateral. Note that $180 - 167 + 106$ is
		equivalent $(114 + 53)$
= 119 (°)	A1	F.T. 'their 74'
	6	
11. A (9, 5)	B2	B1 for each ordinate
B (26, -4)	B2	B1 for each ordinate
C (21, -13)	B2	B1 for each ordinate. F.T. 'their B + $(-5, -9)$'
	6	
	U	

PAPER 1 (Non calculator)	Marks	FINAL MARK SCHEME
Foundation Tier		Comments
12.(a) (£)6400	B1	
(b) (£)2000	B1	
(c) Reasonable straight line of best fit	B1	Some points above and some points below
		Do not accept from 'corner' to 'corner' of the graph
	D 1	<u>paper</u>
(d) Negative (correlation)	B1	
(e) FT from a line of best fit (reading accurate to small	B1	OR an answer between $(\pounds)2600$ and $(\pounds)3600$ inclusive if
square) (curved line or straight line, not dot-to-dot) H1	5	no line of best fit.
13. (a) 3(8x +1)	B1	САО
(b) $x(x-6)$	B1 B1	CAO
(b) $x(x - 0)$ (c) $2x^4 + 12x$	B1 B2	B1 for each term. If B2 penalise further wrong work -1.
(d) $x/3 = 25 - 15$	M1	Or alternate correct first step
$\begin{array}{c} x = 30 \end{array}$	A1	CAO. Accept embedded answers. Mark final answer.
F13 parts (a) to (d) are H4 parts (b) to (e)		SC1 for x=120 from $x/3 = 40$, OR
		SC1 for 'ladder method' showing -15 , $\times 3$
(e) $5x - 7 = 3x + 6$	B1	FT until 2 nd error
2x = 13	B1	OR $x = 13/2$
$x = 6.5 \text{ OR } 6\frac{1}{2}$	B1	Must be simplified
	9	SC1 for 'ladder method'
14.(a) Strategy, shorter edges meeting (accept a diagram)	S1	May be implied in later working that this is the
(Showing) 6 on longer sides (2 lots of 3) and 1 on each end OR idea end tables seat 7 people and middle table seat 6 people	M1	arrangement
(Number of tables is) $(164 - 2) \div 6$ OR 2 correct trials with equivalent "×6 + 2"	M1	Accept intention, not about notation SC2 for 79 or SC1 for $(164 - 6)/2$
27 (tables)	A1	
		Alternative:
		Any 3 multiples of 6 shown or 3 terms of a sequence
		going up in 6s, or 164/6 or 164÷6 S1 27×6 = 162 OR 27 remainder 2 OR 27.3(3) M1 (this implies S1 also)
		$162 + 2 = 164 (seen \ or \ implied) \qquad M1$ $27 \ (tables) \qquad A1$
		An answer of 27 from working '27 remainder 2' or
		^{(27.3(3)} ^(27.3) ^(3.1) ⁽³
		M1, A1 (i.e. remainder justified), otherwise SC1 instead An answer of 27 (tables) without working is awarded SC3
(b) $(n-2)$ ÷6 OR $(n-2)/6$	B3	FT misunderstanding longer edges joined leading to
		(n-6)÷2
		B2 for $n-2 \div 6$ or $n-2/6$ or $-2 \div 6$
		B1 for -2 or ÷6 in an expression
	-	or $n = 6 \times tables + 2$, or $n = 6 \times t + 2$
H5	7	B0 for $\times 6 + 2$ or $n \times 6 + 2$
15. Realising could be 2+2, 1+3, 3+1	B1	May be within a sample space diagram, e.g. sight of two- way table with three 4s shown, or the appropriate additions
Realising 36 different outcomes OR sight of $1/6 \times 1/6$	B1	Maybe shown in a sample space diagram with
OR sight of a denominator of 36	D 1	indication of 36, must be stated not implied
3/36 or equivalent	B1	Ignora incorrect concelling
H6	3	Ignore incorrect cancelling
16. Middle card 6	D1	If boxes are blank, mark the working Smaller numbers to one side and leaven to the other
Two cards (or three cards) 3 <u>as the mode for their cards</u>	B1 B1	Smaller numbers to one side and larger to the other 3 is the distinct mode for their cards
	B1 B1	OR any pair of single digit numbers (including
First card 1 and last card 9 (or in reverse)		
First card 1 and last card 9 (or in reverse)	DI	
First card 1 and last card 9(or in reverse)Correct answer 1 3 3 6 7 8 9 or in reverse	B1	negatives) with a difference of 8 CAO

PAPER 1 - HIGHER TIER

PAPER 1 Higher Tier	Marks	FINAL MARK SCHEME Comments
1.(a) (£)6400	B1	
(b) (£)2000	B1	
(c) Reasonable straight line of best fit	B1	Some points above and some points below.
		Do not accept from 'corner' to 'corner' of the graph paper
(d) Negative (correlation)	B1	
(e) FT from a 'line of best fit' (reading accurate to small	B1	OR an answer between (£)2600 and (£)3600 inclusive if no
square) (curved line or straight line, not dot-to-dot)	5	line of best fit.
2.(a) Correct translation	B1	
(b) Correct reflection	B2	B1 for sight of $y = 6$ or reflection in any horizontal
	3	
3.(a)		Mark intention of straight lines throughout the question
		Use the acetate to follow through for each time period, i.e.
		8:15, 9:00,11:00 Penalise not joined with lines -1 only
(08:00, 0) to (08:15, 2.5) joined with a line	B1	Penanse not joined with lines -1 only
(08.00, 0) to (08.13, 2.3) Joined with a line	DI	
(08:15, 2.5) to (08:36, 2.5) joined with a line AND	B1	
(08:36, 2.5) to (09:00, 5.5) joined with a line	DI	
(00.50, 2.5) to (05.00, 5.5) joined with a fine		
(09:00, 5.5) to (11:00, 5.5) joined with a line	B1	
(····,··,··,··,··,··,·,·,·,·,·,·,·,·,·,		
(11:00,5.5) to (11:30, 0) joined with a line	B1	SC2 for an 'correctly shaped but inverted travel graph', or
		SC1 if '1 error' in this inverted travel graph
(b) $5.5 / 30$ (minutes) or $5.5 / \frac{1}{2}$ (hour) or $5.5 + 5.5$	M1	Accept 5 ¹ / ₂ for the distance
11/60(miles/min)		FT their total distance from their graph in (a), but time must
		be 30 minutes or 1/2 hour, do not accept 0.30 as 30 minutes
11 (mph)	A1	
	6	
4.(a) $6x - 2x = 21 + 7$	B1	FT until 2 nd error
4x = 28	B1	OR $x = 28/4$
$\mathbf{x} = 7$	B1	Must be simplified
(b) $3(8x+1)$	B1	CAO
(c) $x(x-6)$ (d) $2x^4 + 12x$	B1 D2	CAO
(d) $2x^4 + 12x$ (e) $x/3 = 25 - 15$	B2 M1	B1 for each term. If B2 penalise further incorrect work -1
(e) $x/3 = 25 - 15$ x = 30	A1	Or alternate correct first step
x = 30	AI	CAO. Accept embedded answers. Mark final answer. SC1 for $x=120$ from $x/3 = 40$, OR
	9	SC1 for 'ladder method' showing -15, $\times 3$
	9	SCI IOI Taudel method showing -15, ×5

PAPER 1	Marks	FINAL MARK SCHEME
Higher Tier		Comments
5.(a) Strategy, shorter edges meeting (accept a diagram) (Showing) 6 on longer sides (2 lots of 3) and 1 on each end	S1 M1	May be implied in later working that this is the arrangement
OR idea end tables seat 7 people and middle table seat 6 people (Number of tables is) $(164-2) \div 6$ OR 2 correct trials with equivalent "×6 + 2" 27 (tables)	M1 A1	Accept intention, not about notation. For a complete correct method that could lead to 27 tables
		SC2 for 79 or 54, or SC1 for (164 – 6)/2
		Alternative:Any 3 multiples of 6 shown or3 terms of a sequence going up in 6s, or 164/6 or 164 \div 6SI $27 \times 6 = 162$ OR 27 remainder 2OR $27.3(3)$ $(this implies SI also)$ 162 + 2 = 164 (seen or implied)M1 27 (tables)A1
		An answer of 27 from working '27 remainder 2' or '27.3(3)' must be confirmed in order to award the final M1, A1 (i.e. remainder justified), otherwise SC1 instead
QWC0 for answer only	QWC	An answer of 27 (tables) without working is awarded SC3
 QWC2: Candidates will be expected to present work clearly, maybe with diagrams and words explaining process or steps 	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.
 MAND make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer 		QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar OR
 QWC1: Candidates will be expected to present work clearly, maybe with diagrams and words explaining process or steps 		evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar.
 OR make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer 		QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar.
(b) $(n-2)$ ÷6 OR $(n-2)/6$ OR equivalent	В3	FT misunderstanding longer edges joined leading to (n-6)÷2
	9	B2 for n-2 \div 6 or n - 2/6 or -2 \div 6 B1 for -2 or \div 6 in an expression or n = 6×tables + 2, or n = 6×t + 2 B0 for ×6 + 2 or n×6 + 2
6. Realising could be 2+2, 1+3, 3+1	B1	May be within a sample space diagram, e.g. sight of two-
Realising 36 different outcomes OR sight of $1/6 \times 1/6$ OR product of 2 terms both with denominators of 6 seen OR sight of a denominator of 36	B1	way table with three 4s shown, or the appropriate additions Maybe shown in a sample space diagram with indication of 36, must be stated not implied
3/36 or equivalent	B1 3	Ignore incorrect cancelling

