

GCSE MARKING SCHEME

APPLICATIONS OF MATHEMATICS (LINKED PAIR PILOT)

SUMMER 2013

INTRODUCTION

The marking schemes which follow were those used by WJEC for the Summer 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 June 2013		Final
1. (a) $(\pounds)5.20 + (\pounds)3.60$ $(\pounds)8.8(0)$ (b) (Circuits $5 \times (\pounds)4.40 =$) $(\pounds)22.(00)$ (Zumba $4 \times (\pounds)4.50 =$) $(\pounds)18(.00)$ (Aqua $3 \times (\pounds)4.60 =$) $(\pounds)13.8(0)$ (Swim) $6 \times (\pounds)3.60 =$) $(\pounds)21.6(0)$	M1 A1 B2	Award B2 for all correct sub-totals Award B1 for 2 or 3 correct or for 1 missing value.
$(Total =) (\pounds)75.4(0)$	B1	FT their subtotals. If no B marks awarded, award SC1 for $5 \times$ (f.)4 40 + 4 × (f.)4 50 + 3 × (f.)4 60 + 6 × (f.)3 60
(Saves) $(\pounds)75.4(0) - (\pounds)33$ = $(\pounds)42.4(0)$	M1 A1	
 Look for spelling clarity of labels the use of notation (watch for the use '=' "£" being appropriate) 0 consistently missing QWC2: Candidates will be expected to present work clearly, with words explaining process or steps AND make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer QWC1: Candidates will be expected to present work clearly, with words explaining process or steps QWC1: Candidates will be expected to present work clearly, with words explaining process or steps OR make few if any mistakes in mathematical form, spelling, punctuation and grammar in their final answer 	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. QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar OR evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar. QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar.
2 (a) Attempt to count area	9 M1	
Estimate of area within range 50 - 56 Their area × 25 Answer	A1 M1 A1	FT "their area" For a range of 50 – 56, the area would be in the range 1250 - 1400
(b) Correct triangle drawn with AB=8cm (\pm 2mm) Angle A= 64°(\pm 2°) and Angle B=42°(\pm 2°)	B3	Award B3 for a complete correct triangle Award B2 for 2 of the 3 measurements correct or all 3 correct but a triangle not completed Award B2 if triangle correct but labelled incorrectly Award B1 for 1 of the 3 measurements correct.
Distance from A = 5.6 km (± 0.2 km) Distance from B = 7.5 km (± 0.2 km)	B1 B1	Use overlay. FT from their triangle drawn (±0.2km) Award SC1 for answers reversed
(c) For use of 9 hours (Fishing Boats R Us=) 45 + 30 × 8 (£)285 (Ocean Blue Boats =) (£)342 Fishing Boats R Us cheaper by (£)57	B2 M1 A1 B1 B2 16	Award B1 for sight of 8 hours 15 mins FT their whole number of hours. Award M0 A0 for use of 8.15 FT their whole number of hours. Award B0 for use of 8.15 FT their prices for Fishing Boars R Us AND Ocean Blue Boats. Award B1 for (£)57 alone
3. 130 (grams) 270 - 280 (ml) Arrow at 65 grams	B1 B1 B1 3	

4. (a) $2/3 \times 865$	2		M1	
=	5768		A1	
(b) 4120/8 (=51	5)		M1	
	2575		A1	
(c) Correct expl	lanation		E1	Eg. "because 8652 rounded to the nearest 1000 is 9000" or
				"because this is a good estimate" or "it's about 9000"
-			5	
5.	Event	Probability		
A Getting a he	ead on a single thro	$\frac{1}{2}$		Accent equivalent percentages or decimals
ri. Getting un	eud on a single and			(Do not accent words used to describe probabilities)
B. Rolling a 4	on a single roll of a	in ordinary 1/6		
dice.				
C. Choosing F	riday when calacti	ag a day at $1/7$		
random fror	n the days of the w	veek.	B2	Award B1 if 2 or 3 are correct
				Penalise -1 once only for consistent use of incorrect notation
D. Choosing a	letter t when selec	ting a letter 1/5		
at random fr	rom the word stam	p.		
			D1	Accent probabilities to convegent the events $(1/7, 1/6, 1/5, 1/2)$ ET
CDDA			DI	their probabilities
			3	then probabilities
6. (a) (i) Correc	tly labelled axes	and uniform scales used	B2	Award B1 for either both axes labelled correctly or uniform
				scales on both axes or one axis labelled correctly with a uniform
				scale. Penalise -1 if axes are reversed.
Points plotted			P1	Allow 1 error
Correct graph of	drawn with point	s joined with straight lines	L1	CAO. Accept solid or dotted lines
(ii) Explanation	of graph given		E1	Eg. The wind speed increases through the morning (and dies
				down slightly after 1500.) Accept partial explanations.
(b) Adding num	hars (-02)		M1	Attempt to add numbers. Accept sight of volves from 72, 111
(b) Adding hun	(=92)		IVI I	Attempt to add numbers. Accept sign of values from $75 - 111$
$92 \div 8$			m1	FT 'their 92'
Mean = 11.5 (mph)		A1	CAO
Put in order	3, 5, 10, 11, 14,	15, 15, 19	M1	Sight of 11 and 14 only would gain M1
Median $= 12.5$	(mph)		A1	
Mode = 15 (m	ph)		B1	
Range = $16 (m)$	ph)		B1	
_			12	
7. Demoer	Could donate	Descor	В4	Award B1 for each correct response AND valid reason.
rerson	blood today?	Keason		in Charlotte if es accept blank space for feason
	Yes or No			
<u> </u>				
Charlotte	Yes	(Meets all requirements)		
		(weets an requirements)		
		(weets an requirements)		
Aaron	No	Is over age limit		Aaron is 66. Accept 'age'.
Aaron	No	Is over age limit		Aaron is 66. Accept 'age'.
Aaron Sian	No	Is over age limit Is under weight		Aaron is 66. Accept 'age'. Sian weighs 48kg. Accept 'weight'.
Aaron Sian	No No	Is over age limit Is under weight		Aaron is 66. Accept 'age'. Sian weighs 48kg. Accept 'weight'.
Aaron Sian Alun	No No No	Is over age limit Is under weight Gave blood less than 16		Aaron is 66. Accept 'age'. Sian weighs 48kg. Accept 'weight'.
Aaron Sian Alun	No No No	Is over age limit Is under weight Gave blood less than 16 wks ago		Aaron is 66. Accept 'age'. Sian weighs 48kg. Accept 'weight'. 14 weeks since last gave blood or too soon to give blood. Accent 'time' (since last donation)
Aaron Sian Alun	No No No	Is over age limit Is under weight Gave blood less than 16 wks ago	4	Aaron is 66. Accept 'age'. Sian weighs 48kg. Accept 'weight'. 14 weeks since last gave blood or too soon to give blood. Accept 'time' (since last donation)
Aaron Sian Alun 8. (a) Derek	No No No	Is over age limit Is under weight Gave blood less than 16 wks ago	4 B1	Aaron is 66. Accept 'age'. Sian weighs 48kg. Accept 'weight'. 14 weeks since last gave blood or too soon to give blood. Accept 'time' (since last donation)
Aaron Sian Alun 8. (a) Derek (b) Petra and re	No No No	Is over age limit Is under weight Gave blood less than 16 wks ago	4 B1 E1	 Aaron is 66. Accept 'age'. Sian weighs 48kg. Accept 'weight'. 14 weeks since last gave blood or too soon to give blood. Accept 'time' (since last donation) Accept reason implying Petra, e.g. Petra because graph goes flat
Aaron Sian Alun 8. (a) Derek (b) Petra and re (c) (i)Uniform	No No No eason scale on kilomet	Is over age limit Is under weight Gave blood less than 16 wks ago	4 B1 E1 B1	 Aaron is 66. Accept 'age'. Sian weighs 48kg. Accept 'weight'. 14 weeks since last gave blood or too soon to give blood. Accept 'time' (since last donation) Accept reason implying Petra, e.g. Petra because graph goes flat
Aaron Sian Alun 8. (a) Derek (b) Petra and re (c) (i)Uniform Plotting at least	No No No eason scale on kilomet two correct poin	Is over age limit Is under weight Gave blood less than 16 wks ago	4 B1 E1 B1 P1	 Aaron is 66. Accept 'age'. Sian weighs 48kg. Accept 'weight'. 14 weeks since last gave blood or too soon to give blood. Accept 'time' (since last donation) Accept reason implying Petra, e.g. Petra because graph goes flat
Aaron Sian Alun 8. (a) Derek (b) Petra and re (c) (i)Uniform Plotting at least Correct straigh	No No No eason scale on kilomet: two correct point t line through po	Is over age limit Is under weight Gave blood less than 16 wks ago re axis tts ints	4 B1 E1 B1 P1 L1	 Aaron is 66. Accept 'age'. Sian weighs 48kg. Accept 'weight'. 14 weeks since last gave blood or too soon to give blood. Accept 'time' (since last donation) Accept reason implying Petra, e.g. Petra because graph goes flat
Aaron Sian Alun 8. (a) Derek (b) Petra and re (c) (i)Uniform Plotting at least Correct straigh (ii) Full explana	No No No eason scale on kilomet: two correct poin t line through po ation given	Is over age limit Is under weight Gave blood less than 16 wks ago re axis ints	4 B1 E1 B1 P1 L1 E1	 Aaron is 66. Accept 'age'. Sian weighs 48kg. Accept 'weight'. 14 weeks since last gave blood or too soon to give blood. Accept 'time' (since last donation) Accept reason implying Petra, e.g. Petra because graph goes flat Eg use of graph or arithmetic method, eg "he could find what 35
Aaron Sian Alun 8. (a) Derek (b) Petra and re (c) (i)Uniform Plotting at least Correct straigh (ii) Full explana	No No No eason scale on kilomet: two correct poin t line through po ation given	Is over age limit Is under weight Gave blood less than 16 wks ago re axis ints	4 B1 E1 B1 P1 L1 E1	 Aaron is 66. Accept 'age'. Sian weighs 48kg. Accept 'weight'. 14 weeks since last gave blood or too soon to give blood. Accept 'time' (since last donation) Accept reason implying Petra, e.g. Petra because graph goes flat Eg use of graph or arithmetic method, eg "he could find what 35 miles is in km and then double it". FT their graph
Aaron Sian Alun 8. (a) Derek (b) Petra and re (c) (i)Uniform Plotting at least Correct straigh (ii) Full explana Approximately	No No No eason scale on kilomete two correct poin t line through po ation given 112 (km)	Is over age limit Is under weight Gave blood less than 16 wks ago re axis ints	4 B1 E1 B1 P1 L1 E1 B1 7	 Aaron is 66. Accept 'age'. Sian weighs 48kg. Accept 'weight'. 14 weeks since last gave blood or too soon to give blood. Accept 'time' (since last donation) Accept reason implying Petra, e.g. Petra because graph goes flat Eg use of graph or arithmetic method, eg "he could find what 35 miles is in km and then double it". FT their graph Accept answers in the range 110 – 113(km)

