

GCSE MARKING SCHEME

APPLICATIONS OF MATHEMATICS (LINKED PAIR PILOT)

JANUARY 2013

INTRODUCTION

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

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

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

UNIT 1 - FOUNDATION TIER

Applications Unit 1 Foundation Tier January 2013		Final
1. (a) Moscow at -8°C	B1	
Los Angeles at 13°C	B1	Accept between 12 and 14 exclusive
(b) 21(°C)	B1	Accept -21(°C)
	3	
2.(a) Sian AND valid explanation eg "5 divides	E1	Sian may be implied from valid explanation. Do
(exactly) into 10"		not accept "Sian is correct because 5 is a factor of
		10."
David AND valid explanation eg "5 isn't in the 10	E1	David may be implied from valid explanation
times table" or "10 is a multiple of 5" or "5 is a factor		
of 10"		
(b)(i) No AND valid explanation	E1	No may be implied
eg "No because 3 ² is 9" or "when you square an odd		
number you get an odd answer"		
(ii) No AND valid explanation	E1	No may be implied
eg "No because $3 \times 5 = 15$ " or " 3(or 5) goes into 15"		
or "3(or 5) is a factor of 15"		
(c) Valid explanation $(2^3) \rightarrow 0$ and $(2^3) \rightarrow 0$ and $(2^3) \rightarrow 0$	EI	
eg. $(2^{*} =)$ 8 or $11 \text{ s} 2 \times 2 \times 2 \text{ not } 2 \times 3$	5	
2 total tight sales -109770) D1	
5. total ticket sales = 108770×24	DI M1	ET their 108770
(f) 2610/80		1 ⁻¹ men 108770
(£) 2010480	R1	FT 'their 2610/80' rounded to the pearest 100
2010300	DI	11 then 2010400 rounded to the hearest 100
		Alternative method
		$18535 \times 24 + 26750 \times 24 + 19125 \times 24 + 15400$
		\times 24 + 28960 \times 24 M2
		(444840 + 642000 + 459000 + 369600 +
		695040)
		Award M1 for multiplying at least 3 of the
		number of tickets at each venue by 24 with an
		intention to add OR for multiplying all 5 of the
		number of tickets at each venue by 24 with no
		intention to add
		(t)2610480 A1
	4	2010300 B1 ET 'their 2610490' nounded to the request 100
	4	F1 their 2010480 rounded to the hearest 100 for last B1
		jor tust bi
4. (a) For attempting to count squares	M1	Accept use of πr^2 M1 for correct method, $\pi \times 3^2$
Accept in range 24 to 32 (centimetre squares)	A1	A1 for correct answer. 28 –
		28.3
(b) Area of lawn in range 78 to 86	B1	ISW if their pond area \times 5
Their area \times 5	M1	FT 110 (area of rectangle) – their (pond)(a)
Area in range 390 to $430 \text{ (m}^2)$	A1	FT their area
	5	
		If no marks awarded in (b) award SC1 for sight of
		$550 (implies \times 5)$
5 (a) Correct pat	D1	
5. (a) Confect net circled of clearly indicated	DI	
(b) Area of one face = 49 (cm^2)	B1	
Total surface area = 49×6	M1	FT their 49 but not 7
= 294	Al	· · · · · · ·
cm ²	U1	
	5	
6. (a) Mean for Andy = 336	M1	Attempt to add all given values for Andy
$\div 6$	m1	FT 'their 336'
= 56	A1	CAO
(b) Put in order 39, 40, 42, 62, 70 71	M1	Sight of 42 and 62 only would gain M1
Median of $Jim = 52$	A1	
	5	

Applications Unit 1 Foundation Tier January 2013		Final
7. (a) $S = 0.6 \times 3.8 \times 32.5$	M1	
= 74.1	A1	
(b) Marks = $100.8 \div (4.2 \times 0.6)$	M1	
= 40	A1	
	4	T 1 1 1 1 1
8. (a) Angle I ON $= 180 - 118$	M1	Look at diagram, may be seen or implied Or $360 - (118 + 90 + 90)$
Angle $LQN = 160 - 116$ - 62(°)	A1	O(500 - (118 + 90 + 90))
= 02(7) Angle I OP (= 62 + 90) = 152(°)	B2	FT their 62 Award B1 for angle PON $-90(^{\circ})$
Alight EQT $(-02+90) = 152(-)$	22	(may be on diagram)
		Alternative method
		Sum of interior angles of pentagon = 540 (°) B1
		Angle PON or $QPO = 90(^{\circ}) B1$
		540 - (118 + 90 + 90 + 90) M1
		152(°) A1
(b) circle drawn with radius 4cm	B1	±2mm
(c) 125° or 80° drawn	M1	±2°
Accurate completed shape		
0 (Andree) (f) 10.75	/ P2	Award P1 for any 2 of Andrea Davinder & Frike
9. (Andrea) (1) 10.75 (Ravinder) (f) 7.85	D2	Award B1 for any 2 of Andrea, Kavinder & Elika
(Erika) (£)10.65		
(Total Bill) (£)29.25	B1	FT their '10.75 + 7.85 + 10.65'
		(£)29.25 implies B2 B1
(Each pays) 29.25 ÷ 3	M1	FT their total bill
(£)9.75	A1	(£)9.75 implies all previous marks
	. 1	T7T (1 ' 1
Andrea(benefits the most) by $(t)1(.00)$	AI	F1 their values.
		marks
Look for		murs.
• Spelling	QWC	
• Clarity of text explanation	2	QWC2 Presents relevant material in a coherent
• the use of notation, watch for the use of		and logical manner, using acceptable
'=', '£', ÷ being appropriate		mathematical form, and with few if any errors in
		spelling, punctuation and grammar.
For QWC2 labels, appropriate use of '=' and units(£)		OWC1 Presents relevant material in a coherent
must be evident.		and logical manner but with some errors in use of
OWC2: Candidates will be expected to		mathematical form, spelling, punctuation or
• present work clearly with words explaining		grammar
process or steps		ÖR
AND		evident weaknesses in organisation of material
• make few if any mistakes in mathematical		but using acceptable mathematical form, with few
form, spelling, punctuation and grammar in		if any errors in spelling, punctuation and
their answer		grammar.
		OWC0 Evident weaknesses in organisation of
QWC1: Candidates will be expected to		material, and errors in use of mathematical form.
• present work clearly, with words explaining		spelling, punctuation or grammar.
OR		
 make few if any mistakes in mathematical 		
form, spelling, punctuation and grammar in		
their answer	0	
10 (a) Plotting at least two correct points	0 P1	
Correct straight line through points	L1	
(b) Approximately 110 (lbs)	B1	FT their graph, within 1 small square
(c) Clear method shown	M1	Accept use of graph or $200 \div 2.2$ or other valid
		method. FT their line
Approximately 91 (kg). Accept answers in range 85 -	A1	Award SC1 for unsupported answers in the ranges
95		80 - 84.9 or 95.1-100
		in range award M1 A0
	5	In range award with AU
	5	1