Higher HerCommentsMidde card 6The loces are blank, mark the workingMidde card 6Smaller numbers to one side and larger to the otherNo cards (or more) 3 as the mode for their cardsBiFirst card 1 and last card 9 (or in reverse)BiStratt and last card 9 (or in reverse)BiStratt and last card 9 (or in reverse)MillStratt and last card 9 (or in reverse)Mill (or reverse)Stratt and last card 9 (or in reverse)Mill (or reverse)Stratt and last card 9 (or in reverse)Mill (or reverse)Stratt and last card 9 (or in reverse)Mill (or reverse)Stratt and last card 9 (or in reverse)Mill (or reverse)Stratt and last card 9 (or in reverse)Mill (or reverse)Stratt and last card 9 (or in reverse)Mill (or reverse)	PAPER 1	Marks	FINAL MARK SCHEME
Middle card 6B1Smaller numbers to one side and large to the other 3 is the distinct mode for their cards B1 or any norms 3 as the mode for their cards B1 or Ray pair of single digit numbers (including negatives) with a difference of 8Correct answer 1 3 3 6 7 8 9 or in reverseB18(a) 3 reasonable rounded values which could lead to simple calculations Correct evaluation for their figures (b) 3.45M1Not all 3 need to be different to those givenCorrect evaluation for their figures (c) 3.46M1(d) 2, 2, 2, 3, 5B1(e) 10.9 or 1.9(70) 00M1(f) 2, 2, 2, 3, 5B1(g) 1, 2, 2, 2, 3, 5B1(g) 10.9 or 1.9(70) 01.09M1(h) 2, 2, 2, 3, 5B1(g) 10.9 or 1.9(70) 01.09M1(h) 2, 2, 2, 3, 5B1(g) 10.9 and indication that this is GREATER than 0.9A1(h) (2x + 3)(x - 1)B0Both possible solutions $x = -3/2$ AND $x = 1$ (h) $(2x + 3)(x - 1)$ B1Both possible solutions $x = -3/2$ AND $x = 1$ (h) $(2x + 3)(x - 1)$ Both possible solutions $x = -3/2$ AND $x = 1$ (h) $(2x + 3)(x - 1)$ Both possible solutions $x = -3/2$ AND $x = 1$ (h) $(2x + 3)(x - 1)$ Both possible solutions $x = -3/2$ AND $x = 1$ (h) $(2x + 3)(x - 1)$ Both possible solutions $x = -3/2$ AND $x = 1$ (h) $(2x + 3)(x - 1)$ Both possible solutions $x = -3/2$ AND $x = 1$ (h) $(2x + 3)(x - 1)$ Both possible solutions $x = -3/2$ AND $x = 1$ (h) $(2x + 3)(x - 1)$ Both possible s	Higher Tier	IVIALKS	
Two cards (or more) 3 as the mode for their cards First card 1 and last card 9 (or in reverse)B13 is the distinct mode for their cards OR any pair of single digit numbers (including negatives) with a difference of 8 CAOCorrect answer 1 3 3 6 7 8 9 or in reverseB1(Common responses include 5 here) Correct evaluation for their figures (b) 345 (c) 316 (c) 2, 2, 2, 2, 3, 5 2' x 3 × 5 (e) 1.09 or 1/(9/10) or 109 10.9 and indication that this is GREATER than 0.9 $= 6x^2 + 7x - 20$ $= 100 (100) (100$			
First card 1 and last card 9(or in reverse)B1OR any pair of single digit numbers (including negatives) with a difference of 8Correct answer 1 3 3 6 7 8 9 or in reverseB1CAO3(a) 3 reasonable rounded values which could lead to simple calculationsM1Not all 3 need to be different to those givenCorrect evaluation for their figuresA1(Common responses include 5 here)(b) 3.4.5B1CAO(c) 3.16B1CAO(d) 2, 2, 2, 3, 5B1A10 wo (1875. Do not accept 1.58(e) 1.0.9 or 1/(V/10) or 1.0.9B1Fi "thice" primes, needs to have at least 1 index>1(b) 0.4.9 or 1.2(V/10) or 1.0.9B2B1 for any 3 terms correct(b) (2x + 3)(x - 1)B2B1 for any 3 terms correct(b) (2x + 3)(x - 1)B2B1 for any 3 terms correct(c) (x + 5) ⁶ B1Fi Thice in answer of 6x ² () - 20(b) (2x + 3)(x - 1)B2B1 for (1x ² =) ont for alone(b) (2x + 3)(x - 1)B2B1 for (1x ² =) ont for alone(b) (2x + 3)(x - 1)B2B1 for (1x ² =) ont for alone(b) 0.7 × 0.7B1Fi from their pair of brackets(c) (x + 5) ⁶ M1Fi from their tree, provided numbers >0 and <1			
Correct answer 1 3 3 6 7 8 9 or in reverseBit 4With a difference of 88 (a) 3 reasonable rounded values which could lead to simple calculationsMINot all 3 need to be different to those givenCorrect evaluation for their figuresA1(Common responses include 5 here)(b) 3,452' x 3 x 5B1(c) 2, 2, 2, 3, 52' x 3 x 5(e) 1.0.9 or 1/(9/10) or 10.910.9 and indication that this is GREATER than 0.9P110.9 and indication that this is GREATER than 0.9P19(a) 6x ² + 15x - 8x - 20B1(b) (2x + 3)(x - 1)B2B1 for at 2x + 15x - 8x - 20B1(b) (2x + 3)(x - 1)B2B1 for any 3 terms correct(c) (x + 5) ² (d) n ² + 4 or equivalentP2(b) (2x + 3)(x - 1)(c) (x + 5) ² (d) n ² + 4 or equivalent(b) (0, 7 x 0, 7)(c) (x + 5) ² (d) n ² + 4 or equivalent(b) (0, 7 x 0, 7)(c) (x + 5) ² (d) n ² + 4 or equivalent(f) (0, 7 x 0, 7)(g) (x + 5) ² (g) (x + 5) ² (h) (x + 5) ² (h) (x + 5) ² (h) (x + 5) ² (c) (x + 5) ² (b) (x + 5) ² (c) (x + 5) ² (d) n ² + 4 or equivalent(h) (x + 5) ² (h) (
Correct answer 1 3 3 6 7 8 9 or in reverseB1 4CAO8(a) 3 reasonable rounded values which could lead to simple calculations.M1Not all 3 need to be different to those given(b) 3.45Cancet evaluation for their figuresA1 (Common responses include 5 here)(Common responses include 5 here)(c) 3/162 ⁴ × 3 × 5B1 (A) 9 or 1/9/01 or 10.9B1 (A) 9 or 1/9/01 or 10.9B1 (Common responses include 5 here)(a) 0.49 or 1/9/01 00 r 10.910.9M1 (A) 9 or 1/9/01 or 10.9M1 (A) 9 or 1/9 or 1.1(11), statement in reverse9(a) 6x ² + 15x - 8x - 20 = 6x ² + 7x - 20B2 B1 (C) x + 3)%B1 for any 3 terms correct(b) (2x + 3)(x - 1) (C) (x + 5)%B2 (C) (x - 3)(x - 1) (C (2x . 3)(x - 1) 0 (C (2x	First card 1 and last card 9 (or in reverse)	BI	
448(a) 3 reasonable rounded values which could lead to simple calculations Correct evaluation for their figures (b) 3.45MI (Common responses include 5 here) (B) 3.45(c) 3.4581(c) 3.4581(c) 3.4581(c) 3.4724 × 3 × 5(c) 1.40, or 1.(91.0)1.09 and indication that this is GREATER than 0.999.(a) 6x ² + 15x - 8x - 20829.(a) 6x ² + 15x - 8x - 20829.(a) 6x ² + 15x - 8x - 2081(b) (2x + 3)(x - 1)81Both possible solutions x = -3/2 AND x = 1(c) (x + 5) ² 81(c) (x + 7)81(d) n ² + 4 or equivalent910.(a) All entries correct82(b) (2x + 3)(x - 1)0.49A111.(a) Initial strategy, e.g. sketch of concentric rectangles Composite hapes(y + 2x)(5+2x) - 9x5 or $9x+9x+5x+5x+x^2+x^2+x^2$ (b) Cav (4x^2 + 7x) or $4x(x + 7)$ (c) (x + 2) ² (c) (x + 2) ³ (b) (2x + 3)(x - 1)(c) (a) (a) (a) (b) (b) (a) faces or(b) (2x + 3)(x - 1)(c) (a) (b) (b) (a) (a) (a) (b) (b) (b) (a) (a) (a) (b) (b) (b) (a) (a) (a) (b) (b) (b) (a) (a) (a) (a) (b) (b) (b) (a) (a) (a) (b) (b) (b) (a) (a) (a) (a) (b) (b) (b) (a) (a) (a) (a) (b) (b) (b) (a) (a) (a) (a) (a) (a) (a) (a) (a) (a		D1	
8.(a) 2 reasonable rounded values which could lead to simple calculations Correct evaluation for their figures (b) 3.45 (c) 3/16M1 Not all 3 need to be different to those given (<i>Common responses include 5 here</i>) CAO(c) 3/16 (d) 2, 2, 2, 2, 3, 5 (2) 3/16B1 (<i>Common responses include 5 here</i>) (CAOCAO (<i>Common responses include 5 here</i>) (<i>Common responses include 5 here</i>) (<i>Common responses include 5 here</i>) (<i>Common responses include 5 here</i>)(a) 2, 2, 2, 2, 3, 5 (e) 1/9/10 or 10.9 (10.9 or 1/9/10 or 10.9 (10.9 or 1/9/10 or 10.9)B1 (<i>Common responses include 5 here</i>) (<i>Common responses include 5 here</i>)(b) (2x +3)(x - 1) Both possible solutions x = -3/2 AND x = 1 (b) (2x +3)(x - 1) Both possible solutions x = -3/2 AND x = 1 (b) (2x +3)(x - 1)B2 B1 for any 3 terms correct B1 B1 for any 3 terms correct(d) n ² + 4 or equivalent92B1 for any 3 terms correct B1 for from heir pair of brackets CAO. Mark final answer B1 for (10.9 ±, not for n ² alone10.(a) All entries correct (b) 0.7 x 0.7 (0.7)B2 A1 (1.0) Initial strategy, e.g. sketch of concentric rectangles (<i>Correct method to find area</i> , e.g. subtraction of areas or composite shapesS1 Or equivalent(b) Strategy, drawing with ¼ circles in corners (O square any 5 or 9x+9x+5x+5x+x ² +x ² +x ² + x ² (Or equivalent)S1 M1 Mark final answer H <i>fr</i> the <i>ath</i> and <i>FT</i> and <i>FT</i> (<i>leading to 2x²</i> , 4x ² or x(28 + Πx))(b) Strategy, drawing with ¼ circles in corners (O square with ½ circles in corners (O square all of all as a soor (O square all of all as a soor (O all a data as a soor (O all a data as a soor (O all all answer H <i>fr</i> the <i>ath</i> and a	Correct answer 1 3 3 6 7 8 9 or in reverse		CAU
simple calculations Correct evaluation for their figures (b) 3.45 (c) 3/16 (c) 3/16 (c) 2,2,2,2,3,5 (c) 1/0.9 or 1/(9/10) or 10/9 1/0.9 and indication that this is GREATER than 0.9 9(40) $6x^2 + 15x - 8x - 20$ $= 6x^2 + 7x - 20$ (b) $(2x + 3)(x - 1)$ B) for takes 2 correct primes before 2^{n4} error $= 6x^2 + 7x - 20$ (b) $(2x + 3)(x - 1)$ B) for takes 2 correct primes before 2^{n4} error $= 6x^2 + 7x - 20$ (c) $(x + 5)^6$ (d) $n^2 + 4$ or equivalent $= 6x^2 + 7x - 20$ B) I for 1/n or B) provided collection required. Mark final answer B) for (2x - 3)(x . 1) or (2x . 1)(x . 3) (c) $(x + 5)^6$ (d) $n^2 + 4$ or equivalent = 0.49 10.(a) All entries correct (b) $(2x + 3)(x - 1)$ B) 1 for $(2x - 3)(x . 1)$ or $(2x - 1)(x . 3)$ (c) $(x + 5)^6$ (d) $n^2 + 4$ or equivalent = 0.49 11.(a) Initial strategy, e.g. sketch of concentric rectangles Correct method to find area, e.g. subtraction of areas or composite shapes (9+2x)(5+2x) - 9-x5 or 9x+9x+5x+5x+x^2+x^2+x^2 + x^2	\Re (a) 3 reasonable rounded values which could lead to		Not all 3 need to be different to those given
$ \begin{array}{c} \text{Correct evaluation for their figures} \\ (b) 3.45 \\ (c) 3.16 \\ (d) 2, 2, 2, 3, 5 \\ 2^{4} \times 3 \times 5 \\ 10.9 \text{ or } 1/(9/10) \text{ or } 10.9 \\ 10.9 \text{ or } 1/(9/10) \text{ or } 10.9 \\ 10.9 \text{ or } 1/(9/10) \text{ or } 10.9 \\ 10.9 \text{ or } 1/(9/10) \text{ or } 10.9 \\ 10.9 \text{ or } 1/(9/10) \text{ or } 10.9 \\ 10.9 \text{ or } 1/(9/10) \text{ or } 10.9 \\ 10.9 \text{ or } 1/(9/10) \text{ or } 10.9 \\ 10.9 \text{ or } 1/(9/10) \text{ or } 10.9 \\ 10.9 \text{ or } 1/(9/10) \text{ or } 10.9 \\ 10.9 \text{ or } 1/(9/10) \text{ or } 10.9 \\ 10.9 \text{ or } 1/(9/10) \text{ or } 10.9 \\ 10.9 \text{ or } 1/(9/10) \text{ or } 10.9 \\ 10.9 \text{ or } 1/(9/10) \text{ or } 10.9 \\ 10.9 \text{ or } 1/(9/10) \text{ or } 10.9 \\ 10.9 \text{ or } 1/(9/10) \text{ or } 10.9 \\ 10.9 \text{ or } 1/(9/10) \text{ or } 10.9 \\ 10.6 \text{ or } 1^{3} \text{ or } 1.1 \text{ (c) } 1.1 $		IVII	Not all 5 need to be different to those given
		Δ1	(Common responses include 5 here)
(c) 3/16 (d) 2, 2, 2, 3, 5 2 ⁴ × 3 × 5 (e) 1.0.9 or 1/(9/10) or 10.9 10.9 and indication that this is GREATER than 0.9B1 B2 B1 F Their" primes, needs to have at least 1 index>110.9 and indication that this is GREATER than 0.9 9(a) $6x^2 + 15x - 8x - 20$ $= 6x^2 + 7x - 20$ B2 B1 for any 3 terms correct FT from B1 provided collection required. Mark final answer B1 B1 for 1 their" primes, needs to have at least 1 index>1(b) $(2x + 3)(x - 1)$ Both possible solutions $x = -3/2$ AND $x = 1$ (c) $(x + 5)^6$ B2 B1 B1 FT from B1 provided collection required. Mark final answer B1 for (1m^2 ±) not for n² (alone)10.(a) All entries correct (b) 0.7 0.7B2 A1B1 for any 3 terms correct FT from their prime B1 for (1m² ±) not for n² (alone)10.(a) All entries correct (b) 0.7 0.7B2 A1B1 for any one pair of branches correct FT from their tree, provided numbers >0 and <1	-		
(d) $2, 2, 2, 2, 3, 5$ $2^4 \times 3 \times 5$ B2 $2^4 \times 3 \times 5$ B1 bit for at least 2 correct primes, needs to have at least 1 index>1 10^9 and indication that this is GREATER than 0.9B1 A1 A1 A1B1 A1 Or $1^{1}_{,9}$ or 1.1(11.), statement in reverse 9B2 9B1 A1 A1 A1 A1 A1B1 A1 A1 A1 A1B1 A1 A1 A1 A1 A1B1 A1 A1 A1 A1 A1 A1 A1B1 A1 A1 A1 A1 A1 A1 A1B1 A1 A1 A1 A1 A1 A1 A1 A1 A1 A1 A1 A1 A1 A1 A1B1 A1			
$\begin{array}{c c c c c c c c c c c c c c c c c c c $			
(e)10.9or1/(9)10.9M1Or1/2,0or1/2,01.1(1), statement in reverse9(a)6x ² + 15x - 8x - 20B2B1 for any 3 terms correct9(a)6x ² + 15x - 8x - 20B1B1 for any 3 terms correct9(a)6x ² + 15x - 8x - 20B1B1Fr from B1 provided collection required. Mark final answer0(b)(2x + 3)(x - 1)B1B1Fr from B1 provided collection required. Mark final answer0(c)(x + 5) ⁶ B1FT from H2 provided collection required. Mark final answer0(d)n ² + 4 or equivalentB2B1 for (2x3)(x1) or (2x1)(x3)10.4a)Hentries correctB2B1 for any one pair of branches correct(b)0.7 × 0.7M1For intention, but some sections may be missed0.49A1411.(a)Initial strategy, e.g. sketch of concentric rectangles correct method to find area, e.g. subtraction of areas or composite shapesS1(b)Strategy, drawing with ¼ circles in corners (or equivalent)S1For intention, but some sections may be missed(b)Strategy, drawing with ¼ circles in corners (or equivalent)S1F19x+9x+5x+5x+4x+1/X + 1xS2M12(a)5 and -12B2(b)Ay 6 correct ptolsB1B1F1for al answer(c)2 and 6B1(d)y alus 6 0, 3, 4, 3, 0S11Correct area calculation shown(f)(y values 0, 3, 4, 3, 0)			