9.(a) $223(^{\circ}) + 2^{\circ}$	B1	
(b) Indication of bearing from Palma $073^{\circ} + 2^{\circ}$	B1	
Indication of bearing from Alcudia $130^{\circ} + 2^{\circ}$	B1	
Arta indicated (by a cross or name) on the map	B1	FT provided at least one correct bearing and Arta is on land
(-, (-,),,	21	1 provided at least one correct ocaring and rate is on fand
(c) 108	B1	
72	B1	FT y = 180 - x
180 = 90 + z + 72, or $z = x - 90$, or $z = 90 - y$, or equivalent	M1	Provided x is obtuse and v is acute, and neither is 90°
18	A1	CAO
	11	
10.(a) Value between 3 (metres) and 5 (metres) inclusive	B1	
(b) Circle (intention) with radius $4 \text{ cm} \pm 2\text{mm}$ drawn	B2	Accept a suitable sketch where clearly the branches are drawn
		to scale of $4\text{cm} \pm 2\text{mm}$
		Many branches (covering much of the region) shown within
		tolerance is sufficient - circumference may not be shown
		B1 for circle with radius other than $4\text{cm} \pm 2\text{mm}$, or suitable
		sketch with overall idea of $4 \text{cm} \pm 2 \text{mm}$ radius, or a few
		branches shown within the tolerance
	3	
11. (a) 5.5 (metres)	B1	Accept answers in the range 5.4 to 5.6 inclusive
(b) Intention to read horizontal scale for depth of 3m filling	M1	
36 (minutes)	Al	
(c)(1) Use of the 5 hour period	S1	
Looking 3 hours into the period or equivalent	BI	e.g. 2 cycles and 3 hours
Depth is 6(m), or statement that the tank is full	EI	Accept e.g. 'ready for emptying into tanker', etc
(11) Strategy to work out how many hours between 0/00	81	$0700 M$ ($0700 E^{-1}$ () (041
Nonday and a time on Friday	D 1	e.g. $0/00$ Mon to $0/00$ Friday, 4 lots of 24 hours
96 hours to 0/00 Friday of 108 hours to 1900 Friday of another	BI	OR working with multiples of 5 nours, or other suitable
correct number of nours from 0700 Monday to a time on Friday		multiples of nours
Interpretation of a stop time, a g '3 hours into the process' or	R1	Allow from 1 slip in adding on time
'2 more hours'	DI	Or other appropriate correct statement
(Finish time for process is) $21(\cdot)00$ or 9nm	B1	CAO Or other appropriate correct statement
(1 mish this for process is) = 21(.)00 or pm	DI	Final B1 implies previous B1
		Award all 4 marks for a response of 2100 only if no incorrect
		working seen, i.e. not a lucky correct answer
		working seen, not in not a newy correct answer
		If no marks, award SC1 for an answer of 2200 (10pm) by
		starting at 0700 each day
	10	

UNIT 1 (HIGHER TIER)