11. (a) (y=1 is line)q (x=3 is line)B1 B1 B1(b) (f) $\frac{x}{y=2x-1}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{x}{y=2x-1}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{3}{2}$ (ii) Plotting points correctly Correct line drawnP1 F1 their points for P1 CAO A ward P1. L1 for line drawn passing through the correct points $\frac{12(a)}{y=x-1}$ $\frac{5}{xyuare}$ Kite, Rhombus, Parallelogram Kite $\frac{12(a)}{y=x-2}$ $\frac{5}{xyuare}$ Kite, Rhombus, Parallelogram Kite $\frac{12(a)}{y=x-2}$ $\frac{5}{xyuare}$ B1 for any 3 unambiguous correct entries $\frac{12(a)}{y=x-2}$ $\frac{5}{xyuare}$ B1 for any 3 unambiguous correct entries $\frac{12(a)}{y=x-2}$ $\frac{5}{xyuare}$ B1 for any 3 unambiguous correct entries $\frac{12(a)}{y=x-2}$ $\frac{5}{xyuare}$ B1 for any 3 unambiguous correct entries $\frac{12(a)}{y=x-2}$ $\frac{5}{y=x-2}$ B1 for any 3 unambiguous correct entries $\frac{12(a)}{y=x-2}$ $\frac{5}{y=x-2}$ $\frac{1}{y=x-2}$ $\frac{12(a)}{y=x-2}$ $\frac{1}{y=x-2}$ <t< th=""><th>Applications Unit 1 Foundation Tier January 2013</th><th></th><th>Final</th></t<>	Applications Unit 1 Foundation Tier January 2013		Final
$(x = -3; x mo)$ sB1 $\frac{y}{2x}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ (ii) Plotting points correctlyP1FT their points for P1Correct line drawnFT their points for P1 $\frac{12(a)}{Square}$ Kite, Rhombus, ParallelogramB1 $\frac{12(a)}{Square}$ Kite, Rhombus, ParallelogramB2B1 for any 3 unambiguous correct entries $\frac{12(a)}{Square}$ B1 for any 3 unambiguous correct entries $\frac{12(a)}{Square}$ B1 for any 3 unambiguous correct entries $\frac{12(a)}{100}$ B2 $\frac{12(a)}{100}$ B2 $\frac{12(a)}{100}$ B2 $\frac{12(a)}{100}$ B1 for any 3 unambiguous correct entries $\frac{12(a)}{100}$	11. (a) $(y = 1 \text{ is line}) q$	B1	
(b) (i) $\frac{x}{\sqrt{2}x+1} \cdot \frac{1}{5} \cdot \frac{3}{3} \cdot \frac{1}{1} \cdot \frac{1}{1} \frac{2}{3} \cdot \frac{3}{5}$ B2Award B1 for each(ii) Plotting points correctly Correct lime drawnP1 F their points for P1 CAO Award P1. L1 for line drawn passing through the correct points12(a) Square (b) Square, Khombus, Parallelogram (b)B2B1 for any 3 unambiguous correct entries B1 for either 3e (or 3se or ex3) or 2f for 24 or fx2) H fB2, penalise further incorrect work -1 H set clearly show ALL divided by 100. FT their (a) if a sum of 2 terms, equivalent difficulty13(a) $3e + 2f$ (p)B2Allow $3xe + 2xf$ B1 for either 3e (or 3se or ex3) or 2f for 24 or fx2) H fB2, penalise further incorrect work -1 H set clearly show ALL divided by 100. FT their (a) if a sum of 2 terms, equivalent difficulty14(a)Accept 'their North' outside of this tolerance once only (b) 300-21 form the position of the first cluc 280' drawn from Start (0) 900' (c) Disnace (22mm) from the position of the third bits to the third bits to the third (b) 300-22mm from the position of the third bits to the third bits to the third bits the startB1 Within tolerances allowed B1 B22' FT from their diagram (Actual is approximately 10.5x40 = 420m) FT form their diagram (Actual is approximately 250')15(a) Reason, e.g. all different age groupsE1 North accept their divers or no with reason.(b) Two boxes if you are 20 or refers to 'wide' group of older poopleE1 North accept reference to age related ownership of M13 O not accep	(x = -3 is line) s	B1	
$\frac{1}{\sqrt{2x-1}}$ $\frac{1}{2}$ $\frac{1}{3}$ $\frac{1}{3}$ $\frac{1}{3}$ (ii) Plotting points correctlyFT their points for P1Correct line drawnFT their points for P1 $\frac{12(a)}{Square}$ Kite, Rhombus, ParallelogramB1(b)Square, Rhombus, ParallelogramB2B1 for any 3 unambiguous correct entries13(a) $3e + 2f$ (p)B2B1 for any 3 unambiguous correct entries(b)B2B1 for any 3 unambiguous correct entries(c) $3e + 2f$ (p)B2B1 for any 3 unambiguous correct entries(d) $3e + 2f$ (p)B2B1 for any 3 unambiguous correct work.1(h) $3e + 2f$ (p)B1Fr any 5 (ar fc.2)(h) $3e + 2f$ (p)B1Fr any 6 (ar fc.2)(h) $3e + 2f$ (p)B2B314(a)120° drawn from Start00° drawn from Start00° drawn from the position of the first clue280° drawn from the position of the second clue120° drawn from the position of the second clue120° drawn from the position of the third clue to120° drawn from the position of the third clue to120° drawn from the position of the third clue to120° drawn from the position of the third clue to120° drawn from the position of the third clue to120° drawn from the position of the third clue to120° drawn from the position of the third clue to120° (c) Starte (2^{2}) from the position of the third clue to120° (c) Starte (2^{2}) from the position of the third clue to </td <td>(b) (i)</td> <td></td> <td></td>	(b) (i)		
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	x -2 -1 0 1 2 3	B2	Award B1 for each
(ii) Plotting points correctly Correct line drawn PI L1 CAO FT their points for P1 CAO 12(a) Square, Klier, Rhombus, Parallelogram (b) Square, Rhombus, Parallelogram (b) B1 for any 3 unumbiguous correct entries 13(a) 3e + 2f (p) B2 B1 for any 3 unumbiguous correct entries 13(a) 3e + 2f (p) B2 Allow 3ee + 2sf B1 for either 3c (or 3e, or es.3) or 2f (or 2sf or f.2) (b) 2e - 2f 100 or 0.03e + 0.02f (p) or equivalent 100 B1 for any 3 unumbiguous correct entries 14(a) B1 for either 3c (or 3e, or es.3) or 2f (or 2sf or f.2) Their (a) fa a sum of 2 terms, equivalent difficulty 14(a) B1 Accept their North' provided ±2² from the North given, their North' outside of this tolerance once only 120° drawn from Start 040° drawn from the position of the first clue 230° drawn from the position of the third clue to the start B1 Ze ² 22° 14(a) B1 Ze ² 22° Thom their diagram FT from their diagram ft Accurate hart with lengths and angles correct (b) 300° B1 Ze ² 22° 15(a) Reason, e.g. all different age groups F1 Not marking choice 'yes' or 'no', marking understanding of cross-section of people don't go to the cinema', or 'no, as all sorts of people don 'to to the cinema', or 'no, as all sorts of people don't go to the cinema', or 'no, as all sorts of people don't go to the cinema', or 'no, as all sorts of people don	y=2x - 1 -5 -3 -1 1 3 5		
P1FT fielr points for P1Correct line drawnCAO2(a)CAOSquareKite, Rhombus, Parallelogram(b)Square(b)Square(b)Square(c)Square(b)Square(c)Square(d)Square(d)Square(d)Square(e)Square(b)Square(b)Square(c)Square(d)Square <td< td=""><td></td><td></td><td></td></td<>			