No.10.9 and indication that this is GREATER than 0.9A1Or 1^{1}_{29} or $1.1(11)$, statement in reverse9.(a) $6x^{2} + 15x - 8x - 20$ = $6x^{2} + 7x - 20$ B2B1 for any 3 terms correct(b) $(2x + 3)(x - 1)$ Both possible solutions $x = -3/2$ AND $x = 1$ B2SCI for an answer of $6x^{2} () - 20$ Both possible solutions $x = -3/2$ AND $x = 1$ B1B1 for $(2x - 3)(x - 1)$ D($x + 5)^{6}$ (d) $n^{2} + 4$ or equivalentB2B1 for $(2x - 3)(x - 1)$ or $(2x - 1)(x - 3)$ FT from their pair of branches correct(b) 0.7×0.7 B1B1 for $(2x - 3)(x - 1)$ or $(3x - 1) - 0$ B110.(a) All entries correctB2B1 for $(2x - 3)(x - 1)$ or $(3x - 1) - 0$ (b) 0.7×0.7 A10.49A111.(a) Initial strategy, e.g. sketch of concentric rectanglesS1Correct method to find area, e.g. subtraction of areas orS1(w) $2x_{3}(5+2x) - 9\times5$ or $9x+9x+5x+5x+x^{2}+x^{2}+x^{2}+x^{2}$ A1 $4x^{2}+28x$ or $4(x^{2} + 7x)$ or $4x(x + 7)$ A1 $4x^{2}+28x$ or $4(x^{2} + 7x)$ or $4x(x + 7)$ A1(b) Strategy, drawing with 14 circles in cornersS1(b) Strategy, drawing with 14 circles in cornersS1(c) requivalent)TT $9x+9x+5x+4x+4x+14x tx^{2}$ M1 $28x + 11x^{2}$ or $x(28 + 11x)$ TT12.(a) -5 and -12(b) Any 6 correct plots joined with a smooth curveB1(c) 2 and 6B1(d) y values 0, 3, 4, 3, 0Split correct area calculations shown(d) 19			
999999999999999999910910910 <td></td> <td></td> <td>Or 1^{1}_{0} or $1.1(11_{0})$, statement in reverse</td>			Or 1^{1}_{0} or $1.1(11_{0})$, statement in reverse
9.(a) $6x^2 + 15x - 8x - 20$ $= 6x^2 + 7x - 20$ B2 $= 6x^2 + 7x - 20$ B2 $= 6x^2 + 7x - 20$ B1 $= 10x^2 + 7x - 20$ (b) $(2x + 3)(x - 1)$ Both possible solutions $x = -3/2$ AND $x = 1$ (c) $(x + 5)^6$ (d) $n^2 + 4$ or equivalentB2 $= 11 \text{ for } (1n^3 \pm 3)(x - 1) \text{ or } (2x - 1)(x - 3)$ $= 11 \text{ for } (2n^3 \pm 3)(x - 1) \text{ or } (2x - 1)(x - 3)$ $= 11 \text{ for } (1n^3 \pm 3)(x - 1) \text{ or } (2x - 1)(x - 3)$ $= 11 \text{ for } (1n^3 \pm 3)(x - 1) \text{ or } (2x - 1)(x - 3)$ $= 11 \text{ for } (1n^3 \pm 3)(x - 1) \text{ or } (2x - 1)(x - 3)$ $= 11 \text{ for } (1n^3 \pm 3)(x - 1) \text{ or } (2x - 1)(x - 3)$ $= 11 \text{ for } (1n^3 \pm 3)(x - 1) \text{ or } (2x - 1)(x - 3)$ $= 11 \text{ for } (1n^3 \pm 3)(x - 1) \text{ or } (2x - 1)(x - 3)$ $= 11 \text{ for } (1n^3 \pm 3)(x - 1) \text{ or } (2x - 1)(x - 3)$ $= 11 \text{ for } (1n^3 \pm 3)(x - 1) \text{ or } (2x - 1)(x - 3)$ $= 11 \text{ for } (1n^3 \pm 3)(x - 1) \text{ or } (2x - 1)(x - 3)$ $= 11 \text{ for } (2n + 3)(x - 3)(x - 1) \text{ or } (2x - 1)(x - 3)$ $= 11 \text{ for } (2n + 3)(x - 3)(x - 1) \text{ or } (2x - 1)(x - 3)$ $= 11 \text{ for } (2n + 3)(x - 3)(x - 1) \text{ or } (2x - 3)(x - 1)$ $= 11 \text{ for } (2n + 3)(x - 3)(x - 1) \text{ or } (2x - 3)(x - 1)$ $= 11 \text{ for } (2n + 3)(x - 3)(x - 1) \text{ or } (2x - 3)(x - 1)$ $= 11 \text{ for } (2n + 3)(x - 3)(x - 1) \text{ or } (2x - 3)(x - 3)(x$			
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	9.(a) $6x^2 + 15x - 8x - 20$		B1 for any 3 terms correct
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	$= 6x^2 + 7x - 20$		
(b) $(2x + 3)(x - 1)$ B2SCI for an answer of $6x^2 () - 20$ Both possible solutions $x = -3/2$ AND $x = 1$ B1B1for $(2x3)(x1)$ or $(2x1)(x3)$ (d) $n^2 + 4$ or equivalentB1FT from their pair of brackets(d) $n^2 + 4$ or equivalentB2CAO. Mark final answer9B1 for $(1)n^2 \pm, not for n^2 alone10.(a) All entries correctB2B1 for any one pair of branches correct(b) 0.7 \times 0.7A10.49A111.(a) Initial strategy, e.g. sketch of concentric rectanglesS1Correct method to find area, e.g. subtraction of areas orcomposite shapesS1(9+2x)(5+2x) - 9x5 or 9x+9x+5x+5x+x^2+x^2+x^2 + x^2A14x^2+28x or 4(x^2 + 7x) or 4x(x + 7)A1Mark final answerIf the path has been built inside then MR-1 and FT (leadingto 28x - 4x^2)(b) Strategy, drawing with 4 circles in corners(or equivalent)S1OR sight of \pi x^2 or x(28 + \Pi x)A12(a) -5 and -12B2(b) Any 6 correct plotsB1A1B2A1B2A1B1 for each correct answer(F) from (a)B1F1 from (a)Cord inta net equivalentB1(b) Any 6 correct plotsB1A1B2B1F2B1F2B1F3Core correct plotsB1A1B2B1F3Core correct plotsB1F1F1F1from (a)F1$			
Both possible solutions $x = -3/2$ AND $x = 1$ (c) $(x + 5)^6$ B1B1 for $(2x,3)(x,1)$ or $(2x,1)(x,3)$ FT from their pair of brackets(d) $n^2 + 4$ or equivalentB2B1 for $(1)n^2 \pm,$ not for n^2 alone10.(a) All entries correctB2B1 for $(1)n^2 \pm,$ not for n^2 alone(b) 0.7×0.7 M1B1(a) $-4x^2$ A1(b) 0.7×0.7 M1(c) $-2x_1(5+2x) - 9x5$ or $-9x+9x+5x+5x+x^2+x^2+x^2$ A1(a) $-4x^2+7x$ or $4(x^2+7x)$ or $4x(x+7)$ A1(b) Strategy, drawing with ½ circles in corners (or equivalent)S1(b) Any 6 correct plots (c) 2 and 6B1(c) 2 and 6B1(d) y alues 0, 3, 4, 3, 0B1Split correct region into areas to sumB1Numerically correct region into areas to sumB1Numerically correct region into areas to sumB1A1Sight of πx^2 or $x(28 + \Pi x)^2$ (d) y alues 0, 3, 4, 3, 0B1Split correct region into areas to sumB1Numerically correct area calculations shownA1(10 (square units))A1(a) y a $1/x^2$ OR y $= k/x^2$ B1(a) y a $1/x^2$ OR y $= k/x^2$ B1(b) Any 6 correct plots joined with a smooth curve(c)(c) 10 (square units)A1(d) y a $1/x^2$ OR	(b) $(2x+3)(x-1)$	B2	
(c) $(x, \pm 5)^6$ (d) $n^2 \pm 4$ or equivalentB1 B2FT from their pair of brackets CAO. Mark final answer B1 for $(1n^2 \pm, not for n^2 alone)$ 10.(a) All entries correct (b) 0.7 × 0.7 0.49B2B1 for any one pair of branches correct FT from their tree, provided numbers >0 and <1	Both possible solutions $x = -3/2$ AND $x = 1$	B1	
(d) $n^2 + 4$ or equivalentB2 9CAO. Mark final answer B1 for $(1)n^2 \pm, not for n^2 alone10.(a) All entries correctB20.49B1 for any one pair of branches correct(b) 0.7 \times 0.7M10.49A111.(a) Initial strategy, e.g. sketch of concentric rectanglesCorrect method to find area, e.g. subtraction of areas orcomposite shapesS1M1(9+2x)(5+2x) - 9x5 or 9x+9x+5x+5x+x^2+x^2+x^2+x^2+x^24x^2+28x or 4(x^2 + 7x) or 4x(x + 7)A1M1(b) Strategy, drawing with ¼ circles in corners(or equivalent)S1M19x+9x+5x+5x+4x+1/4 \times \Pi \times x^228x + \Pi x^2 or x(28 + \Pi x)S1M19x+9x+5x+5x+4x+1/4 \times \Pi \times x^2(Or equivalent)M1Mark final answerTf the path has been built inside then MR-1 and FT (leadingto 28x - 4x^2)9x+9x+5x+5x+4x+1/4 \times \Pi \times x^2(Or equivalent)M1M29x+9x+5x+5x+4x+1/4 \times \Pi \times x^2(Or equivalent)M1Mark final answerTf the path has been built inside then MR-1 and FT12.(a) -5 and -12(b) Any 6 correct plots(c) 2 and 6B2B1 for each correct answerB1F1 from (a)Cordinate notation is not required.Accept embedded answers(d) y values 0, 3, 4, 3, 0Split correct region into areas to sumNumerically correct area calculations shown10 (square units)B1A1CAO13. y \alpha 1/x^2 OR y = k/x^2y = 1440/x^2B1M1Ignore us of incorrect symbol 'a' laterF1 y \alpha 1/x or y \alpha x^2 for possible M1, A1$		B1	FT from their pair of brackets
9BI for $(1)n^2 \pm \dots$, not for n^2 alone10.(a) All entries correctB210.(a) All entries correctB2(b) 0.7 × 0.7All0.49Al11.(a) Initial strategy, e.g. sketch of concentric rectanglesS1Correct method to find area, e.g. subtraction of areas or composite shapesS1(9+2x)(5+2x) - 9x5 or 9x+9x+5x+5x+x^2+x^2+x^2 + x^2Al(9+2x)(5+2x) - 9x5 or 9x+9x+5x+5x+x^2+x^2+x^2+x^2 + x^2Al(b) Strategy, drawing with 4 circles in cornersS1(b) Strategy, drawing with 4 circles in cornersS1(c) requivalent)FT from (a), to give their (a) $-4x^2 + \Pi x^2$, Not for sight of π^2 (c) requivalent)NII $2x + \Pi x^2$ or $x(28 + \Pi x)$ AlMark final answerT12.(a) -5 and -12B2(b) Any 6 correct plotsB1All 8 correct plots of with a smooth curveB1(c) 2 and 6B1(c) 2 und 6Coordinate notation is not required. Accept embedded answers(d) y values 0, 3, 4, 3, 0B1Split correct region into areas to sumM1Numerically correct area calculations shownA1(b) (square units)A1(c) 2 und 6S1 </td <td></td> <td>B2</td> <td></td>		B2	
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$		9	B1 for $(1)n^2 \pm \dots$, not for n^2 alone
(b) 0.7×0.7 M1 0.49 FT from their tree, provided numbers >0 and <111.(a) Initial strategy, e.g. sketch of concentric rectangles Correct method to find area, e.g. subtraction of areas or composite shapesS1 M1For intention, but some sections may be missed $(9+2x)(5+2x) - 9\times5$ or $9x+9x+5x+5x+x^2+x^2+x^2+x^2$ A1 $4x^2+28x$ or $4(x^2+7x)$ or $4x(x+7)$ A1Or equivalent Mark final answer $If the path has been built inside then MR-1 and FT (leadingto 28x - 4x^2)(b) Strategy, drawing with ¼ circles in cornersOR sight of \pi x^2 or x(28 + \Pi x)S1R^2FT from (a), to give their (a) -4x^2 + \Pi x^2,Not for sight of \pi t^2or x(28 + \Pi x)(b) Ary 6 correct plotsAll 8 correct plots joined with a smooth curve(c) 2 and 6B1RT from (a)R1 for maximumB1RT from (a)R1 from (a)(d) y values 0, 3, 4, 3, 0Split correct region into areas to sumB1M1M2S1M1M2S1M1M2Numerically correct are calculations shown10 (square units)A19CAO13. y \alpha 1/x^2 OR y = k/x^2y = 1440/x^2B1M1Ignore use of incorrect symbol '\alpha' laterFT y \alpha 1/x or y \alpha x^2 for possible M1, A1$	10.(a) All entries correct	B2	B1 for any one pair of branches correct
0.49A1 411.(a) Initial strategy, e.g. sketch of concentric rectangles Correct method to find area, e.g. subtraction of areas or composite shapesS1 $(9+2x)(5+2x) - 9x5$ or $9x+9x+5x+5x+x^2+x^2+x^2+x^2$ A1 $4x^2+28x$ or $4(x^2 + 7x)$ or $4x(x + 7)$ A1ArMark final answer If the path has been built inside then MR-1 and FT (leading to $28x - 4x^2$)(b) Strategy, drawing with ¼ circles in corners OR sight of πx^2 of a fraction or multiple of πx^2 (or equivalent)S1 $9x+9x+5x+5x+4x + 1/4 \times \Pi x \times 2$ M1 $9x+9x+5x+5x+4x + 1/4 \times \Pi x \times 2$ M1 $28x + \Pi x^2$ or $x(28 + \Pi x)$ T712.(a) -5 and -12 (b) Any 6 correct plotsB2B1FT from (a) T from (a)(c) 2 and 6B1(c) 2 and 6B1Split correct region into areas to sumM1M1Si sight of these values alone or within a calculation FT for 1 incorrect y value only. May included area below x-axisNumerically correct area calculations shownA1(4) y values 0, 3, 4, 3, 0B1Split correct region into areas to sumA1910 (square units)13. $y \alpha 1/x^2$ OR $y = k/x^2$ B114.(2) $y \alpha 1/x^2$ OR $y = k/x^2$ 13. $y \alpha 1/x^2$ OR $y = k/x^2$ 13. $y \alpha 1/x^2$ OR $y = k/x^2$ 14.(2) x^2 13. $y \alpha 1/x^2$ OR $y = k/x^2$ 14.(2) x^2 14.(2) x^2 13. $y \alpha 1/x^2$ OR $y = k/x^2$ 14.(2) x^2 14.(2) x^2 13. $y \alpha 1/x^2$ OR $y = k/x^2$ 14.(2) x^2 <td></td> <td>M1</td> <td></td>		M1	
11.(a) Initial strategy, e.g. sketch of concentric rectangles Correct method to find area, e.g. subtraction of areas or composite shapes $(9+2x)(5+2x) - 9x5$ or $9x+9x+5x+5x+x^2+x^2+x^2 + x^2$ $4x^2+28x$ or $4(x^2+7x)$ or $4x(x+7)$ S1For intention, but some sections may be missed Or equivalent Mark final answer If the path has been built inside then MR-1 and FT (leading to $28x - 4x^2$)(b) Strategy, drawing with ¼ circles in corners OR sight of πx^2 of a fraction or multiple of πx^2 (or equivalent) $9x+9x+5x+5x+4x+1/4 \times \Pi \times x^2$ $28x + \Pi x^2$ or $x(28 + \Pi x)$ S1FT from (a), to give their (a) $-4x^2 + \Pi x^2$, Not for sight of $\pi \pi^2$ (or equivalent)12.(a) -5 and -12 (b) Any 6 correct plots All 8 correct plots joined with a smooth curve (c) 2 and 6B2B1 for each correct answer B1 FT from (a) Coordinate notation is not required. Accept embedded answers Sight of these values alone or within a calculation Sight of these values alone or within a calculation FT for 1 incorrect y value only. May included area below x-axis ($\frac{12}{(3) + \frac{12}{(24) + \frac{12}{(24) + \frac{12}{(34) + \frac{12}{(24) + \frac{12}{(34) + \frac{12}{(3$		A1	
Correct method to find area, e.g. subtraction of areas or composite shapesM1For intention, but some sections may be missed $(9+2x)(5+2x) - 9\times 5$ or $9x+9x+5x+5x+x^2+x^2+x^2+x^2+x^24x^2+28x or 4(x^2+7x) or 4x(x+7)A1Or equivalentMark final answerIf the path has been built inside then MR-1 and FT (leadingto 28x - 4x^2)(b) Strategy, drawing with ¼ circles in cornersOR sight of \pi x^2 of a fraction or multiple of \pi x^2(or equivalent)S1FT from (a), to give their (a) -4x^2 + \Pi x^2,Not for sight of \pi r^2(a) -5x + 4x + 1/4 \times \Pi \times x^228x + \Pi x^2 or x(28 + \Pi x)M1Mark final answerIf the path has been built inside then MR-1 and FT12.(a) -5 and -12(b) Any 6 correct plotsAll 8 correct plots(c) 2 and 6B2B1 for each correct answerB1(d) y values 0, 3, 4, 3, 0Split correct region into areas to sumB1Sight of these values alone or within a calculationFT for 1 incorrect y value only.May included area below x-axis(\frac{10}{2}(3) + \frac{12}{2}(3)13. y \alpha 1/x^2 OR y = k/x^2y = 1440/x^2B1Ignore use of incorrect symbol '\alpha' laterFT y \alpha 1/x or y \alpha x^2 for possible M1, A1$		4	
composite shapes $(9+2x)(5+2x) - 9\times 5$ or $9x+9x+5x+5x+x^2+x^2+x^2+x^2$ $4x^2+28x$ or $4(x^2+7x)$ or $4x(x+7)$ A1Or equivalent Mark final answer If the path has been built inside then MR-1 and FT (leading to $28x - 4x^2$)(b) Strategy, drawing with ¼ circles in corners OR sight of πx^2 of a fraction or multiple of πx^2 (or equivalent) $9x+9x+5x+5x+4\times 1/4 \times \Pi \times x^2$ $28x + \Pi x^2$ or $x(28 + \Pi x)$ S1FT from (a), to give their (a) $-4x^2 + \Pi x^2$, Not for sight of πr^2 (a) -5 and -12 (b) Any 6 correct plots All 8 correct plots joined with a smooth curve (c) 2 and 6B2B1 for each correct answer If the path has been built inside then MR-1 and FT(d) y values 0, 3, 4, 3, 0 Split correct region into areas to sumB1 M1 A1FT from (a) Coordinate notation is not required. Accept embedded answers Accept embedded answers M1 ($\frac{10}{2}(3) + \frac{1}{2}(4x) + \frac{1}{2}(4x) + \frac{1}{2}(4x) + \frac{1}{2}(4x) + \frac{1}{2}(4x) + \frac{1}{2}(3x)$ 13. $y \alpha 1/x^2$ OR $y = k/x^2$ $y = 1440/x^2$ B1 M1Ignore use of incorrect symbol 'a' later FT y $\alpha 1/x$ or $y \alpha x^2$ for possible M1, A1	11.(a) Initial strategy, e.g. sketch of concentric rectangles	S1	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Correct method to find area, e.g. subtraction of areas or	M1	For intention, but some sections may be missed