Applications Unit 1 June 2013 Higher Tier		Final
1.(a) 9cm, 8cm and 5cm lines in correct orientation	B1	±2mm on all lengths
$60^{\circ}+2^{\circ}$ constructed using the appropriate arcs	B2	No arcs no marks!
00 ±2 constructed using the appropriate arcs	D2	or for at least one arc correct with the other slightly outside of tolerance together with angle attempted, or for full method clearly attempted
90°±2° by appropriate compasses construction	B2	B1 for appropriate arcs but angle slightly outside the tolerance, or for full method clearly attempted
	5	If no construction arcs shown, then B0 apart from first B1 for the lengths
2.(a) $223(^{\circ}) \pm 2^{\circ}$	B1	
(b) Indication of bearing from Palma $073^{\circ} \pm 2^{\circ}$	B1	
Arta indicated (by a cross or name) on the map	BI B1	ET provided at least one correct bearing and Arts is on land
Arta indicated (by a cross of name) on the map	DI	F1 provided at least one correct bearing and Arta is on land
(c) 6 cm ± 2 mm measured	B1	
$54 \div 6$ or 9 (km) or 1cm: 9(km)	M1	FT 54÷ 'their 6'. Accept method with incorrect place value
(1cm :) 9000 (m) (d) 108	AI B1	
72	B1	FT y = 180 - x
180 = 90 + z + 72, or $z = x - 90$, or $z = 90 - y$, or equivalent	M1	Provided x is obtuse and y is acute, and neither is 90°
18	Al	CAO
3(a) Value between 3 (metres) and 5 (metres) inclusive	B1	
(b) Circle (intention) with radius 4 cm \pm 2mm drawn	B2	Accept a suitable sketch where clearly the branches are drawn
		to scale of $4\text{cm} \pm 2\text{mm}$
		Many branches (covering much of the region) shown within tolerance is sufficient circumference may not be shown
		B1 for circle with radius other than $4\text{cm} + 2\text{mm}$, or suitable
		sketch with overall idea of $4\text{cm} \pm 2\text{mm}$ radius, or a few
	2	branches shown within the tolerance
4(a) 8 mm	B2	B1 for an answer of 8, or for an answer between 6 and 9
		inclusive (excluding 8) with mm given
(b) (i)Method, e.g. increase in L / increase in W	M1	Or idea of alternative complete method Accept sight of quotient based on misread of the scale for M1
e.g. 12/150 (= 0.08)	A1	only. Or alternative complete method with accurate values Mark final answer.
(ii) Full explanation, e.g. 'rate of change length with weight', 'for every 1g increase 0.08mm increase'	E2	E1 for mention of 'rate of change' without being specific, e.g. '1g gives 0.08mm'.
(c) Explanation, e.g. 'no more data recorded', 'spring snaps',	E1	Allow length increases as weight increases for Eloniy
'broken spring', 'spring now completely straight', etc		
(d) $L = 2W + 35$	B3	B2 for either of 2 or 35 correctly placed, or
		B1 for a correct interpretation of data given, e.g. sketch shows start (0.35) and and $(100, 235)$
	10	start (0,55) and end (100, 255)
5(a) 210÷30 (=7)	M1	OR using 1:4:10 to find 210÷15 (=14)
14, 56, 140 in this order	A2	A1 for any one answer correct, or for 14, 56 and 140 in an
(b) $T = 15 r$	B 3	incorrect order P2 for $(T-) = x + 4x + 10x$ or
(b) $I = 15x$	D5	B1 for sight of $4x$ or $10x$ OR 4 and 10
(c) $8P/30$ (= $4P/15$)	B2	Mark final answer. B1 for $8/30$ or $P \div 30$ or $P/30$ or from
		simplified ratio P ÷15 or $P/15$
	8	If no marks, SC1 for sight of $P = 3.75 \times variable'$ or equivalent
6.A uniform scale used (shown) at least 30 to 140 with idea of how and whicker plot AND with local C^{2}	B1	
Range of whiskers correct	B1	
Lower and upper quartiles used as ends of the box	B1	
Median shown correctly within the box	B1	
	4	Award B4 for a correct response