Correct line drawn 1 CAO 12(a) Square, Kine, Rhombus, Parallelogram 6 3(a) 3e + 2f (p) B1 for any 3 unambiguous correct entries 13.(a) 3e + 2f (p) B2 B1 for any 3 unambiguous correct entries 13.(a) 3e + 2f (p) B2 Allow 3re + 2rf 11 B1 for any 3 unambiguous correct entries 13.(a) 3e + 2f (p) B2 Allow 3re + 2rf 14 B1 for any 3 unambiguous correct entries 100 0.03e + 0.02f (p) or equivalent B1 100 16 a sum of 2 terms, equivalent difficulty 14(a) 3 Accept 'their North' provided ±2° from the North given. 120° drawn from Start B1 ±2° 14(a) 3 Accept 'their North' provided ±2° from the North given. 120° drawn from Start B1 ±2° 120° drawn from the position of the first cher B1 ±2° 121 Promothe cyclim from the position of the third clue to the start B1 120° Promothe cyclim from the position of the third clue to the start B1 15(a) Reason, e.g. all different age groups B1 15(a) Reason, e.g. a	(11) Plotting points correctly	P1	FT their points for P1
6 Award PI, L1 for ine drawn passing through the correct points 12(a) Correct points Square Kite, Rhombus, Parallelogram B2 (b) Square, Rhombus, Parallelogram Kite 13(a) 3e + 2f (p) B1 for any 3 unambiguous correct entries (b) Square, Rhombus, Parallelogram Kite 13(a) 3e + 2f (p) B2 Allow 3xe + 2xf (b) Square for the points B1 for any 3 unambiguous correct entries (c) Square, Rhombus, Parallelogram B2 (b) Square, Rhombus, Parallelogram B2 (b) Square, Rhombus, Parallelogram B2 (c) Square, Rhombus, Parallelogram B2 (b) Square, Rhombus, Parallelogram B2 (b) Square, Statt B1 (c) Square, Statt B1 (d) Casta Casta 14(a) Square, Statt B1 120° drawn from the position of the first clue B1 22° 20° drawn from the position of the third clue B1 22° 11 Zama B1 22° 12(c) Statt B2 B1 (b) So could be, square, Statt Casta (c) Statt B2<	Correct line drawn	LI	CAO
12(a) correct points (b) Square, Kine, Rhombus, Parallelogram B1 (b) Square, Rhombus, Parallelogram B1 13(a) 3e + 21 (p) B2 Allow 3xe + 2xf 13(a) 3e + 21 (p) B2 Allow 3xe + 2xf B1 for either 3e (or 3e or ex3) or 2f (or 2xf or fx2) FB2, penalise further incorrect work -1 Must clearly show ALL divided by 100. FT their (a) if a sum of 2 terms, equivalent difficulty FB2, penalise further incorrect work -1 14(a) 3 Accept 'their North' provided ±2° from the North given. 120° drawn from Start B1 42° 14(a) 3 Accept 'their North' provided ±2° from the North given. 120° drawn from Start B1 42° 14(a) 3 Accept 'their North' provided ±2° from the North given. 120° drawn from the position of the first chen 230° from the position of the third clue to the start B1 ±2° 15(a) Reason, e.g. all different age groups B1 Tf from their diagram (Actual is approximately 10.5×40 = 420m) 15(a) Reason, e.g. all different age groups B1 Not marking choice 'yes' or 'no', marking understand that est 3 boxes, no overlap or 1ga, mas the suitable for amountascined or 1 gap, mas the suitable for amoutascept contradiction of		6	Award P1, L1 for line drawn passing through the
12(a) Equare Kite, Rhombus, Parallelogram B2 B1 for any 3 unambiguous correct entries Square, Rhombus, Parallelogram Kite B2 B1 for any 3 unambiguous correct entries 13(a) 3c + 2f (p) B2 Allow 3xc + 2xf B1 for either 3e (or 3xe or ex3) or 2f (or 2xf or fx2) (b) <u>2c + 2f</u> or 0.03c + 0.02f (p) or equivalent B1 B1 B1 for either 3e (or 3xe or ex3) or 2f (or 2xf or fx2) 14(a) The field penalize further incorrect work - 1 Must clearly show ALL, divided by 100. FT ther (a) if a sum of 2 terms, equivalent difficulty 3 Accept 'their North' provided $\pm 2^n$ from the North given. Penalise: 'their North' novided $\pm 2^n$ from the North given. 14(a) 3 Accept 'their North' novided $\pm 2^n$ from the North given. Penalise: 'their North' novided $\pm 2^n$ from the North given. 14(a) 22 E1 Accept 'their North' novided $\pm 2^n$ from the North given. Penalise: 'their North' novided $\pm 2^n$ from the North given. 14(a) 23 E1 Within tolerances allowed $\pm 2^n$. 16(b) 300° E2 B1 $\pm 2^n$ $\pm 2^n$ 17(c) Acawn from the position of the third clue to the start B1 E1 Not marking choice' yes' or 'no', marking understand thit estart	12()		correct points
Logiate (b) Square, Rhombus, ParallelogramIntermediation (a)Square, Rhombus, ParallelogramRife13.(a) $3e + 2f$ (p)B211.(a) $3e + 2f$ (p)B211.(b) $3e + 2f$ (p)B211.(c) $3e + 2f$ or 0.03e + 0.02f (p) or equivalentB110010010010010010011.(a) $3e + 2f$ or 0.03e + 0.02f (p) or equivalent11.(b) $3e + 2f$ or 0.03e + 0.02f (p) or equivalent11.(c) $3e + 2f$ or 0.03e + 0.02f (p) or equivalent11.(a) $3e + 2f$ or 0.03e + 0.02f (p) or equivalent11.(a) $3e + 2f$ or 0.03e + 0.02f (p) or equivalent11.(a) $3e + 2f$ or 0.03e + 0.02f (p) or equivalent11.(a) $3e + 2f$ or 0.03e + 0.02f (p) or equivalent120° drawn from the position of the first clue120° drawn from the position of the first clue120° drawn from the position of the second clue121122° drawn from the position of the third clue121122° drawn from the position of the third122° drawn from the position of the third clue to1230 drawn from the position of the third clue to1240 (c) Distance ($2e^{2n}$) from the position of the third clue to125(a) Reason, e.g. all different age groups15(a) Reason implying 'no' showing understand that repeating an experiment can lead to different results(b) Two boxes if you are 20 or refers to 'wide' group of older people(c) Suitable questio	12(a)	DЭ	P1 for any 2 unembiguous correct entries
100 Square, Rhombus, Parallelogram Kite B2 B1 for any 3 unambiguous correct entries 13.(a) 3e + 2f (p) 4 Allow 3xe + 2xf 13.(a) 3e + 2f (p) B2 Allow 3xe + 2xf (b) 3e + 2f or 0.03e + 0.02f (p) or equivalent B1 B1 14(a) 3 14(a) 3 14(a) 3 14(a) 4 120° drawn from Start 4 040° drawn from the position of the first clue 81 280° drawn from the position of the second clue 122° 1100 B1 ±2° 200° drawn from the position of the third clue to the start B1 4 22° 17 from their diagram (b) 300° (c) Distance (g2mn) from the position of the third clue to the start B1 15(a) Reason, e.g. all different age groups E1 Not marking choice 'yes' or 'no', marking understand that repeating an experiment can lead to different results (c)', 'all Q on severed', 'ago and prices from a low value upwards considered (c) Suitable question with at least 3 boxes, no overlap or gaps (in pence) and prices from a low value upwards considered E1 (d) Reason implying 'no' showing understand that repeating an experiment can lead to different results (c)', 'all Q on severe1', 'ago pend' schoet 'ges' or 'no' con called or anabiguous) (c) Suitable question with at least 3 boxes, no overtap or gaps (in pence) and pric	Square Kite, Kitoliibus, Paranelogram	D2	B1 for any 5 unanoiguous correct entries