$4x^2+28x \text{ or } 4(x^2+7x) \text{ or } 4x(x+7)$ A1Mark final answer If the path has been built inside then MR-1 and FT (leading to $28x - 4x^2$)(b) Strategy, drawing with ¼ circles in corners OR sight of πx^2 of a fraction or multiple of πx^2 (or equivalent)S1FT from (a), to give their (a) $-4x^2 + \Pi x^2$, Not for sight of πr^2 $9x+9x+5x+5x+4 + 1/4 \times \Pi \times x^2$ $28x + \Pi x^2$ or $x(28 + \Pi x)$ M1 $12.(a) -5$ and -12 B2B1 for each correct answer(b) Any 6 correct plots All 8 correct plots joined with a smooth curve (c) 2 and 6B1FT from (a)(d) y values 0, 3, 4, 3, 0B1FT form (a)Split correct area calculations shownM1FT for 1 incorrect y value only. May included area below x-axis ($+60$ if below x-axis included10 (square units)A1CAO13. $y a 1/x^2$ OR $y = k/x^2$ $y = 1440/x^2$ B1Ignore use of incorrect symbol 'a' later FT y a 1/x or y a x ² for possible M1, A1	composite shapes		
If the path has been built inside then MR-1 and FT (leading to $28x - 4x^2$)(b) Strategy, drawing with ¼ circles in corners OR sight of πx^2 of a fraction or multiple of πx^2 (or equivalent)S1FT from (a), to give their (a) $-4x^2 + \Pi x^2$, Not for sight of πr^2 $9x+9x+5x+5x+4x 1/4 \times \Pi \times x^2$ $28x + \Pi x^2$ or $x(28 + \Pi x)$ M1A1A1Mark final answer If the path has been built inside then MR-1 and FT12.(a) -5 and -12 (b) Any 6 correct plotsB2B1 for each correct answer(c) 2 and 6B1FT from (a)(d) y values 0, 3, 4, 3, 0B1Sight of these values alone or within a calculationSplit correct region into areas to sumM1FT for 1 incorrect y value only. M3 wincluded area below x-axisNumerically correct area calculations shownA1 $(43) + \frac{1}{2}(3) +$	$(9+2x)(5+2x) - 9 \times 5$ or $9x+9x+5x+5x+x^2+x^2+x^2+x^2$	A1	Or equivalent
to $28x - 4x^2$)(b) Strategy, drawing with ¼ circles in corners OR sight of πx^2 of a fraction or multiple of πx^2 (or equivalent)S1FT from (a), to give their (a) $-4x^2 + \Pi x^2$, Not for sight of πr^2 $9x+9x+5x+5x+4x 1/4 \times \Pi \times x^2$ $28x + \Pi x^2$ or $x(28 + \Pi x)$ M1 $12.(a) -5$ and -12 (b) Any 6 correct plotsB2B1 for each correct answer FT from (a) $A11$ $B1$ C cordinate notation is not required. Accept embedded answersB1 $(c) 2$ and 6B1 C coordinate notation is not required. Accept embedded answers $(d) y$ values 0, 3, 4, 3, 0 Split correct region into areas to sumB1 $M1$ Numerically correct area calculations shownA1 $(12(3) + 1/2(3+4) + 1/2(4+3) + 1/2(3))$ $(+ 60 if below x-axis included10 (square units)A19CAO13. y a 1/x^2 OR y = k/x^2y = 1440/x^2B1M1$	$4x^2+28x$ or $4(x^2+7x)$ or $4x(x+7)$	A1	
(b) Strategy, drawing with ¼ circles in corners OR sight of πx^2 of a fraction or multiple of πx^2 (or equivalent) $9x+9x+5x+5x+4x 1/4 \times \Pi \times x^2$ $28x + \Pi x^2$ or $x(28 + \Pi x)$ S1FT from (a), to give their (a) $-4x^2 + \Pi x^2$, Not for sight of πr^2 9x+9x+5x+5x+4x 1/4 $\times \Pi \times x^2$ $28x + \Pi x^2$ or $x(28 + \Pi x)$ M1A1Mark final answer If the path has been built inside then MR-1 and FT12.(a) -5 and -12 (b) Any 6 correct plotsB2B1B1 for each correct answer FT from (a)A11 8 correct plots joined with a smooth curve (c) 2 and 6B1Cordinate notation is not required. Accept embedded answers(d) y values 0, 3, 4, 3, 0B1Split correct region into areas to sumB1Numerically correct area calculations shownA1(V2 (3) + V2 (3+4) + V2 (4+3) + V2 (3)) (+ 60 if below x-axis included10 (square units)A110 = k/12^2 y = 1440/x^2B1Ignore use of incorrect symbol 'a' later FT y α 1/x or y α x ² for possible M1, A1			
OR sight of πx^2 of a fraction or multiple of πx^2 (or equivalent)Not for sight of πr^2 $9x+9x+5x+5x+4 \times 1/4 \times \Pi \times x^2$ $28x + \Pi x^2$ or $x(28 + \Pi x)$ M1A1Mark final answer If the path has been built inside then MR-1 and FT12.(a) -5 and -12 (b) Any 6 correct plotsB2B1B1 for each correct answer(c) 2 and 6B1(d) y values 0, 3, 4, 3, 0B1Split correct region into areas to sumB1Numerically correct area calculations shownA1(10 (square units))A1(10 = k/12^2 y = 1440/x^2B1Ignore use of incorrect symbol 'a' laterID = k/12^2 y = 1440/x^2B1Isometric or integration of the symbol for			to $28x - 4x^2$)
OR sight of πx^2 of a fraction or multiple of πx^2 (or equivalent)Not for sight of πr^2 $9x+9x+5x+5x+4 \times 1/4 \times \Pi \times x^2$ $28x + \Pi x^2$ or $x(28 + \Pi x)$ M1A1Mark final answer If the path has been built inside then MR-1 and FT12.(a) -5 and -12 (b) Any 6 correct plotsB2B1B1 for each correct answer(c) 2 and 6B1(d) y values 0, 3, 4, 3, 0B1Split correct region into areas to sumB1Numerically correct area calculations shownA1(10 (square units))A1(10 = k/12^2 y = 1440/x^2B1Ignore use of incorrect symbol 'a' laterID = k/12^2 y = 1440/x^2B1Isometric or integration of the symbol for			
(or equivalent)MI $9x+9x+5x+5x+4x 1/4 \times \Pi \times x^2$ M1 $28x + \Pi x^2$ or $x(28 + \Pi x)$ A1Mark final answer7 $12.(a) -5$ and -12 B2(b) Any 6 correct plotsB1All 8 correct plots joined with a smooth curveB1(c) 2 and 6B1(d) y values 0, 3, 4, 3, 0B1Split correct area calculations shownM1Numerically correct area calculations shownA1(b) (square units)A1(c) 2 and $has y = k/x^2$ B1Split correct area calculations shownA1(b) $has (has y = h/x^2)^2$ B1(c) $has (has y = h/x^2)^2$ B1(c) $has (has y = h/x^2)^2$ B1(c) $has (has has has has has has has has has has $		51	
$9x+9x+5x+5x+4 \times 1/4 \times \Pi \times x^2$ M1 $28x + \Pi x^2$ or $x(28 + \Pi x)$ A1A1Mark final answer7If the path has been built inside then MR-1 and FT12.(a) -5 and -12B2(b) Any 6 correct plotsB1All 8 correct plots joined with a smooth curveB1(c) 2 and 6B1(d) y values 0, 3, 4, 3, 0B1Split correct region into areas to sumB1Numerically correct area calculations shownA110 (square units)A113. $y \alpha 1/x^2$ OR $y = k/x^2$ B1 $10 = k/12^2$ B1 $y = 1440/x^2$ B1Isometric area calculationB1Isometric area calculationB1Image: CAOImage: CAOImage: CAOImage: CAO13. $y \alpha 1/x^2$ OR $y = k/x^2$ B1Image: Image: Im			Not for sight of πr^2
$\begin{array}{c c c c c c c c c c c c c c c c c c c $		141	
12.(a) -5 and -127If the path has been built inside then MR-1 and FT12.(a) -5 and -12B2B1 for each correct answer(b) Any 6 correct plotsB1FT from (a)All 8 correct plots joined with a smooth curveB1FT from (a)(c) 2 and 6B1Coordinate notation is not required. Accept embedded answers(d) y values 0, 3, 4, 3, 0B1Sight of these values alone or within a calculationSplit correct region into areas to sumM1FT for 1 incorrect y value only. May included area below x-axisNumerically correct area calculations shownA1 $(\frac{1}{2}(3) + \frac{1}{2}(3+4) + \frac{1}{2}(4+3) + \frac{1}{2}(3))$ (+ 60 if below x-axis included10 (square units)A1CAO13. $y \alpha 1/x^2$ OR $y = k/x^2$ B1Ignore use of incorrect symbol ' α ' later FT y $\alpha 1/x$ or $y \alpha x^2$ for possible M1, A1 $y = 1440/x^2$ A1FT y $\alpha 1/x$ or $y \alpha x^2$ for possible M1, A1			
12.(a) -5 and -12B1B2B1 for each correct answer(b) Any 6 correct plotsB1FT from (a)All 8 correct plots joined with a smooth curveB1FT from (a)(c) 2 and 6B1Coordinate notation is not required. Accept embedded answers(d) y values 0, 3, 4, 3, 0B1Sight of these values alone or within a calculationSplit correct region into areas to sumB1FT for 1 incorrect y value only. May included area below x-axisNumerically correct area calculations shownA1 $(\frac{12}{2}(3) + \frac{12}{2}(3+4) + \frac{12}{2}(4+3) + \frac{12}{2}(3))$ (+ 60 if below x-axis included10 (square units)A1CAO13. $y \alpha 1/x^2$ OR $y = k/x^2$ B1Ignore use of incorrect symbol '\alpha' later FT y \alpha 1/x or $y \alpha x^2$ for possible M1, A1 $y = 1440/x^2$ A1FT y \alpha 1/x or $y \alpha x^2$ for possible M1, A1	$28x + 11x^2$ or $x(28 + 11x)$		
(b) Any 6 correct plotsB1FT from (a)All 8 correct plots joined with a smooth curveB1FT from (a)(c) 2 and 6B1Coordinate notation is not required. Accept embedded answers(d) y values 0, 3, 4, 3, 0B1Sight of these values alone or within a calculationSplit correct region into areas to sumM1FT for 1 incorrect y value only. May included area below x-axisNumerically correct area calculations shownA1 $(\frac{12}{2}(3) + \frac{1}{2}(3+4) + \frac{1}{2}(4+3) + \frac{1}{2}(3))$ (+ 60 if below x-axis included10 (square units)A1CAO9Ignore use of incorrect symbol 'a' later FT y a l/x or y a x² for possible M1, A110 = k/12² y = 1440/x²A1			
All 8 correct plots joined with a smooth curveB1FT from (a)(c) 2 and 6B1Coordinate notation is not required. Accept embedded answers(d) y values 0, 3, 4, 3, 0B1Sight of these values alone or within a calculation FT for 1 incorrect y value only. May included area below x-axisNumerically correct area calculations shownA1 $(\frac{12}{2}(3) + \frac{12}{2}(3+4) + \frac{12}{2}(4+3) + \frac{12}{2}(3))$ (+ 60 if below x-axis included13. $y \alpha 1/x^2$ OR $y = k/x^2$ B1Ignore use of incorrect symbol ' α ' later FT $y \alpha 1/x$ or $y \alpha x^2$ for possible M1, A1			
(c) 2 and 6B1Coordinate notation is not required. Accept embedded answers(d) y values 0, 3, 4, 3, 0B1Sight of these values alone or within a calculation FT for 1 incorrect y value only. May included area below x-axisNumerically correct area calculations shownA1 $(\frac{12}{2}(3) + \frac{12}{2})$ (+ 60 if below x-axis included10 (square units)A1 9CAO13. $y \alpha 1/x^2$ OR $y = k/x^2$ $y = 1440/x^2$ B1Ignore use of incorrect symbol ' α ' later FT y $\alpha 1/x$ or $y \alpha x^2$ for possible M1, A1			
(d) y values 0, 3, 4, 3, 0B1Accept embedded answersSplit correct region into areas to sumB1Sight of these values alone or within a calculationNumerically correct area calculations shownA1 $(\frac{1}{2}(3) + \frac{1}{2}(3+4) + \frac{1}{2}(4+3) + \frac{1}{2}(3))$ (+ 60 if below x-axis included10 (square units)A1CAO13. $y \alpha 1/x^2$ OR $y = k/x^2$ B1Ignore use of incorrect symbol ' α ' later $10 = k/12^2$ $y = 1440/x^2$ M1FT y $\alpha 1/x$ or $y \alpha x^2$ for possible M1, A1			
(d) y values 0, 3, 4, 3, 0B1Sight of these values alone or within a calculationSplit correct region into areas to sumM1FT for 1 incorrect y value only. May included area below x-axisNumerically correct area calculations shownA1 $(\frac{1}{2}(3) + \frac{1}{2}(3) + \frac{1}{2}(3))$ (+ 60 if below x-axis included10 (square units)A1CAO913. $y \alpha 1/x^2$ OR $y = k/x^2$ $y = 1440/x^2$ B1Ignore use of incorrect symbol ' α ' later FT $y \alpha 1/x$ or $y \alpha x^2$ for possible M1, A1	(c) 2 and 6	BI	
Split correct region into areas to sumM1FT for 1 incorrect y value only. May included area below x-axis $(\frac{1}{2}(3) + \frac{1}{2}(3+4) + \frac{1}{2}(3))$ $(+ 60 \text{ if below x-axis included})$ Numerically correct area calculations shownA1 $(\frac{1}{2}(3) + \frac{1}{2}(3+4) + \frac{1}{2}(3))$ $(+ 60 \text{ if below x-axis included})$ 10 (square units)A1CAO9913. $y \alpha 1/x^2$ OR $y = k/x^2$ B1Ignore use of incorrect symbol ' α ' later FT $y \alpha 1/x$ or $y \alpha x^2$ for possible M1, A1 A1 $y = 1440/x^2$ A1		D1	
Numerically correct area calculations shownA1May included area below x-axis $(\frac{1}{2}(3) + \frac{1}{2}(3+4) + \frac{1}{2}(3))$ $(+ 60 \text{ if below x-axis included})$ 10 (square units)A1CAO13. $y \alpha 1/x^2$ OR $y = k/x^2$ B1Ignore use of incorrect symbol ' α ' later FT $y \alpha 1/x$ or $y \alpha x^2$ for possible M1, A1 $y = 1440/x^2$ A1			
Numerically correct area calculations shownA1 $(\frac{1/2}{3}) + \frac{1}{2}(3+4) + \frac{1}{2}(4+3) + \frac{1}{2}(3))$ (+ 60 if below x-axis included10 (square units)A1CAO9913. $y \alpha 1/x^2$ OR $y = k/x^2$ B1Ignore use of incorrect symbol ' α ' later $10 = k/12^2$ $y = 1440/x^2$ M1FT $y \alpha 1/x$ or $y \alpha x^2$ for possible M1, A1	spin correct region into areas to sum	IM I	
10 (square units)A1 9CAO13. $y \alpha 1/x^2$ OR $y = k/x^2$ B1 $10 = k/12^2$ Ignore use of incorrect symbol ' α ' later $y = 1440/x^2$ M1 A1FT $y \alpha 1/x$ or $y \alpha x^2$ for possible M1, A1	Numerically compations 1 1-times 1	A 1	
10 (square units)A1 9CAO13. $y \alpha 1/x^2$ OR $y = k/x^2$ B1 $10 = k/12^2$ Ignore use of incorrect symbol ' α ' later FT $y \alpha 1/x$ or $y \alpha x^2$ for possible M1, A1 A1	numericany correct area calculations snown	AI	
913. $y \alpha 1/x^2$ OR $y = k/x^2$ 10 = $k/12^2$ $y = 1440/x^2$ B1Ignore use of incorrect symbol ' α ' laterFT $y \alpha 1/x$ or $y \alpha x^2$ for possible M1, A1	10 (square units)	Δ 1	
13. $y \alpha 1/x^2$ OR $y = k/x^2$ B1Ignore use of incorrect symbol ' α ' later $10 = k/12^2$ M1FT y $\alpha 1/x$ or y αx^2 for possible M1, A1 $y = 1440/x^2$ A1	10 (square units)		
$10 = k/12^{2}$ $y = 1440/x^{2}$ M1 FT y α 1/x or y α x ² for possible M1, A1 A1	13 $y \alpha 1/y^2 OR y - \frac{1}{y^2}$		Janore use of incorrect symbol 'a' later
$y = 1440/x^2$ A1			
			1 1 y w 1/x of y w x for possible wit, At
3	$y = 1440/\Lambda$		