7(a) 5.5 (metres)	B1	Accept answers in the range 5.4 to 5.6 inclusive
(b) Intention to read horizontal scale for depth of 3m filling	M1	
36 (minutes)	A1	
(c)(i) Use of the 5 hour period	S1	
Looking 3 hours into the period or equivalent	R1	$e \sigma$ '2 cycles and 3 hours'
Depth is $6(m)$ or statement that the tank is full	F1	Accent e.g. 'ready for emptying into tanker' ato
(ii) Strategy to work out how many hours between 0700	C1	recept e.g. ready for emptying into tanker, etc
(II) Strategy to work out now many nours between 0700	51	$0700 M + 0700 E^{-1} + 41 + 5241$
Monday and a time on Friday	D 1	e.g. 0700 Mon to 0700 Friday, 4 lots of 24 hours
96 nours to 0700 Friday or 108 nours to 1900 Friday or another	BI	OR working with multiples of 5 hours, or other suitable
correct number of hours from 0/00 Monday to a time on Friday		multiples of hours
Interpretation of a stop time, e.g. '3 hours into the process', or	B1	Allow from 1 slip in adding on time.
'2 more hours'		Or other appropriate correct statement
(Finish time for process is) 21(:)00 or 9pm	B1	CAO. Or other appropriate correct statement
		Final B1 implies previous B1
		Award all 4 marks for a response of 2100 only if no incorrect
		working seen, i.e. not a lucky correct answer
		If no marks, award SC1 for an answer of 2200 (10pm) by
		starting at 0700 each day
Look for		
• relevance	OWC	OWC2 Presents relevant material in a coherent and logical
spalling	2	manner using acceptable mathematical form and with few if
• spennig	-	any errors in spelling, punctuation and grammar
• clarity/llow of text explanations		any errors in spering, punctuation and grammar.
		OWC1 Presents relevant material in a coherent and logical
QWC2: Candidates will be expected to		were here with some arrows in use of mothematical form
 present work clearly, with words explaining choices 		mainer out with some errors in use of mathematical form,
AND		spenning, punctuation or grammar
 make few if any mistakes in mathematical form, 		OR
spelling, punctuation and grammar in their answer		evident weaknesses in organisation of material but using
		acceptable mathematical form, with few if any errors in
QWC1: Candidates will be expected to		spelling, punctuation and grammar.
• present work clearly, with words explaining choices		
OR		QWC0 Evident weaknesses in organisation of material, and
		errors in use of mathematical form, spelling, punctuation or
• make few if any mistakes in mathematical form,		
		grammar.
spelling, punctuation and grammar in their answer		grammar.
spelling, punctuation and grammar in their answer	12	grammar.
spelling, punctuation and grammar in their answer 8(a) The last reading (0.44)	12 M1	grammar. Not from an incorrect calculation
8(a) The last reading (0.44) E.G. "more potatoes" checked	12 M1 A1	grammar. Not from an incorrect calculation
8(a) The last reading (0.44) E.G. "more potatoes" checked (b) Use of 0.4 or sight of 40	12 M1 A1 B1	grammar. Not from an incorrect calculation
8(a) The last reading (0.44) E.G. "more potatoes" checked (b) Use of 0.4 or sight of 40 40 × 0.15 or equivalent	12 M1 A1 B1 M1	grammar. Not from an incorrect calculation
spelling, punctuation and grammar in their answer 8(a) The last reading (0.44) E.G. "more potatoes" checked (b) Use of 0.4 or sight of 40 40×0.15 or equivalent (f) 6, or 600(p)	12 M1 A1 B1 M1 A1	grammar. Not from an incorrect calculation Ignore incorrect place value Accept 600 without units but not with incorrect unit
spelling, punctuation and grammar in their answer 8(a) The last reading (0.44) E.G. "more potatoes" checked (b) Use of 0.4 or sight of 40 40×0.15 or equivalent (£) 6 or 600(p) (c) 0.44	12 M1 A1 B1 M1 A1 B1	grammar. Not from an incorrect calculation Ignore incorrect place value Accept 600 without units but not with incorrect unit CAQ. Not from an incorrect method
spelling, punctuation and grammar in their answer 8(a) The last reading (0.44) E.G. "more potatoes" checked (b) Use of 0.4 or sight of 40 40×0.15 or equivalent (£) 6 or 600(p) (c) 0.44	12 M1 A1 B1 M1 A1 B1	grammar. Not from an incorrect calculation Ignore incorrect place value Accept 600 without units but not with incorrect unit CAO. Not from an incorrect method FT 'their 0.44' or (a) provided within the range 0.36 to 0.52
spelling, punctuation and grammar in their answer 8(a) The last reading (0.44) E.G. "more potatoes" checked (b) Use of 0.4 or sight of 40 40×0.15 or equivalent (£) 6 or 600(p) (c) 0.44	12 M1 A1 B1 M1 A1 B1	grammar. Not from an incorrect calculation Ignore incorrect place value Accept 600 without units but not with incorrect unit CAO. Not from an incorrect method FT 'their 0.44' or (a), provided within the range 0.36 to 0.52 inclusive, excluding 0.5
spelling, punctuation and grammar in their answer 8(a) The last reading (0.44) E.G. "more potatoes" checked (b) Use of 0.4 or sight of 40 40×0.15 or equivalent (£) 6 or 600(p) (c) 0.44 $\times 000 \times (0.0)2$	12 M1 A1 B1 M1 A1 B1	grammar. Not from an incorrect calculation Ignore incorrect place value Accept 600 without units but not with incorrect unit CAO. Not from an incorrect method FT 'their 0.44' or (a), provided within the range 0.36 to 0.52 inclusive, excluding 0.5 Ignore incorrect place value
spelling, punctuation and grammar in their answer 8(a) The last reading (0.44) E.G. "more potatoes" checked (b) Use of 0.4 or sight of 40 40×0.15 or equivalent (£) 6 or 600(p) (c) 0.44 $\times 900 \times (0.0)2$	12 M1 A1 B1 M1 A1 B1 M1	grammar. Not from an incorrect calculation Ignore incorrect place value Accept 600 without units but not with incorrect unit CAO. Not from an incorrect method FT 'their 0.44' or (a), provided within the range 0.36 to 0.52 inclusive, excluding 0.5 Ignore incorrect place value ET from M1
8(a) The last reading (0.44) E.G. "more potatoes" checked (b) Use of 0.4 or sight of 40 40×0.15 or equivalent (£) 6 or 600(p) (c) 0.44 $\times 900 \times (0.0)2$ 792(p) or (£)7.92	12 M1 A1 B1 M1 A1 B1 M1 A1	grammar. Not from an incorrect calculation Ignore incorrect place value Accept 600 without units but not with incorrect unit CAO. Not from an incorrect method FT 'their 0.44' or (a), provided within the range 0.36 to 0.52 inclusive, excluding 0.5 Ignore incorrect place value FT from M1
8(a) The last reading (0.44) E.G. "more potatoes" checked (b) Use of 0.4 or sight of 40 40×0.15 or equivalent (£) 6 or 600(p) (c) 0.44 $\times 900 \times (0.0)2$ 792(p) or (£)7.92 $9 \times 4.5(0)$	12 M1 A1 B1 M1 A1 B1 M1 A1 M1	grammar. Not from an incorrect calculation Ignore incorrect place value Accept 600 without units but not with incorrect unit CAO. Not from an incorrect method FT 'their 0.44' or (a), provided within the range 0.36 to 0.52 inclusive, excluding 0.5 Ignore incorrect place value FT from M1
8(a) The last reading (0.44) E.G. "more potatoes" checked (b) Use of 0.4 or sight of 40 40×0.15 or equivalent (£) 6 or 600(p) (c) 0.44 $\times 900 \times (0.0)2$ $792(p) \text{ or } (£)7.92$ $9 \times 4.5(0)$ (£)40.5(0)	12 M1 A1 B1 M1 A1 B1 M1 A1 M1 A1	grammar. Not from an incorrect calculation Ignore incorrect place value Accept 600 without units but not with incorrect unit CAO. Not from an incorrect method FT 'their 0.44' or (a), provided within the range 0.36 to 0.52 inclusive, excluding 0.5 Ignore incorrect place value FT from M1
8(a) The last reading (0.44) E.G. "more potatoes" checked (b) Use of 0.4 or sight of 40 40×0.15 or equivalent (£) 6 or 600(p) (c) 0.44 $\times 900 \times (0.0)2$ $792(p) \text{ or } (£)7.92$ $9 \times 4.5(0)$ (£)40.5(0) (£)32.58 or 3258(p)	12 M1 A1 B1 M1 A1 B1 M1 A1 M1 A1 B1	grammar. Not from an incorrect calculation Ignore incorrect place value Accept 600 without units but not with incorrect unit CAO. Not from an incorrect method FT 'their 0.44' or (a), provided within the range 0.36 to 0.52 inclusive, excluding 0.5 Ignore incorrect place value FT from M1 CAO