Land expanseParameterizationParameterization13.(a) $3e + 2f(p)$ B2Allow $3xe + 2xf$ 13.(a) $3e + 2f(p)$ B2Allow $3xe + 2xf$ (b) $3e + 2f(p)$ B1B1 for either 3e (or $3xe$ or $ex3$) or $2f(or 2xf or fx2)(b) 3e + 2f(p)B1B1 for either 3e (or 3xe or ex3) or 2f(or 2xf or fx2)(b) 3e + 2f(p)B1B1 for either 3e (or 3xe or ex3) or 2f(or 2xf or fx2)(c) 3e + 2f(p)B1B1 for either 3e (or 3xe or ex3) or 2f(or 2xf or fx2)(b) 3e + 2f(p)B1B1 for either 3e (or 3xe or ex3) or 2f(or 2xf or fx2)(c) 3e + 2f(p)B1B1(d) 4e^{2} form the position of the first clueB1200 drawn from StartB1(b) 300^{\circ}B1(c) 2b + 2f(p)B1(c) 2b + 2f(p)B1Barring (2e^{2}) from the position of the third clue toBarring (2e^{2}) from the position of the third clue toBarring (2e^{2}) from the position of the third clue toBarring (2e^{2}) from the position of the third clue toBarring (2e^{2}) from the position of the third clue toBarring (2e^{2}) from the position of the third clue toBarring (2e^{2}) from the position of the third clue toBarring (2e^{2}) from the position of the third clue toBarring (2e^{2}) from the position of the third clue toBarring (2e^{2}) from the position of the third clue toBarring (2e^{2}) from the position of the third clue toBarring (2e^{2}) from the position of the third clue toBarring$	(U) Saucra Bhambus Darallalagram Vita	B2	B1 for any 3 unambiguous correct entries
13.(a) $3e + 2f$ (p)B2Allow $3xe + 2xf$ B If or either $3e$ (or $3xe$ or ex3) or $2f$ (or $2xf$ or $2xf$) If B2, penalise further incorrect work -1 Must clearly show ALL divided by 100. FT their (a) if a sum of 2 terms, equivalent difficulty14(a)314(a)314(a)314(a)314(a)3120° drawn from Start (40° drawn from the position of the first clue 280° drawn from the position of the second clue tageB1 2^2 2^2 2^2 2^2 2^2 2^2 2^2 16) 300°B1 2^2 , FT from their diagram (Actual is approximately 10.5×40 = 420m)17(a) Reason, e.g. all different age groupsB1 the start(b) Two boxes if you are 20 or refers to 'wide' group of older peopleE1(b) Two boxes if you are 20 or refers to 'wide' group of older peopleE1(c) Suitable question with at least 3 boxes, no overlap or gaps (in pence) and prices from a low value upwards consideredE1(d) Reason implying 'no' showing understand that repeopleE1(d) Reason implying 'no' showing understand that repeopleE1(d) Reason implying 'no' showing understand that repeople of dider peopleE1(d) Reason implying 'no' showing understand that repeople of dider peopleS1 B1 If or rize from a low value upwards considered(d) Reason implying 'no' showing understand that repeopleS1 B1 If or rizes from a low value upwards considered as well as S1 boxes, max of 1 overlap or 1 gap, must be suitable for amount such as 219.99, i.e. pence considered as well as S1 boxes, max of 1 overlap or 1 gap, must	Square, Knollibus, Paranelograni Kite	4	bi for any 5 unanoiguous correct entries
Intervent (b) $3e + 2f$ (c) $3e + 2f$ (d) $2e + 2f$ (d) $2e + 2f$ (e) $3e + 2f$ (e) $3e + 2f$ (f) $2e + 2f$ <td>13(a) 3e + 2f(n)</td> <td>B2</td> <td>Allow $3 \times e + 2 \times f$</td>	13(a) 3e + 2f(n)	B2	Allow $3 \times e + 2 \times f$
(b) $3c + 2f$ 100or 0.03e + 0.02f (p) or equivalent 1002f (or 2×f or f.2) If B2, penalise further incorrect work -1 	10.(d) 00 + 21 (p)	52	B1 for either 3e (or $3 \times e$ or $e \times 3$) or
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value upwards consideredamounts such as £19.99, i.e. pence considered as well as £s, OR E1 for prices from a low value upwards considered, minimum acceptable range \approx £30 to \approx £50(d) Reason implying 'no' showing understand that repeating an experiment can lead to different results (e)(i) Reason implying no, such as: 'all columns total 20', 'all 60 answered', 'all people selected red, black or silver' (ii) Strategy to use all data (for 60 people)E1Accept 'no, as different people have different thoughts/amount to spend'E1Accept 'no, as different people have different thoughts/amount to spend'E1E1Accept more complex answers. Do not accept reference to just 20 peopleS1B1Ignore incorrect cancelling of 12/60. B0 for 12 out of 60, or 12 in 60, but either of these responses gets S1	overlap or gaps (in pence) and prices from a low		max of 1 overlap or 1 gap, must be suitable for
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(d) Reason implying 'no' showing understand that repeating an experiment can lead to different results (e)(i) Reason implying no, such as: 'all columns total 20', 'all 60 answered', 'all people selected red, black or silver' (ii) Strategy to use all data (for 60 people)E1considered, minimum acceptable range $\approx £30$ to $\approx £50$ E1Accept 'no, as different people have different thoughts/amount to spend'E1E1Accept more complex answers. Do not accept reference to just 20 peopleS1B1Ignore incorrect cancelling of 12/60. B0 for 12 out of 60, or 12 in 60, but either of these responses gets S1			E1 for prices from a low value upwards
(d) Reason implying 'no' showing understand that repeating an experiment can lead to different results (e)(i) Reason implying no, such as: 'all columns total 20', 'all 60 answered', 'all people selected red, black or silver' (ii) Strategy to use all data (for 60 people) $12/60 \ (= 1/5 = 0.2)$ E1 $\approx £50$ Accept 'no, as different people have different thoughts/amount to spend' Do not accept reference to just 20 peopleS1E1Accept more complex answers. Do not accept reference to just 20 people12/60 \left(= 1/5 = 0.2)S188			considered, minimum acceptable range \approx £30 to
(d) Reason implying 'no' showing understand that repeating an experiment can lead to different results (e)(i) Reason implying no, such as: 'all columns total 20', 'all 60 answered', 'all people selected red, black or silver' (ii) Strategy to use all data (for 60 people) 12/60 (= 1/5 = 0.2)E1Accept 'no, as different people have different thoughts/amount to spend' Do not accept reference to just 20 peopleS1S1B1Ignore incorrect cancelling of 12/60. B0 for 12 out of 60, or 12 in 60, but either of these responses gets S1			≈£50
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or sirverS1(ii) Strategy to use all data (for 60 people)S1 $12/60 \ (= 1/5 = 0.2)$ B1Ignore incorrect cancelling of 12/60. B0 for 12 out of 60, or 12 in 60, but either of these responses gets S1	20, all ou answered, <u>all</u> people selected red, black		Do not accept reference to just 20 people
$12/60 \ (= 1/5 = 0.2)$ B1 Ignore incorrect cancelling of 12/60. B0 for 12 out of 60, or 12 in 60, but either of these responses gets S1 8	(ii) Strategy to use all data (for 60 people)	S 1	
out of 60, or 12 in 60, but either of these responses gets S1	$12/60 \ (= 1/5 = 0.2)$	R1	Janore incorrect cancelling of 12/60 B0 for 12
responses gets S1		D 1	out of 60, or 12 in 60, but either of these
8			responses gets S1
v I		8	