PAPER 1 Higher Tier	Marks	FINAL MARK SCHEME Comments
14.(a) Transformation horizontally to the right	B1	
Correct translation with 2 indicated correctly on the x-axis	B1	SC1 for left shift with -2 indicated on the x-axis
(b) Idea of reflection in x-axis	B1	May include an incorrect translation, but clearly there has been a reflection
Idea of vertical translation	B1	Allow 'up' or 'down'
Correct transformation with 3 indicated on the y-axis	B1	
	5	
15.(a) 1/8000	B2	B1 for 1/20 ³
(b) Attempt to subtract $100x = 65.252$ and $x = 0.652$	M1	Or equivalent for $1000x - 10x$
646/990 ISW	A1	Final answer of 64.6/99 M1 only
(c) 9 - $15\sqrt{2}$ - $15\sqrt{2}$ + 50	M1	With at least 3 of the terms correct OR $9 \pm a\sqrt{2} + 50$ with
$= 59 - 30\sqrt{2}$	A1	a≠0
Irrational	B1	CAO
	7	FT provided at least M1 awarded
16.(a) Any one correct area	B1	10, 15, 35, 80, 60
10 + 15 + 35 + 80	M1	
= 140	A1	If no other marks allow SC1 for an answer of 135
(b) (i) 50 (seconds)	B1	Do not accept a group or interval
(ii) Correct histogram	B3	B2 for sight of 1, 2, 2.5, 3.5, 10 or histogram with first bar
		correct but with 1 error in one of the other bars, OR
		B1 for histogram with any 3 bars correct
(c) A reasonable statement,	E1	Could be either Yes or No with a suitable reason.
e.g. 'No, children median lower', or 'no, 140 children less		FT their histogram
than 50 seconds but only 100 adults', or 'no, because more		Accept an answer of 'same' if the candidate calculating the
adults spent over 50 seconds'	8	means to be the same