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8(a) The last reading (0.44) E.G. "more potatoes" checked (b) Use of 0.4 or sight of 40 40×0.15 or equivalent (£) 6 or 600(p) (c) 0.44 $\times 900 \times (0.0)2$ 792(p) or (£)7.92 $9 \times 4.5(0)$ (£)40.5(0) (£)32.58 or 3258(p)	12 M1 A1 B1 M1 A1 B1 M1 A1 M1 A1 B1 11	grammar. Not from an incorrect calculation Ignore incorrect place value Accept 600 without units but not with incorrect unit CAO. Not from an incorrect method FT 'their 0.44' or (a), provided within the range 0.36 to 0.52 inclusive, excluding 0.5 Ignore incorrect place value FT from M1 CAO
spelling, punctuation and grammar in their answer 8(a) The last reading (0.44) E.G. "more potatoes" checked (b) Use of 0.4 or sight of 40 40×0.15 or equivalent (£) 6 or 600(p) (c) 0.44 $\times 900 \times (0.0)2$ 792(p) or (£)7.92 $9 \times 4.5(0)$ (£)40.5(0) (£)32.58 or 3258(p) $9(a) 3.40 \times 10^3$ and 3.39×10^3	12 M1 A1 B1 M1 A1 B1 M1 A1 M1 A1 B1 11 B3	grammar. Not from an incorrect calculation Ignore incorrect place value Accept 600 without units but not with incorrect unit CAO. Not from an incorrect method FT 'their 0.44' or (a), provided within the range 0.36 to 0.52 inclusive, excluding 0.5 Ignore incorrect place value FT from M1 CAO Do not accept 3.4×10^3 for 3.40×10^3
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spelling, punctuation and grammar in their answer 8(a) The last reading (0.44) E.G. "more potatoes" checked (b) Use of 0.4 or sight of 40 40×0.15 or equivalent (£) 6 or 600(p) (c) 0.44 $\times 900 \times (0.0)2$ 792(p) or (£)7.92 $9 \times 4.5(0)$ (£)40.5(0) (£)32.58 or 3258(p) $9(a) 3.40 \times 10^3$ and 3.39×10^3	12 M1 A1 B1 M1 A1 B1 M1 A1 M1 A1 B1 11 B3	grammar. Not from an incorrect calculation Ignore incorrect place value Accept 600 without units but not with incorrect unit CAO. Not from an incorrect method FT 'their 0.44' or (a), provided within the range 0.36 to 0.52 inclusive, excluding 0.5 Ignore incorrect place value FT from M1 CAO Do not accept 3.4×10^3 for 3.40×10^3 B2 for either answer correct, OR B1 for 3.397×10^3 or 3.4×10^3 and 3.394×10^3 , or 3400 and
spelling, punctuation and grammar in their answer 8(a) The last reading (0.44) E.G. "more potatoes" checked (b) Use of 0.4 or sight of 40 40×0.15 or equivalent (£) 6 or 600(p) (c) 0.44 $\times 900 \times (0.0)2$ 792(p) or (£)7.92 $9 \times 4.5(0)$ (£)40.5(0) (£)32.58 or 3258(p) $9(a) 3.40 \times 10^3$ and 3.39×10^3	12 M1 A1 B1 M1 A1 B1 M1 A1 M1 A1 B1 11 B3	grammar. Not from an incorrect calculation Ignore incorrect place value Accept 600 without units but not with incorrect unit CAO. Not from an incorrect method FT 'their 0.44' or (a), provided within the range 0.36 to 0.52 inclusive, excluding 0.5 Ignore incorrect place value FT from M1 CAO Do not accept 3.4×10^3 for 3.40×10^3 B2 for either answer correct, OR B1 for 3.397×10^3 or 3.4×10^3 and 3.394×10^3 , or 3400 and 3390
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spelling, punctuation and grammar in their answer 8(a) The last reading (0.44) E.G. "more potatoes" checked (b) Use of 0.4 or sight of 40 40 × 0.15 or equivalent (£) 6 or 600(p) (c) 0.44 $\times 900 \times (0.0)2$ $9 \times 4.5(0)$ (£)40.5(0) (£)32.58 or 3258(p) 9(a) 3.40×10^3 and 3.39×10^3 (b) $4.87 \times 10^{24} \div 3.30 \times 10^{23}$ = 14.7575	12 M1 A1 B1 M1 A1 B1 M1 A1 B1 11 B3 M1 A1	grammar.Not from an incorrect calculationIgnore incorrect place valueAccept 600 without units but not with incorrect unitCAO. Not from an incorrect methodFT 'their 0.44' or (a), provided within the range 0.36 to 0.52inclusive, excluding 0.5Ignore incorrect place valueFT from M1CAODo not accept 3.4×10^3 for 3.40×10^3 B2 for either answer correct, ORB1 for 3.397×10^3 or 3.4×10^3 and 3.394×10^3 , or 3400 and 3390MR-1 if data used from the other website, which leads to 15from 14.8484
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spelling, punctuation and grammar in their answer 8(a) The last reading (0.44) E.G. "more potatoes" checked (b) Use of 0.4 or sight of 40 40 × 0.15 or equivalent (£) 6 or 600(p) (c) 0.44 × 900 × (0.0)2 792(p) or (£)7.92 9 × 4.5(0) (£)40.5(0) (£)32.58 or 3258(p) 9(a) 3.40×10^3 and 3.39×10^3 (b) $4.87 \times 10^{24} \div 3.30 \times 10^{23}$ = 14.7575 15 (c)(i) Explanation, e.g. 'First table 3 sig. figs. and 2 nd table 2 sig figs', or (ii) $6.42 \times 10^{23} - 6.4 \times 10^{23}$ = 2(.0) × 10 ²¹	12 M1 A1 B1 M1 A1 B1 M1 A1 B1 11 B3 M1 A1 A1 E2 M1 A1	grammar.Not from an incorrect calculationIgnore incorrect place valueAccept 600 without units but not with incorrect unitCAO. Not from an incorrect methodFT 'their 0.44' or (a), provided within the range 0.36 to 0.52inclusive, excluding 0.5Ignore incorrect place valueFT from M1CAOCAODo not accept 3.4×10^3 for 3.40×10^3 B2 for either answer correct, ORB1 for 3.397×10^3 or 3.4×10^3 and 3.394×10^3 , or 3400 and 3390MR-1 if data used from the other website, which leads to 15from 14.8484E1 for mention of significant figures but no accuracy stated, e.g. 'one is more accurate than the other' Do not accept reference to decimal places, e.g. 2 or 3 d.p.Allow M1 for an answer of 0.02×10^{23} or equivalent
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$10(a) 2^{-3}$	B1	
(b) $2^{0.12}$	B1	Accept $2^{12/100}$ or equivalent
(c) 2^9	B2	B1 for sight of $8^{12/4}$ or $8^{1/4 \times 12}$ or 8^3 or $(2^3)^3$ or $(2^3)^{1/4 \times 12}$ or
		equivalent
		If a candidate writes only the index, penalise -1 once only on
		the first occasion
	4	
11. Idea to find 4 areas of strip width $\frac{1}{2}$ hour	B1	
r i i i i i i i i i i i i i i i i i i i		
2 + 4.75 + 5 + 4	M2	M1 for any 2 of the 4 areas correct, or '2 of their areas'
		correctly evaluated from an incorrect interpretation of the scale
		or of the $\frac{1}{2}$ strip requirement, e.g. use of 4 or 30 for the
		horizontal
15 75	Δ1	Other A marks are included by sight of 15.75
15.75	711	Only award $\Delta 1$ for correct calculation based on 4 strips to 14:00
km	II1	Independent mark
KIII	01	Accept other units from appropriate calculations
	5	Accept other units from appropriate calculations
12(a) Entries in frequency table: 32 and 28	BJ	B1 for each correct entry
Histogram: 12 to 16 fd 10 20 to 20 fd 2	D2 D2	D1 for each correct bar
(h) 9 (light hulls)	D2 D1	BI for each confect bai
(b) 8 (light builds) (c) Identifying that the property is in the property $2.8 \text{ and } <12$	DI M1	Marka share an the bisterness ET from their 22 antes
(c) Identifying that the answer is in the range >8 and ≤ 12	IVI I	maybe shown on the histogram. F1 from their 52 entry,
$\mathbf{D} = \{1, \dots, n\}$	3.41	provided it is >8
Realise need 8 of the $32(8 \le 12)$	IVI I	Maybe snown on the histogram. F1 from their 32 entry,
or 1/4 of the entry for $8 < t \le 12$		provided it is >8
(x -) 0 or 0 hundred hours or equivalent	A 1	CAO
(y =) 9 or 9 hundred hours of equivalent	AI	CAU
	8	
13(a) Suitable strategy to find b. e.g. attempt to sketch or by	S1	Accept substitution with use of at least one of the values given
some substitution	51	but with incorrect interpretation
Fither $0 = -5^2 + bx 5$ or $625 = -25^2 + bx 25$	M1	Accept interpretation of $-x^2$ as $(-x)^2$ for M1 only
h = 5	A1	
$y = -x^2 + 5y$	Δ1	FT their b provided M1 awarded
(b) Method to find c e g $0 = -6^2 + c \times 6$	M1	
c=6		
Use $y = -y^2 + 6y$ when $y = 3$		
(Max height found) y = 9 (metree)		
Correct sketch with the $3(m \operatorname{across} to may ht)$ and $0(m \operatorname{baisht})$	Al	Do not award previous 4 marks for a correct sketch based on
Context sketch with the 5(in across to max in.) and 9(in height)	BI	spurious or incorrect working
		spurious of mediteet working.
	9	