UNIT 1 - HIGHER TIER

Applications Unit 1 Higher Tier January 2013		Final
1.(a)(i) 3e + 2f(p)	B2	Allow $3 \times e + 2 \times f$
		B1 for either 3e (or $3 \times e$ or $e \times 3$) or
		$2f (or 2 \times f or f \times 2)$
		If B2, penalise further incorrect work -1
(ii) $3e + 2f$ or $0.03e + 0.02f$ (p) or equivalent	B1	Must clearly show ALL divided by 100.
		FT their (i) if a sum of 2 terms, equivalent difficulty
(b) 1000t	B1	Allow 1000×t or t×1000
(c) $5x$ (d) $14-2(-x^2) = -x^2 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + $	B1	Allow $5 \times x$ or $x \times 5$
(d) 14q (cm) or equivalent	B2	B1 for $\frac{1}{2} \times 4q \times 7q$
	/	If B2, penalise further incorrect work -1
$\frac{2(a)}{a}$	D2	D1 for any 2 monthing a monthing
Square Kite, Rhombus, Parallelogram	B2	BI for any 5 unambiguous correct entries
(D)	B2	B1 for any 3 unambiguous correct entries
Square, Rhombus, Parallelogram Kite	1 1 1 1 1	BT for any 5 unamorguous correct entries
3(a) 255	B1	CAO
$51(578 \pm 5)$ OR $6v^3 \pm 15v$	M1	
= 29733		CAO
Abby's code AND 1083	D1	CAO Answer space not a contradiction FT 1083 AND all
	DI	their 4 digit codes selected
		If correct evaluation accept blank 'Abby's code ' space
(b) 1369	B2	B1 for sight of 37
	6	
4(a) Reason, e.g. all different age groups	E1	Not marking choice 'ves' or 'no', marking understanding of
((i),88. 8. 8F.		cross-section of people asked. So could be, e.g. 'ves, as older
		people don't go to the cinema', or 'no, as all sorts of people go
		to the cinema'. Look for focus on age in response. Do not
		accept contradiction of choice yes or no with reason.
(b) Two boxes if you are 20 or refers to 'wide' group of older	E1	Do not accept reference to age related ownership of MP3
people		Do not accept 'people not liking to give age', or 'lie about age',
		or 'not enough boxes' (as ambiguous)
(c) Suitable question with at least 3 boxes, no overlap or gaps	E2	E1 for suitable question with at least 3 boxes, max of 1 overlap
(in pence) and prices from a low value upwards considered		or 1 gap, must be suitable for amounts such as £19.99, i.e.
		pence considered as well as £s, OR
		E1 for prices from a low value upwards considered, minimum
	D 1	acceptable range $\approx \pm 30$ to $\approx \pm 50$
(d) Reason implying no snowing understand that repeating an	EI	Accept no, as different people nave different thoughts/amount
experiment can lead to different results $(a)(i)$ Passon implying no. such as: 'all columns total 20' 'all	E 1	A scent more complex answers
60 answered' 'all people selected red black or silver'	LI	Do not accept reference to just 20 people
(ii) Strategy to use all data (for 60 people)	S 1	Do not accept reference to just 20 people
$12/60 \ (= 1/5 = 0.2)$	B1	Ignore incorrect cancelling of 12/60. B0 for 12 out of 60, or 12
	8	in 60, but either of these responses gets S1
5(a)	-	Accept 'their North' provided $+2^{\circ}$ from the North given.
		Penalise 'their North' outside of this tolerance once only
120° drawn from Start	B1	+2°
040° drawn from the position of the first clue	B1	$\frac{-}{+2^{\circ}}$
280° drawn from the position of the second clue	B1	$\frac{-}{+2^{\circ}}$
Line 7.5cm OR 9cm OR 2.5cm for the appropriate stage	B1	+2mm
Accurate chart with lengths and angles correct	B1	Within tolerances allowed
(b) 300°	B1	$\pm 2^{\circ}$. FT from their diagram
(c) Distance (± 2 mm) from the position of the third clue to the	B1	FT from their diagram
start		(Actual is approximately $10.5 \times 40 = 420$ m)
Bearing $(\pm 2^{\circ})$ from the position of the third clue to the start	B1	FT from their diagram
	8	(Actual is approximately 250°)
6. 195/3 (=65)	M1	OR sight of 130, (195,) and 325
$\times 10$	m1	OR sight of 130+195+325
(£)650	A1	CAO
	3	

Applications Unit 1 Higher Tier January 2013		Final
7.(a)(i) Mid-points 52, 56, 60 and 64	B1	
$52 \times 12 + 56 \times 32 + 60 \times 14 + 64 \times 2$ (= 3384)	M1	FT their mid-points including bounds
/60	м1	FT their $\Sigma f x/60$
56.4	A1	Accept 56 from correct working seen
(ii) Strategy to look back that 32 out of 60 are size 2, e.g.	M1	Accept reference back to (a)(i) table without specific numeral
(table shows) about half customers are size 2		details provided 'salesman correct' stated.
Conclusion to give Salesman is correct	A1	1
(b)(i) 242 235 229	B3	B2 for any two correct entries,
	_	B1 for a correct method seen, or 1 correct entry
(ii) Refers to 'smoothing out data', or 'giving a picture of a	E1	Do not accept 'makes it clearer'
complete year's sales', or similar	10	Accept 'averages data out'
8(a) Valid reason or explanation e.g. 'pond fits inside a	S1	Sight of the word rectangle. Needs to be precise in reference to
rectangle' or 'pond fits inside a rectangle' or 'approximates to a	51	rectangle, not vague referring to edges or banks of the pond
rectangle'		being extra
Sight of 6×20	B1	boing online
(b) E σ Considers 2 semi-circles and a rectangle	S1	Idea of splitting up the area
Method of calculating area	M1	$e \sigma \pi r^2 + 1 \times w$
Accuracy in establishing missing lengths / dimensions	M1	e g Sight of diameter 6m or radius 3m
recuracy in establishing missing lenguis / unicusions		AND length of rectangle 20_6(=14)m or $\pi \times 3^2 + 14 \times 6$
Improved estimate	Δ1	$e g 112(27 m^2)$
improved estimate	711	c.g. 112(.27 III)
OWC1 for a clear explanation of 'their idea' with generally	OWC	OWC2 Presents relevant material in a coherent and logical
accurate spelling	$\frac{\sqrt{2}}{2}$	manner using acceptable mathematical form and with few if
Look for	2	any errors in spelling, punctuation and grammar
		any errors in spennig, punctuation and graniniar.
		OWC1 Presents relevant material in a coherent and logical
• spennig		manner but with some errors in use of mathematical form
• clarity of text explanations,		spelling nunctuation or grammar
• the use of notation (watch for the use = being		OR
appropriate)		evident weaknesses in organisation of material but using
• units		acceptable mathematical form, with few if any errors in
• labelling		spelling, punctuation and grammar
		spennig, punctuation and grammar.
QWC2: Candidates will be expected to		OWC0 Evident weaknesses in organisation of material and
 present work clearly, with words explaining process 		errors in use of mathematical form spelling punctuation or
or steps		grammar
AND		
 make few if any mistakes in mathematical form, 		
spelling, punctuation and grammar in their answer		
QWC1: Candidates will be expected to		
 present work clearly, with words explaining process 		
or steps		
OR		
 make few if any mistakes in mathematical form, 	8	
spelling, punctuation and grammar in their final	-	
answer		
9.(a) $6.8(408) \times 10^7$	B2	B1 for 68408000 or $3.4(204) \times 10^7$
(b) 5.43×10^6 / 19 or 5.43×10^6 / 19 <u>+</u> x	M1	Ignore for some candidates realising 1 less gap for overall
_		length, x is a small compensation value.
$\times 0.03$	м2	M1 for \times 3
$8.57(368) \times 10^3$ (m) or 8.6×10^3 (m)	A1	FT from M1, M1 but must be in standard form
		If division by 19.03 leading to $8.56(0168) \times 10^3$ (m) mark as
		above, i.e. allow M1, m2 but award A0 for this
	6	misinterpretation of the gaps as extra