PAPER 2 - FOUNDATION TIER

PAPER 2 (Calculator allowed) Foundation Tier	Marks	FINAL MARK SCHEME Comments
1. (a) (242.68) 146.16 (tables) 87.5(0) (chairs) 160.56 (cabinets)	B1 B1 B1	
(£) 636.9(0)	B1	F.T. their figures for 1 error
(b) Builder pays (£) 573.21	B2	 F.T. their total rounded or truncated. <u>Must be in 2 dec. places for the B2</u> B1 for a correct 10% (£) 63.69. <u>2 dec. pl. NOT required for B1</u>
	6	
2. 50g 500kg 50mg 50kg	B1	
27 litres (270 ml) 2.7 cm ³ 270 litres	B1	
(180cm) 18m 180mm 1800cm	B1	
266mm 266cm 266km 266km	B1	
	4	
3. (a) Evidence of square counting 72 – 78 (inclusive)	M1 A1	
3. (b) Lines Arc	B1 B1	Correct curvature starting and ending at the candidate's 2 lines.
3. (c) c a b	B1 B1 B1	If angle values used then they must be appropriate on the diagram AND in the correct place on the answer line.
4. (a) Spring (S) 10, Summer (U) 15, Autumn (A) 8,	7 B2	May be inferred from their bar chart.
 Winter (W) 7 Both axes labelled, e.g. frequency along one axis and Spring (S), Summer (U), Autumn (A), Winter (W) along other axis (or on the bars) Anywhere within the base (inc.) of the corres. bar. and uniform scale for the frequency axis starting at 0 and labelled 'frequency' OR 'number of pupils'. 	B2 B2	B1 for any two/three correct frequencies If frequencies score 0, then give B1 for all 4 correct tallies. B1 if no scale, but allow one square to represent 1 OR B1 if not labelled as 'frequency' or similar. If frequency scale starts with 1 at the top of the first square the starting at 0 will be implied for this axis. <u>Condone frequency numbers alongside square instead of</u> <u>at the top of the squares.</u>
Four bars at correct heights (bars must be of equal width). Can be in any order.	B2	F.T. their frequencies throughout. B1 for any 2 or 3 correct bars on F.T. If no frequencies given in their working, penalise -1 for each incorrect frequency on their bars up to -4 (First and third B2s)
(b) Summer OR U	B1	Accept 15 and (Summer OR U), but B0 for 15 only
(c) 7/40 I.S.W.	B2 9	B1 for the 7 (in a fraction < 1) OR B1 for a denominator of 'their 40' (in a fraction < 1). F.T. their frequencies. Penalise –1 for incorrect notation, e.g. '7 out of 40', '7:40' Allow decimals and percentages including on F.T. For example, (0).175 or 17.5% for 7/40