UNIT 2 (FOUNDATION TIER)

Applications Unit 2	Foundation June	2013		Final
1.(a)(i)			-	
Goods	Quantity	Cost		
Croissants	15	£1.50		
Cheese	1	£6.92	BI D1	
Pain au chocolat	10	£3.2(0)	DI	CAU
Coffee	4	£6.08		
Bread	10	£9.90		
Jam	5	£6.20	B1	CAO
	TOTAL COST	£33.8(0)	B1	FT. Award B4 for only an answer of £33.8(0)
			-	
(ii) $15/100 \times$ 'their 3.	3.8(0)'		M1	FT from (a)
(£)5.07 ISW			Al	An unsupported answer of £28.73 gets SC1 FT from (a) for SC1
(b)(i) 5 ÷ 0.62 (8.064	5)		M1	Or equivalent.
Buys 8 pain au choco	olate		A1	
(ii) Change = 4(penc	e)		B1	Or equivalent. FT $\pounds 5 - 4$ their $8^{\circ} \times 0.62$ B0 for $\pounds 4$ or 0.04p. Accept $\pounds 0.04p$ Watch for misread of 32p instead of 62p in (c) $(5 \div 0.32 = 15(.625) \text{ can buy 15. There will be}$ 20 pence change)
(c) Labels of drinks Uniform scale startin	g from zero and la	belled or key	B1 B1	May use bar chart or pictogram
All correct heights ar	nd widths		B2	Award B1 for 3 or 4 correct OR B1 for correct heights with inconsistent widths. FT if no scale on vertical axis but a uniform scale has been
				applied.
(d) (1 box <) 65/7			MI	Award M1 for $(\pounds)9.28(57)$ or $(\pounds)9.29$ or $(\pounds)9.20$
(£)9			A1 15	
2.				
Item	Quantity	X or ✓	B4	Award B4 for all 8 correct responses
Orange juice	2 litres	(🔨)		Award B3 for 6 or 7 correct responses
Mushrooms	50 kilograms	X		Award B1 for 4 correct responses
A bag of sugar	1 kilogram	✓		Trivita DT for Teorie trisponses
Tomato sauce	350 litres	X		
Potatoes	5 grams	(X)		
Large chocolate bar	100 grams	√ /		
Bottle of vinegar	250 millilitres			
Butter	500 grams			
Mill	A litraa			
	4 nues			
Washing-up liquid	500 litres	X	4	

2		I ask at aglandan for in diagtion throughout the
5.		Look at calendar for indication inroughout the
		question
Identifying/sight of when Chloe can(/cannot) go	B1	e.g. Sept, Oct, Nov, Dec crossed out
Identifying/sight of when Gethin can go	B1	Look for focus on Sundays
Identifying (sight of when Martyn can((cannot) go	B1	(26 th Ian) 23 rd Feb 23 rd & 30 th March 27 th
identifying / sight of when Martyn can(/cannot) go	DI	$\Delta pril 25^{th} M_{ev} 22^{nd} e^{20^{th}} Jupe 27^{th} July 24^{th}$
		April, 25 May, 22 ≈ 29 June, 27 July, 24
		& 31" Aug, 28" Sept, 26" Oct, (23" Nov & 28"
		Dec)
Identifying common dates – 23 rd Feb, 23 rd & 30 th	B1	Sight of common dates triggers 1 st 4 marks
March, 22 nd & 29 th June		
Latest date -29^{th} June	B1	Award full marks for an unsupported correct
Eurost dute – 25 Julie	DI	answar
	-	answei
	5	
4. (Perimeter=) $12 + 9 + 12 + 9$	M1	
=42 (m)	A1	
Number of panels $(42 \div 3 =) 14$	B1	FT their perimeter
Cost $14 \times (f)21.98$	M1	FT their number of panels
$(f)_{207,72}$	A 1	1 1 then number of parens
(L)507.72	AI	
		Alternative method: dividing by 3 to get no.of
		panels on I side BI
		4 + 3 + 4 + 3 M1
		(Number of panels =)14 A1
		Cost $14 \times (\pounds) 21.98$ M1
		(f)30772 A1
		Award SC3 for unsupported answer of (f) 152 96
	F	Awara SCS for unsupported answer of (1)155.80
	3	
5. $A = 14$	BI	
B = 15	B1	
2C = 12	M1	
C = 6	A1	
	4	

6. (a) (Cost of Adults=) 2 × 498	M1	Penalise any consistent misreads of dates and
(£)996	A1	number of children -1 each
(Cost of children=) 2×219	M1	
$(\pounds)438$	AI M1	
Sea view $4\times4\times7$ of All inclusive $4\times23\times7$ (f)112		
(£)112 (£)700		
(Total cost=)(f)2246	B1	
(1000 0000) (2)2210	21	FT provided at least 2 M1 marks awarded
		An answer of £1550 gets M1 A1 M1 A1 M0 A0 B1
Look for	Q	QWC2 Presents relevant material in a coherent and
• spelling	Ŵ	logical manner, using acceptable mathematical
• clarity of labels	С	form, and with few if any errors in spelling,
• the use of notation (watch for the use '=' "£"	2	punctuation and grammar.
being appropriate)		
		QWC1 Presents relevant material in a coherent and
QWC2: 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		OK
 make few if any mistakes in mathematical form, 		using acceptable mathematical form, with faw if
spelling, punctuation and grammar in their		any errors in spelling, punctuation and grammar
answer		any crois in spennig, punctuation and grammar.
OWC1. Candidates will be avaasted to		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 final		
answer		
		Use the correct overlay and allow +2°. Correct
(b) 3 or 4 angles correct and correctly labelled.	B4	labels (Words NOT the frequency OR angle)
	OR	insens (words not interrequency on angle)
3 or 4 angles correct, labels not fully correct.	(B3)	3 correct labels are enough
2 angles correct and correctly labelled.	(B2)	
2 angles correct, labels not fully correct.	(B1)	
1 angle correct and correctly labelled.	(B1)	If only B1 is scored for the diagram and all the
		angles given correctly, then cancel the B1 and
UK If 0 OD 1 for their diagram or no diagram		award M1. A1 for 2 marks.
<u>II O OK 1 for their diagram of no diagram.</u>		
		If B0 scored for the diagram, check the angles and
		the method to see if the M1 and the A1 can be
		awarded.
		(1 is) 1.5° gets the M1
360/240	(M1)	OR SC1 for all the correct percentages
		25.8%, 22.5%, 16.7%, 35%.
Angles are 93, 81, 60, 126.	(A1)	Arrowd D1 for $02(29225)$
	DO	Awaiu B1 IOF 93.(38233).
(c) 93.4(%)	Б2 14	
	16	