Applications Unit 1 Higher Tier January 2013		Final
10(a) 40, 55, 60	B1	
(b) Correct cumulative frequency diagram, points plotted at	B2	FT from cumulative (i). Allow initial plot at the origin.
bounds and joined by a curve or straight line		B1 for points correct but not joined, OR
		B1 correct apart from 0.5 translation, OR
		B1 if one error in plotting but joined correctly
(c) Median 17 (±0.5)	B1	FT from their cumulative diagram. Not cumulative no FT
Intention to subtract readings from horizontal axis for vertical	M1	FT from their cumulative diagram.
45 & 15		Watch for an answer of 12 from LQ rather than interquartile
Interquartile range (12±1)	A1	range, must be IQR is $(24-12 =)$ 12 if working shown
(d) General idea of what box – whisker should be	S1	
Range ends 37 and 2 correctly indicated	B1	
Median line correctly indicated	B1	FT their median
UQ and LQ correctly indicated	B1	FT their UQ and LQ readings
(e) Strategy: use of median as same number above and below	S1	
Interpretation: half free + half at $\pounds 4$	M1	
Conclusion based on appropriate working that no difference		
expected, i.e. compares with all at $\pounds 2$	A1	
	13	
$11(a)(i)$ Idea: $6 \times = 12$	S 1	
Height of 16 to 22 group indicated as 2	B1	
Correct uniform scale shown	B1	3 correct values, no incorrect values is sufficient
(ii) Method of summing width \times height	M1	Must include at least 3 correct products.
		FT from their histogram with a uniform scale
		$(6 \times 0.5 + 4 \times 5 + 4 \times 6 + 6 \times 2)$
59	A1	CAO
(iii) Finding middle worker i.e. 30 th value (or 20 1/2 th)	S1	FT from their histogram with a uniform scale
Realising within 12 to 16 interval	M1	
7 (or 6.5) out of the 24 in the group	M1	
13(17) seconds) or $13(108)$ seconds)	A1	Must FT from histogram or either no working or correct
		working
		Do not accept an answer of 13 without working
(b) Correct histogram on the graph paper provided	B3	B2 for suitable uniform scale to at least 9, having worked with
		frequency density with at least 3 bars of the histogram correct
		B1 for working with frequency density, at least 3 calculations
		correct, OR sight of a uniform scale to 9 (not a scale to 36)
(c) '40 and over' with a reason based on the shape of the	E1	Accept 'over 40s' with a suitable reason
histogram or the skew of the data	10	Accept over 40s, other median is 13 seconds where as median
	13	for these lies in 8 to 12 second group
12(a) Correct evaluation of at least 3 coordinates	M1	t 0 1 2 3 4 5 6 7 8
Critchle and mith announciety and and labels	A 1	V = 0 to $V = 0$ to 16 (or 20) Must ET at least 2 correct
Suitable axes with appropriate scale and labels	AI	t = 0.008 and $v = 0.0010$ (01.20). Must F1 at least 5 confect
Disting at least 7 compating (allow 2 aling)	MO	FT for their axes if reasonable
Plotting at least 7 correct points (anow 2 stips)	IVI2	M1 for plotting between 3 and 6 correct points
Initian all 0 points with a surge	A 1	wit for plotting between 5 and 6 correct points
(b) $(t -) A$ (seconds)	AI D1	FT from their graph
(b) $(t -) 4$ (seconds) (c) Strategy a g to draw a tangent at $t = 7$	51 51	Accept appropriate other methods, e.g. close calculations to 7
Use of difference $y / difference t$	M1	Must be differences not readings from axes. Ignore signs
	Δ1	Reasonable from their graph. Must be negative (e.g. -6)
$m/s^2 \text{ or } ms^{-2}$	III	Does not depend on previous marks
(d) Identifying the required area	S1	Maybe shown on their graph
Solitting area into areas that can be approximated	M1	
Complete calculation for the area required	M1	
Accurately calculated	A1	(Possible answers include 80 (metres) using 2 triangles and 2
recuratory carculated	14	trapezia or 84 (metres) using 2 triangles and 6 trapezia 85 33
		(metres)

UNIT 2 - FOUNDATION TIER

Applications Unit 2 Foundation Tier January 2013		Final
1. (a)(i) $2 \times (\pounds)1.99 + (\pounds)2.10 + 3 \times (\pounds)1.80$	M1	Allow one omission/extra
(£)11.48	A1	CAO
(ii) $6 \times (\pounds) 1.29$	M1	FT 'their number of sandwiches' used in part (a)
(£)7.74	A1	
(b) $48 \div 6$	M1	FT 'their number of men'
8	A1	
	6	
2. (a) 6	B1	
(b) $8 + 12 + 6 + 7$	M1	For adding frequencies
33	A1	
(c) For correct pictogram drawn with labels	B3	Award B2 for 3 correct, B1 for 2 correct
		Penalise -1 for no labels
\square		
- $ -$		
Toast (+-) (+-)		
\frown		
Cooked breakfast () (
U		
	6	
3. (a) A and D	B1	Accept pairs of answers in any order in both parts
B and H	B1	
(b) F and G	B1	
K and J	B1	
	4	
4. (a) Correct completion of Rangoli Pattern (10 lines)	B2	Award B1 for 5 or more lines correctly drawn
(b) Triangle in correct position in 4 th diagram	B2	Award B1 for the triangle drawn in correct position
		in 2 nd or 3 rd diagram OR award B1 for incorrect
		triangle drawn in 2 nd diagram but then a correct FT
		drawn in (3 rd and) 4 th diagram(s).
	4	
5. (a) Length of pen $- 14$ cm	B4	Award B3 for 3 or 4 correct, B2 for 2 correct, B1
Height of door $-2m$		for 1 correct.
Weight of a tin of beans – 420g		
Capacity of a can of fizzy drink – 330ml		
Weight of a bag of sugar – 1kg	50	
(b) Better buy is 3kg of potatoes for 80 pence with a	E2	Award E1 for a partial reason or award E1 for sight $f(x) = f(x) + f(x)$
reason that 3kg is approx 6(.6)lbs, so are getting a		of 6(.6) lbs with no reason
greater weight of polatoes (for the same money).		Eg II say Skg is neavier than JDS award $E1$
	6	or 5 kg gives ore polatoes for the same money
$6(a) 40/100 \times 140$	M1	
(£)56	Al	Answer of $(\pounds)84$ in this part gets M1 A0
		r
(b) coat on Tuesday costs $(140 - 56 =)$ (£)84	B1	FT 'their 56.' Award this B1 if shown in part (a)
		5 F ··· (~)
$20/100 \times 84$	M1	Alternative method $80/100 \times 84 M2$
(£)16.8(0)	A1	$=(\pounds)67.2(0) A1$
Coat costs (84 – 16.80=) (£)67.2(0)	B1	FT 'their 84 and 16.80' if at least M1 awarded in (a)
		or (b)
		If no marks awarded in (b)
		Award SC2 for an answer of 112
		Or Award SC1 for sight of 28 or for 1 slip in
	-	workings towards answer of 112
	6	