PAPER 2 (Calculator allowed) Foundation Tier	Marks	FINAL MARK SCHEME Comments
5. (a) C A B 0 1 (b) likely	B1 B1 B1 B1	A should be between ¹ / ₂ and ³ / ₄ (Accept P for A). <u>A should be to the right of the halfway and up to</u> <u>alongside the gap between the a and l in ball (OR</u> <u>between ê and l in pêl in the Welsh version)</u> B should be at 1. C should be between 0 and ¹ / ₄ (Accept G for C). <u>C should be to the right of the 0 and up to alongside the y</u> <u>in probability (OR the y in tebygolrwydd in the Welsh</u> <u>version)</u>
6. $(\frac{1}{4})$ $(0).25$ (25%) any fraction equiv. to $\frac{6}{10}$ (0.6) $\frac{60(\%)}{(75\%)}$ any fraction equiv. to $\frac{3}{4}$ (0.75) (75%)	4 B1 B1, B1 B1 4	ISW for the fractions 6/10 and ³ / ₄ Do not accept fractions like 7.5/10
All triangles must be 'base' side to 'base' side 7. (a) Rhombus <u>OR square</u> Sketch	B1 B1	Mark name first then sketch B0 for what looks more like a parallelogram than rhombus
7. (b) Kite Sketch	B1 B1	Mark name first then sketch
8. (a) (i) Decrease previous term by 7	4 B1	Accept –7. <u>B0 for n – 7</u>
(ii) Multiply previous term by -2	B1	Accept $\times -2$ B0 for n $\times -2$
8. (b) (i) 10w (ii) x - 6 and x + 6	B1 B1	Allow 10×w, w×10 and w10. Ignore any g(rams) Ignore w= and =w For both
8. (c) $1/9 \times 45 = 5$ and $4 \times 5 = 20$	M1 A1	Any correct method
8. (d) $5 \times 4 = 2P + 3 \times -4$	B1	Correct substitution, not awarded until the 2 multiplications
2P = 20 + 12 OR 32 P = 16	B1 B1	are seen to be implemented. Sight of 20 and -12 gets B1 F.T. P= $32/2$ gets B0. Must be 16 F.T. P = 'their $32'/2$. Allow embedded answers, such as $20 = 2 \times 16 - 12$.
8. (e) $4x = 18$ (x =) 4 ½ OR 4.5	B1 B1	<u>Must be 18 NOT 21–3</u> (x=) 18/4 gets B0. (x=) 9/2 gets B0
$0.(0)$ ymp $= 700 \times 0.70$	11 M1	
9. (a) yuan = 700×9.79 = 6853 (yuan) <u>ISW</u>	M1 A1	Yuan not required but A0 for £6853
9. (b) Pounds = $2447.5/9.79$ = (£) 250 <u>ISW</u>	M1 A1	£ not required but A0 for 250 yuan
	4	

PAPER 2 (Calculator allowed)		FINAL MARK SCHEME
Foundation Tier	Marks	Comments
 10. (a) (10) 17 24 31 (b) (35 31) 27 23 19 (c) (Yes) because 100 is 60 away and 60 is divisible by 6 (d) After 5 steps 	B1 B1 E2 B1	E2 for $6 \times 10 + 40$ OR equivalent, <u>e.g. Yes, in 10 steps (E2)</u> E1 for considering 60 with an indication of steps of 6 e.g. listing all numbers between 40 to 100. 75 can be answered in lists, but the 5 must be given as an
75	B1	answer.
(e) Starting numbers are 44 apart.	B1	Allow <u>B1</u> for sight of 44 <u>OR 40 by comparing 21 and 61</u> <u>after one step etc.</u>
44 is divisible by 4	B1	SC1 for only listing the correct sequences.
	8	Look for the angles shown in their diagram
11. (a) $(\hat{ACB}) = 60 (^{\circ})$	B1	(Angles of an equilateral triangle are 60°)
$(\hat{BCE}) = 45 (^{\circ})$	B1	(Half the angle of a square is 45°)
$(A\hat{C}E) = 105 (^{\circ})$	B1	C.A.O.
		105(°) with NO supporting work gets 0.
11. (a) (continued) QWC	QWC	
 Look for Spelling Clarity of text explanations Some geometrical statements, e.g. angles of a equilateral triangle are 60° QWC2: Candidates will be expected to present work clearly, with words explaining their processes 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 their processes or steps OR make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer 	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
11. (b) First arcs Final arcs and line	B1 B1	If no pair of compasses used (i.e no arcs) then 0 for their work in (b) and (c)
11. (c) First arcs Final arcs and line	B1 B1 9	They can use the points A and B for this first B1 Remember the 2 methods discussed in the conference.
Use Overlay	7	Use Overlay
12. Bearing from Holyhead Bearing from Cardigan Position of Ship	M1 M1 A1	Use overlayWithin ±2°.Watch out for unambiguous 'dots' withinWithin ±2°the boundaries of the overlay and award M1sF.T. provided at least M1One unambiguous 'dot' within the 'box' on the overlay
	3	gets all 3 marks.

PAPER 2 (Calculator allowed) Foundation Tier	Marks	FINAL MARK SCHEME Comments
13. One correct evaluation (1 dec.pl.) of x^3-7x-2 $2 \le x \le 3$ Watch for pupils who are trying to make x^3-7x equal to 2 rather than x^3-7x-2 equal to 0. Two correct evaluations (1 dec.pl.) x^3-7x-2	B1	Calculations should be accurate to 1 decimal place rounded or truncated If no calculations are given accept use of "too low" or "too high" OR >0 and <0. Useful Data
$2.65 \leq x \leq 2.85$	B1	
which give opposite signs for $f(x)$. Two correct (OR F.T.) evaluations (1 dec.pl.) $2.75 \le x \le 2.85$ which give opposite signs for $f(x)$.	M1	$ \begin{bmatrix} 2 & -8 \\ 2.1 & -7.4390 \\ 2.2 & -6.7520 \\ 2.3 & -5.9330 \\ 2.4 & -4.9760 \end{bmatrix} \begin{bmatrix} 2.7 & -1.217 \\ 2.71 & -1.067489 \\ 2.72 & -0.916352 \\ 2.73 & -0.763583 \\ 2.74 & -0.609176 \end{bmatrix} \begin{bmatrix} 2.65 & -1.9404 \\ 2.66 & -1.7989 \\ 2.67 & -1.6558 \\ 2.68 & -1.5112 \\ 2.69 & -1.3649 \end{bmatrix} $
Thus solution is 2.8 correct to 1 decimal place.	A1	2.5 -3.8750 2.75 -0.453125 2.8 0.3520 2.6 -2.6240 2.76 -0.295424 2.81 0.5180
Note that candidates must give a method that proves the solution is 2.8 correct to 1 decimal place. Just stating 0.3520 is closer than -1.217 is NOT enough	4	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$
14.(a) 23 (m) (b) (12+24)÷4 9 (car lengths) (c)	B1 M1 A1	
Speed mph km/ h 30 48 70 112 112	M1 A2	Evidence of a method, e.g. $\div 5$ and $\times 8$, or $\times 5$ and $\div 8$ as appropriate, or sight of a correct scale, e.g. $80 \times 30/50$ A1 for either answer correct. Also implies M1
(d) 15 + 0.30 × 15 OR 38 + 0.20 × 38 or equivalents 19.5 and 45.6 65(.1 m)	M1 A2 A1	A1 for either correct answer. Accept 20 and 46 FT from M1, A1 FT from rounding to 'their 20'+ 'their 46 '= 66(m) Unsupported 65 or 66 gain full credit <u>If no marks, award SC1 for an answer of 12.1 or 12</u> (giving the increase not the total).
15. 654 a	10 B1	Accept truncated or
173.31 b 203.76 c 10.18(8) d 171.58(8) e	B1 B1 B1 B1	F.T. $a \times 0.265$ rounded answers F.T. $b + 30.45$ $c \times 0.05$ B0 if 105% given here F.T. $c \times 0.05$ B0 if 105% given here F.T. $c + d - 42.36$
20.91(2) CR Answers in the bill take precedence over answers on the 'working lines' below it.	B1	F.T. $ e - 192.50$ Allow $\pm 2p$ If their total cost is < 192.50 then their final balance must show $-$ or CR. If their total cost is > 192.50 then B0.
$16. (a) Area = \frac{1}{2} \times 8.6 \times 4.1$ 17.6(3 cm ²)	6 M1 A1	
(b) $(AB^{2} =) 8.6^{2} + 4.1^{2}$ OR 73.96 + 16.81 $(AB^{2} =) 90.77$ (AB) = 9.5(273) (cm)	M1 A1 A1	Correct substitution in Pythagoras' Theorem <u>This work could be seen in (a) and should be credited</u> <u>appropriately.</u>
Perimeter = 12.7 + 9.5 = 22.2 (cm) = 22 (cm)	M1 A1	FT their 8.6+4.1+ 'their AB if from Pythagoras work' Given to 2 sig. figs.
	7	