7. Volume of bar $20 \times 8 \times 4.5$	M1	
$= 720 \text{ (cm}^{3})$	A1	
Volume of cube 2 ³	M1	
$= 8 (cm^2)$	AI	ET their has and auto provided MO amended
-90	A1	FT then bar and cube provided Wi2 awarded
- 70		Alternative method
		Attempt to divide all dimensions by 2 M2
		10 & 4 A1
		2.25 Al
	6	$10 \times 4 \times 2.25$ M1 F1 if M2 awarded
8 Howard (f)10	0 B1	90 A1
Betty $2/5 \times 10$ OR Charlie $2/5 \times 6$	M1	
$(\pounds) 4$ $(\pounds) 2.4(0)$	A2	A1 for each correct answer
	4	
9. (a) Reason e.g. 'fair comparison', 'doing survey the	B1	
same way'	D 1	
(i) Rilly with a reason e.g. 'Billy because no	BI B1	
correlation'. 'Billy because leaves are different'. 'Billy	DI	
as no connection between length and width'		
(iii) Reasonable straight line of best fit	B1	With some points above and some points below
		following the trend
		Ignore a 'tail' at the lower part of the line
(iv) Width in the range 6.6 to 7.5 cm	B 1	OP correct reading from their line of best fit
(iv) width in the range 0.0 to 7.5 cm	5	OK correct reading from their fine of best fit
10. (a) All three stages of the appropriate calculation	M3	M2 for sight of $560 \times 4.55 \div 37.8$, OR
$560 \times (4.55 \div 37.8) \times 1.48$		M1 for sight of 560 ÷ 37.8, 4.55 ÷ 37.8,
		37.8÷4.55, or 4.55× 1.48
		Note:
		$560 \div 37.8$ (= 14.814814 gallons)
		$\times 4.55$ (= 67.407 litres)
		<i>Use of 14.8 gives 07.34, use of 15 gives 08.25</i>
(£)99.76	A2	Depends on M3
		A1 for (£)99.7629 or 99.6632 or 101.01 or
		other amount from premature approximation
(b)(i) 560 / 10.75 or 560 / 10.34		
52(.093 mph)	M2	M1 for 560/10.45 or 560/675 or 560/645
(ii) C selected or implied with a reason, e.g.	F1	Only FT provided their answer in 70>(h)(i)>50
'C because 52mph average means travels fast'	21	
	9	
11.		
	ЪЭ	For correct first 2 solumns
Design n r Satisfies the criterio?	62	OR B1 for any 4 correct entries in the first 2
Yes or No		columns
Rings 3 3 Yes	B1	For correct final column, FT appropriate
Petals 4 4 Yes		decision for their lines and rotational responses
Legs 0 3 No	-	written in the table
	3	
12.(a)	B3	B2 for 4 or 5 correct entries
Median Kange Mode		D1 IOF 2 OF 5 COFFECT ENTRIES
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		
(b) Statement, e.g 'not typical'. 'the town centre shops	E1	
are actually in need of more help rather than the internet		
businesses' 'mode for businesses is actually only twice'		
	4	

UNIT 2 (HIGHER TIER)

Applications Unit 2 Summer 2013 Higher Tier GCSE		Final
1(a)		Penalise once only for consistent incorrect cell
(D3 =) C3 – B3	B2	<i>number</i> B1 for 3C – 3B or 1108.8(0) – 660 B0 for B3 – C3
(F3=) D3 * E3 OR (F3=) D3 × E3 or equivalent	B1	Accept $(C3 - B3) * E3$ or $(C3 - B3) \times E3$ Do not accept numerical solutions Ignore inclusion of £ sign
(b) (i) D2 219 F2 1095 D3 448.8(0) F3 3590.4(0)	B1	
$F4 \ 5000$ (ii) (G5 =) F2 + F3 + F4 OR (G5 =) SUM(F2:F4)	B1	Accept if formula continued for addition of further F cells
3	5	
Design <i>n r</i> Satisfies the criteria?	B2	For correct first 2 columns OR B1 for any 4 correct entries in the first 2
Yes or No Rings 3 Petals 4 4 Yes	B1	columns For correct final column, FT appropriate decision for their lines and rotational responses written in
Legs 0 3 No	2	the table
2 Howard (C)10	5 D1	
Betty $2/5 \times 10$ OR Charlie $2/5 \times 6$	M1	
$(\pounds) 4$ $(\pounds) 2.4(0)$	A2	A1 for each correct answer
	4	
4. (a) Reason e.g. 'fair comparison', 'doing survey the	B1	
same way' (b) (i) Name: Shaun I angth in range 10.3 to 10.5(cm)	R1	
(ii) Billy with a reason, e.g. 'Billy because no	B1	
correlation', 'Billy because leaves are different', 'Billy		
as no connection between length and width'	R1	With some points above and some points below
(iii) reasonable straight line of best fit	DI	following the trend Ignore a 'tail' at the lower part of the line
(iv) Width in the range 6.6 to 7.5 cm	B1	OR correct reading from their line of best fit
	5	

5(a) All three stages of the appropriate calculation $560 \times (4.55 \pm 37.8) \times 1.48$	M3	M2 for sight of $560 \times 4.55 \div 37.8$, OR M1 for sight of $560 \div 37.8 + 4.55 \div 37.8$
		37.8÷4.55, or 4.55×1.48
		Note:
		$560 \div 37.8$ (= 14.814814 gallons)
		× 4.55 (= 6/.40/ litres) Use of 14.8 gives 67.34, use of 15 gives 68.25
(£)99.76	Δ2	Depend s on M3
	112	A1 for (£)99.7629 or 99.6632 or 101.01 or other amount from premature approximation
Look for		
 spelling clarity 	QWC	QWC2 Presents relevant material in a coherent and logical manner, using acceptable
• the use of notation (watch for the use of '=', £, being appropriate)	2	mathematical form, and with few if any errors in spelling, punctuation and grammar.
QWC2: Candidates will be expected to		QWC1 Presents relevant material in a coherent
 present work clearly, with words explaining process or steps 		and logical manner but with some errors in use of mathematical form spelling punctuation or
AND		grammar
• make few if any mistakes in mathematical form spelling punctuation and grammar and		OR evident weaknesses in organisation of material
include units in their final answer		but using acceptable mathematical form, with
• OWC1: Candidates will be expected to		few if any errors in spelling, punctuation and grammar.
present work clearly, with words explaining		
process or steps OR		QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form,
• make few if any mistakes in mathematical		spelling, punctuation or grammar.
form, spelling, punctuation and grammar and include units in their final answer		
(b)(i) 560 / 10 75 or 560 / 10 $\frac{34}{4}$	M2	M1 for 560/10.45 or 560/675 or 560/645
52(.093 mph)	A1 E1	CAO Only ΣT may ideal their answer in 70 (h)(i)>50
(ii) C selected or implied with a reason, e.g. 'C because 52mph average means travels fast'	LI	Only F1 provided then answer in $70 \ge (0)(1) \ge 50$
6(2) 0.5 × 6 × 8 × 120	11 M2	M1 for $0.5 \times 6 \times 8 \times 1.3(0)$ or
	1112	for $\frac{1}{2} \times 6 \times 8 \times$ 'digits 13 with incorrect place
		value'
3120 (cm ³)	A1	CAO
(b) Greater (by) 120 (cm ³)	B1	FT difference between 'their 3120' and 3000
		greater or less
7(a)	4 P2	P2 for 4 or 5 correct entries
Median Range Mode	60	B1 for 2 or 3 correct entries
Internet 4 39 2 Town 16 20 14		
(b) Statement, e.g 'not typical', 'the town centre shops	E1	
are actually in need of more help rather than the internet		
businesses, mode for businesses is actually only twice	4	