Applications Unit 2 Foundation Tier January 2013		Final
7. (Cost of Sausages) $240 \div 15 \times 5.20$	M1	
(£)83.2(0)	A1	If M0 A0 Award SC1 for 16 (kgs)
(Cost of Rolls) $240 \div 12 \times 1$	M1	
(£)20	A1	If answer given as 20 packs Award SC1
(Total) (£) 103.2(0)	B1	FT 'their (£)83.20' + 'their (£)20' provided at least M1 awarded
$35/100 \times 103.2(0)$ (f)36.12	M1 A1	FT 'their (£)103.2(0)'
$(\frac{1}{4} \times 103.2(0)=)$ (£)25.8(0)	B1	FT 'their $(£)103.2(0)$ ' but not 'their $(£)36.12$ '
(103.2(0) - 36.12 - 25.8(0) =) (£)41.28	B1	FT 'their (£)103.2(0) – 'their (£)36.12' – ' their (£)25.80'
		Watch for 103.2(0) – 60% of 103.2(0) or 40% of
$(41.09 \cdot 9) \times (2) = 1$	D1	$\frac{103.2(0)}{500}$
$(41.28 \div 8 =) (\pounds) 5.16$	BI 10	F1 their remaining cost -8
8 (a) $(area -)$ 45×25	10 M1	
$1125(m^2)$	Al	
$(\text{Cost} =) 1125 \times (\text{\pounds})85$	M1	FT 'their area'
(£) 95625	A1	
		If no marks awarded
		Award SC2 for sight of (£)11900
		OR Award SC1 for ×85 correctly
	0	
Look for	QW	QWC2 Presents relevant material in a coherent and
• spelling	w C	form and with faw if any arrors in spalling
• clarity of text explanations,		punctuation and grammar
• the use of notation (watch for the use of $=$,	2	punctuation and grammar.
z, m being appropriate)		OWC1 Presents relevant material in a coherent and
OWC2: Candidates will be expected to		logical manner but with some errors in use of
• present work clearly, with words explaining		mathematical form, spelling, punctuation or
process or steps		grammar
AND		OR
• make few if any mistakes in mathematical		evident weaknesses in organisation of material but
form, spelling, punctuation and grammar and		using acceptable mathematical form, with few if
include units in their final answer		any errors in spelling, punctuation and grammar.
QWC1: Candidates will be expected to		OWC0 Evident weaknesses in organisation of
• present work clearly, with words explaining		material and errors in use of mathematical form
process or steps		spelling, punctuation or grammar.
OK • make few if any mistakes in mathematical		
• make lew if any mistakes in mathematical form spelling, punctuation and grammar and		
include units in their final answer		
mende units in their initia unswer		
(b) $60(\pm 2)/360$ ISW	B2	Award B1 for sight of 60 ($\pm 2^{\circ}$)
	0	or for a numerator <90 with a denominator of 560
0.2r + r + 7 - 25	ð B1	ET until 2 nd error
3x = 18	B1	This line implies 1 st B1
x = 6	B1	Answer only of $(r =)$ 6 award B0 B0 B1
<i>x</i> = 0	3	
$10.16000 \times 6.5 \div 100$ OR $16000 \times 6.5 \times 5$	M1	Or sight of 1040
$\times 5$ OR $\div 100$	m1	
Simple interest = $(\pounds)5200$	A1	
Total paid $(16000 + 5200 =) (\pounds)21200$	B1	FT their 5200 provided M1 awarded
11 (a) All 8 points correctly plotted	4 D2	R1 for at least 6 points correctly related OP all
11.(a) An o points correctly protied	D2	correctly plotted but joined dot-to-dot
(b) $(f)40$	B1	OR FT from their graph for their oldest clock
(c) Implies "no" with a reason (e.g. points scattered or	E1	Accept statements saving it is 'not positive and not
not in line, etc.)		negative correlation'
	4	-

Applications Unit 2 Foundation Tier January 2013		Final
12.		Accept percentages used within comparison Do not accept percentages quoted without
		interpretation. Accept statements such as 'only
		74%' as a comparison
No, Yes, No	B1	No with statement of 1 of the 2 reasons
Far Flung: No and most expensive or most often late	E1	Unambiguous and not contradicted. In either
Statement that implies Celtic Flights is more reliable	E1	reason box for Celtic Flights or Roly Air
than Roly Air	3	
13.(a) $(245/9.8(0) - 17)$ or $(245-9.8(0)\times17)\div9.8(0)$	M1	Or equivalent method that could lead to 8
(=25-17=8)	1	
$\frac{1}{2}$		Depends on M1. May be embedded
Conclusion D4 entry is 4 (i.e. nall their 8)	AI	Δ correct answer in the table gets M1 m1 Δ 1
(b) (-) $C_{2} \times D_{2} + 2 \times D_{2} \times D_{2} $ (D)	B /	A confect answer in the table gets $M1$, $M1$, $A1$ Ignore $(E2 = 2)$ Accept $(*2)$ as $(x)^2$
$(0) (=) C_3 \times B_3 + 2 \times D_3 \times B_3 OR$	D4	Ignore ES – Accept \cdot as \times
$(=) (2 \times D3 + D3 \times D3 + D3 \times D3) OR$		Award b5 for sign of $C5 \times B5 + D5 \times B5$,
$(=)$ $(2 \times D3 + C3) \times B3$ OK equivalent		$OI \ 2 \times D3 \times D3,$
		or $D3 \times B3 + D3 \times B3$,
		Of $(2 \times D3 + C3)$
		Award B2 for signt of $B3 \times C3$
		$01 D_3 \wedge D_3$
		then to use a cell reference
		Penalise consistent incorrect row -1 only
	7	Tenanse consistent incorrect for Toniy
14. $AC^2 = 75^2 + 140^2$	M1	
$AC^2 = 25225 \text{ OR } AC = \sqrt{25225}$	A1	
AC = 158.8(238017) or 159 (m)	A1	
	3	
15.(a) 5 4 and 2 5	B2	B1 for either entered correctly
(b)	D 4	FT their entries, or no extra entries, to mark (b)
Median Range Mode	В4	Median, mode and range correct, OR
$\operatorname{in} \mathfrak{t}$ $\operatorname{in} \mathfrak{t}$ $\operatorname{in} \mathfrak{t}$		B5 10F 4 OF 5 COFFECT ENTITIES B2 for 2 correct entries
NewKey 23 40 23		B2 for 1 or 2 correct entries
eLime 36 37 31		DI IOI I OI 2 COITECT EIRITES
	6	

UNIT 2 - HIGHER TIER

Applications Unit 2 January 2013 Higher Tier GCSE		Final
1.(a) 4.5(00 m)	B1	
(b) 3200×750 with an attempt to change units	M1	Attempt to change units needs evidence of $\div 10^{n}$ where n>3
$24 (m^2)$	A1	
$(c) 600 \times 750 \times - 405\ 000\ 000$	M1	Or equivalent method
900 (mm)	Al	
	5	
2.(a) All 8 points correctly plotted	B2	B1 for at least 6 points correctly plotted, OR all
		correctly plotted but joined dot-to-dot
(b) (£)40	B1	OR FT from their graph for their oldest clock
(c) Implies "no" with a reason (e.g. points scattered, or	E1	Accept statements saying it is 'not positive and
not in line, etc.)	4	not negative correlation'
3. (a) (i)250 × 4.37	M1	
= 1092.5(0)	A1	
(Buys)1050 (zloty)	A1	FT provided M1 awarded
(ii) 1050 ÷ 4.37	M1	FT 'their 1050 zloty' provided rounded to the
$=(\pounds)240.27(46)$	A1	nearest 50, must be in zloty not £s
(b) (1050 – 340.40 =) 709.6(0)	B1	FT 'their (a)' provided >340.40
$709 \div 4.43$	M1	FT rounding down their 709.60 to whole
(£) 160.04	A1	number
		Accept (£)160.05
		An answer of (£)160.18 should be awarded B1
		then SC1 in (b)
	8	An answer of $(\pounds)160.27$ should be awarded
		SC1, with B1 only if 709.6(0) seen
4.		Accept percentages used within comparison
		Do not accept percentages quoted without
		interpretation. Accept statements such as 'only
		74%' as a comparison
No, Yes, No	B1	
Far Flung: No and most expensive or most often late	E1	No with statement of 1 of the 2 reasons
Statement that implies Celtic Flights is more reliable	E1	Unambiguous and not contradicted. In either
than Roly Air	3	reason box for Celtic Flights or Roly Air
5.(a) $(245/9.8(0) - 17)$ or $(245-9.8(0)\times17) \div 9.8(0)$	M1	Or equivalent method that could lead to 8
$(=25 - 17 = 8) \qquad (78.4(0) \div 9.8(0) = 8)$		
$\div 2$	m1	Depends on M1. May be embedded
Conclusion D4 entry is 4 (i.e. half their 8)	A1	CAO
		A correct answer in the table gets M1, m1, A1
(b) (=) $C3 \times B3 + 2 \times D3 \times B3$ OR	B4	Ignore 'E3 ='. Accept '*' as ' \times '
$(=) C3 \times B3 + D3 \times B3 + D3 \times B3 OR$		Award <i>B3</i> for sight of $C3 \times B3 + D3 \times B3$,
(=) $(2 \times D3 + C3) \times B3$ OR equivalent		or $2 \times D3 \times B3$,
		or $D3 \times B3 + D3 \times B3$,
		or $(2 \times D3 + C3)$
		Award B2 for sight of 'B3×C3'
		or 'B3×D3'
		Award <i>B1</i> if shown numerically, with an
	7	attempt then to use a cell reference
	,	Penalise consistent incorrect row -1 only
6.(a) 5 4 and 2 5 only (with no other entries)	В2	B1 for either entered correctly
(b)	D.4	<u>F1 their 2 entries, or 'nil entries', or if 1 extra</u>
Median Range Mode	В4	entry to mark (b). However if responses in (b)
		are correct then award marks as appropriate
NewKey 23 40 23		D2 for 4 or 5 correct or t
eLime 36 37 31		D5 10r 4 0r 5 correct entries
		D2 for 5 correct entries B1 for 1 or 2 correct entries
	D 1	
(c) Snows understanding that the pie charts don't show	81	
now many phones were sold	/	