PAPER 2 - HIGHER TIER

PAPER 2		FINAL MARK SCHEME
Higher Tier	Marks	Comments
1. $a = 76(^{\circ})$	B1	
b = 53(°)	B1	
c = 51(°)	B1 3	FT 180 - (a + b)
2.(a) 23 (m)	B1	
(b) $(12+24)\div4$	M1	
9 (car lengths)	A1	
(c)		
Speed	M1	Evidence of a method, e.g. $\div 5$ and $\times 8$, or $\times 5$ and $\div 8$ as
$\frac{\text{mph}}{30} \frac{\text{km/h}}{48}$	1111	appropriate, or sight of a correct scale, e.g. $80 \times 30/50$
50 48	A2	A1 for either answer correct. Also implies M1
70 112		
	MI	
(d) $15 + 0.30 \times 15$ OR $38 + 0.20 \times 38$ or equivalents 19.5 and 45.6	M1 A2	A1 for either correct answer. Accept 20 and 46
19.5 and 45.6 65(.1 m)	A1	FT from M1, A1
		FT from rounding to 'their 20 '+ 'their 46 '= $66(m)$
		Unsupported 65 or 66 gain full credit
	10	If no marks, SC1 for an answer of 12.1 or 12 (giving the
3.(a) Scale factor 2 enlargement	10 B1	increase not the total)
(Intention of the) Correct position	B1	Perhaps watch for the position of the bottom left vertex
(b) Correct rotation about (2, 1)	B2	B1 for rotation of 180° about (1, 2)
	4	
4. Janie 450/1.57 or Ami 30000/129.82	M1	
Janie (£)286.6242 or (£)286.62 Ami (£)231.0892 or (£)231.08 or (£)231.09 or (£)231	A1 A1	Allow (£)286.6(0) Allow (£)231.1(0)
(£)251.089201 (£)251.08 01 (£)251.09 01 (£)251 (£)186.62 and 131.09	B1	FT correctly subtracting $(\pounds)100$ from each of their amounts,
(a)100102 and 101109	51	but not from 450 or 30000
Sight of an amount (not starting dollars or yen) \times 1.18	M1	For method of conversion, even if £250 not added
669.9(0 euros) or 669 (euros) or 670 (euros)	A1	FT their (amounts in £s) rounded or truncated, e.g. leading
Look for		to 669.88. Must be FT for the 3 girls e.g. $\{186, ()+131, ()+250\}\times 1.18$ correctly evaluated, rounded or
• spelling		truncated
 clarity of text explanations, 	QWC	a anoutod
• the use of notation (watch for the use of '=', £,	2	MR-1 for treat situation of exchange of money for whole
\$, Yen being appropriate)		notes
		QWC2 Presents relevant material in a coherent and logical
QWC2: Candidates will be expected to • present work clearly, with words explaining		manner, using acceptable mathematical form, and with few
 present work clearly, with words explaining process or steps 		if any errors in spelling, punctuation and grammar.
AND		
• make few if any mistakes in mathematical form,		QWC1 Presents relevant material in a coherent and logical
spelling, punctuation and grammar and include		manner but with some errors in use of mathematical form, spelling, punctuation or grammar
units in their final answer		OR
QWC1: Candidates will be expected to		evident weaknesses in organisation of material but using
 present work clearly, with words explaining 		acceptable mathematical form, with few if any errors in
process or steps		spelling, punctuation and grammar.
OR		OWCO Evident weaknesses in organisation of material and
• make few if any mistakes in mathematical form,		QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or
spelling, punctuation and grammar and include	8	grammar.
units in their final answer	I	č

PAPER 2	Marks	FINAL MARK SCHEME
Higher Tier 5.(a) 7.6 (cm)	B1	Comments
(b)(i) Mid-points 5,6,7,8,9	B1 B1	
$5 \times 4 + 6 \times 2 + 7 \times 1 + 8 \times 1 + 9 \times 2$	M1	FT their mid points including bounds provided they fall within the classes. $20 + 12 + 7 + 8 + 18 (= 65)$
Intention their $\sum fx / 10$	m1	
6.5 (cm)	A1	(65/10) For correct evaluation of $\sum fx / 10$
(ii) Modal class $4.5 \le s < 5.5$	B1	Accept '4.5 to 5.5'
Median $5.5 \le s < 6.5$	B1	Accept '5.5 to 6.5'
6.(a) Radius 2.3	7 B1	
$\Pi \times 2.3^2 \times 8.4$	M1	
$139.5(998 \text{ cm}^3)$ to $139.7(\text{cm}^3)$	A1	Do not accept from premature approximate SC1 for an answers 558(.3992 cm ³) to 558.7(cm ³)
(b)(i) ($x^2 = $) 3.4 ² + 5.6 ²	M1	
$x^2 = 42.92$ or $x = \sqrt{42.92}$	A1	
6.6 (cm)	A2	Depends on previous M1 and process of $$. Mark final answer.
	M1	A1 for 6.5(51 cm)
(ii) $\frac{1}{2} \times 5.6 \times 3.4$ 9.5(2 cm ²)	Al	Mark final answer
9.5(2 cm)	9	
7.(a) Correct frequency polygon	B2	Must be accurate between bounds of 1 small square
		horizontally and on the line vertically
		B1 if translated OR joined with curve or not joined OR one plot incorrect within the polygon
		Ignore frequency diagram as working
(b) 22 60 90 100	B1	ignore frequency and fram as working
(c) Uniform scale vertically	B1	Appropriate for their values in (b)
Plotting all points at the upper bounds	B2	FT their <u>cumulative</u> table only if cumulative
		Ignore if (50, 0) omitted Must be accurate on vertical lines and horizontal lines
		B1 if one error in plots, OR for all vertical plots correct but
		not at upper bounds
All 6 accurate upper bound plots joined with a curve or	B1	
lines		FT from their <u>cumulative</u> graph in (d)(i) and (ii)
(d)(i) Median for their graph	B1	(Answer in the range 63.5 to 64 (cm)) ($(7 + 1)$ ($(9 + 1)$ ($(9 + 1)$)
(ii) Idea UQ $-$ LQ, with an attempt at readings and	M1	(67 to 68 - 60 to 60.5)
intention to subtract		
Interquartile range accurate for their graph	A1	(Answers in the range 6.5 to 7.5)
0 () ()	10	
8.(a)(i)	B2	B1 for any 3 correct entries
45.5 46.5 54.5 55.5	B2	Accept .49' RECURRING as being equivalent to .5
61.5 62.5		Accept ity Alecontento as being equivalent to is
(ii) $161296(.875 \text{ cm}^3)$ or $161297 \text{ (cm}^3)$ ISW	B2	FT their greatest provided all > given values and <47, <56 and <63 respectively
	1	B1 for selection of 46.5 (\times) 55.5 (\times) 62.5 (sight of digits
		161296 or 161297). Allow SC1 for an answer of 164.5, or
(b) Least: (x-0.5)(y-0.5)(z-0.5)	DO	for selecting and recording addition for their greatest values
	B2	B1 for minor slip, or omission of brackets, there needs to be intention to multiply, or if further incorrect working
	6	B0 for sight of the 3 terms only without intention to
		multiply
9. $\tan A = 3.2/7$	M1	
24.567(°) rounded or truncated	A2	A1 for 0.457 or $\tan^{-1}3.2/7$
	3	SC1 for calculating B , an answer of $65.43(9)$, this is not for an answer labelled as A
	5	this is not for an answer labelled as A

PAPER 2 Higher Tier	Marks	FINAL MARK SCHEME Comments
10.(a) Method, equating coefficients or alternative	M1	Allow 1 slip, but not in equated coeffs.
First variable correct	A1	Anow 1 ship, but not in equated coerts. x = 11 y = -3
Method to find second variable	M1	x = 11 y = -3 FT their first variable
Second variable correct	A1	
(b) $11(3 + x) + 2(2x - 1) = 13 \times 2 \times 11$	M2	No M mark if left as quotient
$(0) 11(3+x) + 2(2x-1) = 13 \times 2 \times 11$	1412	M1 for 2 of these 3 terms correct
15x + 31 = 286	A1	FT from M1 for A1 only
x = 17	A1	CAO (Must be simplified)
(c) $7r - ar = b - c$	B1	Like terms FT until second error
r(7 - a) = b - c	B1	Factorise
r = (b - c)/(7 - a) or equivalent	B1	Isolate
I = (0 - c)/(1 - a) of equivalent	11	
11.(a) 0.05	B1	Accept equivalents, 1/20
(b) 1.1×10^{-4}	B1 B2	B1 for 1×10^{-4} or 1.11×10^{-4} or 1.111×10^{-4}
$(0) 1.1 \times 10$	D2	SC1 FT from their (a)/450 correctly expressed in standard
	3	form
12.(a) $(y =) 360 - 2x$ or $(y =) 2(180 - x)$ ISW	B2	B1 for <u>appropriate</u> $2x$, or $180 - x$ may be seen on the
12.(a) $(y - j) = 500 - 2x$ OI $(y - j) = 2(100 - x)$ IS W	D2	diagram or labelled, OR B1 for $x = (360 - y)/2$, or a correct
		expression but not 'y=' ($500 - y/2$, of a correct
	B1	expression but not y
(b) FGH = 90° seen or implied by used in calculation $FH = 68 (\sin 22) (\sin ECH)$	M2	M1 for sin 22 – 6.8/ EH or EH/sinECH – 6.8/ sin 22
$FH = 6.8/\sin 32 (\times \sin FGH)$	A1	M1 for sin 32 = 6.8 / FH or FH/sinFGH = 6.8 / sin 32
FH = 12.8(32 cm) or 13 (cm)		Answer of 12 gets A0
12	6	A
13. (There i her an 000	B1	Accept descriptions Do not accept e.g. 'dashes in the same places'
'Three sides' or SSS	B1 B1	Must be clear that it is the included angle
'Two sides and INCLUDED angle' or SAS	2	Must be clear that it is the included angle
14 Strategy to find (1/2) DO and CDDO	2 S1	
14. Strategy to find ($\frac{1}{2}$) PQ and <pbq PQ² = $4^{2}+6^{2}-2.4.6.\cos 82$</pbq 	M1	
PQ = 4 + 6 - 2.4.0.00882 $PQ^2 = 45.31969$	A1	
PQ = 43.51909 PQ = 6.73199	AI A1	Maybe embedded
$PQ^2 = 8^2 + 8^2 - 2.8.8.CosPBQ$	M1	OR Alternative: $\sin \frac{1}{2} PBQ = \frac{1}{2} PQ / 8 M1$
$Cos PBQ = \frac{8^2 + 8^2 - PQ^2}{1000000000000000000000000000000000000$	A1	$< \frac{1}{2} PBQ = 24.88$ A1
$\frac{2.8.8}{2.8.8}$	AI	~
<pbq 49.763(°)<="" =="" td=""><td>A1</td><td>< PBQ = 49.763(°) A1</td></pbq>	A1	< PBQ = 49.763(°) A1
$\langle PBQ = 49.763(1)$	AI	Accept answers in the range 49.5 to 49.8 inclusive, or 50
$1 + 1 + (DDO(260) + 0^{2})$	M1	Correct answer, not FT
Area shaded = $(\langle PBQ/360 \rangle) \times \Pi \times 8^2$	M1	FT their <pbq 82="" all="" and="" awarded<="" m="" marks="" not="" provided="" td=""></pbq>
= 27.79 (cm ²) or 28 (cm ²) or 27.8(cm ²)	A1	Accept answers in the range 27.6 to 28 inclusive
15 () Decision 4. Conditional 11 () 1 () 1 (9	(24 1122)
15.(a) Decision to find overall totals of a, e, r and number	M1	(34 and 132)
of letters	A 1	
34/132 or 0.2575 or equivalent	A1	Mark final answer
	D 1	
(b)Use or sight of (a, e, $r =$) 34 AND (number of letters =)	B1	Accept sight of 34 and 132, or 17 and 66. FT from (a)
132, OR, sight of any correct probability product,		For the idea without need to use values $(A + C + 122)$
equivalent to/132×/131 (or/66×/65) as	C 1	$(As 66 = 132 \div 2)$
appropriate	S1	
P(at least one of a,e,r) = $1 - P(\text{none})$	1.61	
OR equivalent full strategy	M1	FT their <u>totals</u> , a method that would lead to correct answer
$1 - 98/132 \times 97/131$ or equivalent full method	A2	A1 for answer not correct to 2dp, as a result of incorrect or
0.45	_	premature rounding
	7	N.B. Markers check working for no replacement
16. Cosine curve from 0° to 360°	M1	Any vertical translation, but must be correct horizontally
		Accept if numbers of degrees missed but unambiguous
Correct cosine curve with the correct translation, with 2	A1	
marked on the y-axis	2	

GCSE Mathematics - Linear MS November 2012/ED



WJEC 245 Western Avenue Cardiff CF5 2YX Tel No 029 2026 5000 Fax 029 2057 5994 E-mail: <u>exams@wjec.co.uk</u> website: <u>www.wjec.co.uk</u>