Applications Unit 2 January 2013 Higher Tier GCSE		Final
7.(a) (Driftwood) $\frac{68 \times 36 - 2000}{2000}$ (×100)	M1	(2448 – 2000)/2000 or 0.224
22.4(%)	A1	Accept 22(%) from correct working If no marks SC1 for an answer of 122(.4%)
(Grain Bank) $0.1 \times 2000 + 15 \times 146$ (= 2390) <u>'their 2390' -2000</u> ×100	M1 m1	(200+2190-2000)/2000 or 0.195
2000 19.5(%)	A1	An answer of 19(%) or 20(%) is A0 If M1 only, then also award SC1 for an answer of 119.5(%), 119(%) or 120(%)
Other considerations, e.g. reference to time period	E1	Accept reasonable ideas, i.e. 'consider other bank terms/rates', 'length of time business will last' 'able to repay the loan each month'
 spelling clarity of text explanations, the use of notation (watch for the use of '=', £, % being appropriate) 	Q W C 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.
 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 		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.
 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)(i) 26.60/3.5 (£)7.6(0)	M1 A1	For an answer of 8.06, implying division by 3.3, award SC1
(ii) 26.60/1.3 (£)20.46	M1 A1 12	Accept (£)20.47 Award M1 only for 20.4615
8. $2f + 3g = 5$ and $3f + 4g = 4$	B1	FT provided at least 1 correct equation and solving is of equivalent difficulty
Method, e.g. equal coefficients	M1	Allow 1 slip in non-equalised variable
Correct first variable N_{ath} of 2^{nd} variable a substitution	A1 m1	f = -8 or g = 7
Correct second variable	A1 5	
9.(a) 34990 / 1.175	M1	(29778.72(34))
× 1.24 36930 (euros)	M1 A2	Independent of 1 st M1 CAO Not FT from M0, M1. A1 for 36925(.617 euros) or if incorrectly rounded to 36920
(\mathbf{h}) Sight of 1760 5 (mm)	R1	If M0, M1 also allow SC1 for an answer of 35790 (euros)
Sight of 2007.5 (mm)	B1	Or half of this
$2007.5 - 1769.5$ ($\div 2$)	M1	
(One wing mirror) 119(mm)	A1	Must FT from correct working
(c) $11.5 \times 7.5 \times 5.5$ 474.4(cm ³)	M1 A2 11	A1 for 474.375 rounded or truncated, but not to 1dp as required An answer of 472.4699 comes from 11.49, 7.49 and 5.49 which is M0, A0, A0
$10.(a) 2.0 \times 10^4$	B2	B1 for 2×10^4 or $1.9(984) \times 10^4$.
(b) 1.1×10^5	B2 4	B1 for $1.(05191) \times 10^5$
11. Opposite = $Tan56^{\circ} \times 19$	M2	M1 for $tan56^\circ = opposite/19$
= 28.168658(m)	A1	Accept rounded or truncated from working
mergin 01 the tree = 29.968658(m)	4	FT from their rounded or truncated 170m working, and

Applications Unit 2 January 2013 Higher Tier GCSE		Final
12.(a) $t + f \le 30$ and $3t + 4f \ge 80$	B3	B2 for t+f \leq 30 and 3t+4f80,
		or t+f 30 and $3t+4f \ge 80$,
		or $t+f < 30$ and $3t+4f > 80$
		B1 for either inequality correct, $a_{1} + b_{2} = 20$ and $2t + 4f = -80$
		of $t+1 \dots 50$ and $5t+41 \dots 80$
		similar level of difficulty
(b) Line t+f=30 drawn correctly	B1	similar level of difficulty
Line 3t+4f=80 drawn correctly	B1	
The region indicated	B1	FT from 2 lines with at least one line drawn
-		correctly
(c) Any correct point from the correct region, using whole numbers only	B1 7	OR FT their graph for whole number solutions only
13.(a) Calculation that would lead to a correct answer	M1	Calculations are:
for TOTAL 2009, 2010, 2011 and 2012		2009: 2300
		2010: 2300×3
		2011: 2300×3×3
		2012: 2300×3×3×3
92000 (T-shirts)	A2	2012 as 2300 6900 20700 62100 T-shirts
		SC1 for an answer of 6900, 20700 or 62100 T-
		shirts only
		Treat starting with 2009 as 2300×3 and
		continuing with appropriate pattern of trebling
		as MR-1 and mark accordingly
	D1	
(b) Idea that 3.60 is 112% of previous year price 2.60 ± 1.12^3	Ы М2	M1 for equivalent of 3.60 ± 1.12
$3.60 \div 1.12^{3}$	A1	With for equivalent of $5.00 \div 1.12$
(£)2.56		
(c) Strategy to use quadratic similarity	S1	This may be linear or cubic
		The following answers imply S1:
		for linear, 6.468 or 6.46 or 6.47
	M1	for cubic, 12.677 or 12.67 or 12.68
Sight of 50 ² with 70 ² , or 5 ² with 7 ² , or 1.4 ² , or $(5/7)^2$		
$(4.62/50^2) \times 70^2$ or equivalent	A1	$A_{ccent}(f) = 0.05(52)$
(±)9.06	11	Ассерт (2)3.03(32)
14.(a) Area of 5 faces of the cuboid 2304 (cm ²)	B1	(144+ 540+ 540+ 540 + 540 = 2304)
Slant height ² = $18^2 + 6^2$ (=360)	M1	Or alternative complete method
Slant height = 18.97 or 19(cm)	A1	r in the rest of t
Area 1 triangular face $-16 \times 12 \times 2$ (dant height)	M1	ET for their 18.07 provided not 18
(=113.84)	IVII	11 for their 16.97, provided not 18
OR 4 triangular areas (= 455.36798)	A1	Rounded or truncated
Total area 2759.36798(cm ²)	B1	FT provided includes 'their area of 4 triangles'
$(\pounds 0.045 \times \text{Total area} =) (\pounds) 124.17$		and 'their total area of rectangles' only if at
		least 4 rectangles have been considered
		Allow rounding or truncation errors if method
		truncation errors then penalise PR-1
		n meanon errors men penunse I K-1
	S 1	
(b) Appropriate sketch (may be implied) with		
realisation that 1 st step is to find the height/length of the		
cylinder, then subtraction from 22 will give the height	M1	
of the cone	Δ1	
$\Pi \times 6^2 \times height of evaluation = 1019$	M1	ET '22 their height of cylinder'
$11 \times 0 \times \text{neight of cylinder} = 1018$ Height of the cylinder $9(.00 \text{ cm})$	Al	r 1 22 – then neight of cylinder
Notice the construction of the construction o	A1	CAO from correct working
Volume cone, answers in range 489.8 to 490.3 (cm^3)	12	č
Overall volume 1.5 (litres)		

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