8(a) Method to calculate costs, e.g. 14 portions is $2(.)19 + 14 \times (0.)12$ or equivalent calculation in pence	M1	OR for 1 portion, $2.19 \div 14 + 0.12$ (£0.2764) or equivalent calculation in pence. Units must be consistent
(Cost of making 14 portions) (£)3.87	A1	Allow B1 (instead of M1, A1) for costs (£)3.27 (considering $9 \times 0.12 + 2.19$)
(Sales from 9 bowls of soup =) 9×2.95 (= £26.55)	M1	Do not accept for $(2.95 \pm) \times 9$ unless used
(Profit) (£)22.68	B1	CAO
(% profit =) 22.68×100 'their costs'	M1	FT provided M1 awarded and profit is (£)22.68
586(.046%)	A1	CAO
(b) $(x - 1) \times 1.6 + 13.4 = 35.8$ OR $x = \frac{35.8 - 13.4}{1.6} + 1$	M2	M1 for $1.6 \times x + 13.4 = 35.8$, or x = (35.8 - 13.4)/1.6, OR M1 for equation would be correct apart from missing brackets, OR M1 for correct equation expressed in words
15 (cartons)	A1	Accept missing brackets if implied by a correct response If no marks allow SC1 for 15 (cartons)
(c) $2c + 4.5s = 3(.)69$ and $5c + 7.5s = 6(.)90$	B2	Accept 'carrots' and 'swede' written in full within an equation B1 for either equation, or inconsistent place value for money
Method to solve, e.g. equal coefficients	M1	FT provided at least 1 equation is correct and equivalent level of difficulty Allow 1 slip in non equated variable
Correct first value	A1	
Correct second value	MI A1	F1 from their first value Carrots 45(p) per kg, Swede 62(p) per kg Accept 0.45 and 0.62.
		If units are given they need to be correct for AI
	15	Do not accept unsupported answers or use of trial & improvement methods. No marks
 9. Any 2 correct separate reason based on risk: Reason: Females (pay less) longer life expectation Reason: 'Smokers life expectation shorter than non smokers (of same age)' Reason: 'Premiums increase with age as risk increases' Reason: 'Older people pay more as shorter time to make payments' 	E2	E1 for one correct reason Do not accept a statement without giving reason, Do not accept e.g. 'premiums increase with age', or 'smokers pay more' within statement of why.
10(a) Idea to divide by 2 or a power of 2 2 $3 \times 10^{30} / 2^5$ or equivalent	M1 m1	Dividing their 2.3 $\times 10^{30}$ by 2 ⁵ or equivalent
7.2 ×10 ²⁸ (b) $r = 0.75^t \times x$	A2 B3	A1 for 7.1875 $\times 10^{28}$ B2 for correct expression 0.75 ^t $\times x$ B1 for 0.75x, x -1/4 x, 0.75 ² x, SC2 for r= 0.25 ^t $\times x$ or SC1 for 0.25 ^t $\times x$ or equivalent
	7	cymraicht

11. Idea of ratio or length scale factor, e.g. sight of 0.8 or 1.25	M1	
Area scale factor used correctly $\div 0.8^2$ or $\times 1.25^2$ or equivalent	M1	Evidence of this implies also the first M1 FT their linear scale factor squared used correctly for all further marks
1 cartridge to make 38281(.25) smaller bubbles 15 000 000 ÷ 38281(.25)	A1 M1	FT 'their 38281.25'number of smaller bubbles provided both M1 awarded
391.8 or 392 cartridges needed Cost (£)9800	A1 A1	CAO. FT for the cost of a whole number of cartridges rounded up. (Note 9795.92 is A0)
	6	Allow M1 and SC1 for linear calculation with answer (£)12 250
12(a) 3.24 × 0.8 OR 3.24 × 0.60 2.59(%) AND 1.94(%)	M1 A3	Or other complete method A2 for 2.59(2) AND 1.94(4) A1 for either 2.59(2) OR 1.94(4) If no marks SC1 for sight of digits 2592 and 1944 (incorrect place value), OR for 0.65 and 1.3(0)
(b)(i) Oak AND a reason showing understand of AER	E1	Reason must say about comparing annually Accept 'Oak, because they give more interest (annually)'
(ii) Oak (Total amount after 2 years $= \pounds$)25000 × 1.023 ⁴	M2	Or for alternative complete method compounding 4 times, or M1 for 2.3% \times 25000 (= £575)
(Total amount £)27380.57(37) OR (Interest £)2380.57(3696)	A1	Do not accept other rounding or truncation
Sycamore (Total amount after 2 years $= \pounds$)25000 × 1.046 ²	M1	Or alternative complete method
(Total amount £)27352.9(0) OR (Interest £)2352.9(0)	A1	Do not accept other rounding or truncation
(Difference in interest is £) 27.67	B1	FT provided M mark(s) for Oak or Sycamore awarded, with all this answer to nearest penny
13. Density = 21.4×10.13	M1	
$\begin{array}{l} 19.3 \\ = 11.2(322 \text{troy ounces/cubic inch}) \end{array}$	A1 2	
14(a) R + P < 45	B1	If no marks, SC1 for R+P45 and
40R + 65P > 1560	B1	40R +65P1560, with the gaps here both being inequalities
(b) Line $R + P = 45$ shown	B1	FT their inequalities if possible from a slip
Line $40R + 65P=1560$ shown Region between the lines indicated	В1 В1	Accept FT from either line correct but for a similar region
(c) Using their graph to show Iwan's statement outside the region with 'No' in the table AND shown on the graph Using their graph to show Sid's statement inside the	B1	MUST be a FT from their graph in (c) provided at least 1 line is correct. Do not accept numerical explanations. Accept unambiguous unlabelled plots provided the table is completed correctly
region with 'Yes' in the table AND shown on the graph	B1 7	

15. Sight of 3.45, 3.55, 4.75 and 4.85	B1	
$\tan x = 3.55/4.75$ and $\tan x = 3.45/4.85$	M1	FT their least and greatest provided > < or > then
		values given in the question for M1 only
Greatest $x = 36.77(3^{\circ})$ or $36.8(^{\circ})$ or $37(^{\circ})$	A1	From correct working
Least $x = 35.4(25^{\circ})$ or $35.43(^{\circ})$ or $35(^{\circ})$	A1	From correct working
	4	
16. Volume hemisphere = $\frac{1}{2} \times \frac{4}{3} \times \pi \times 0.9^3$	M1	
$= 1.5(268 \text{ cm}^3)$	A1	Accept rounded or truncated 1.53 or 1.52
Volume cylinder = $8.6 - $ volume hemisphere correctly	B1	FT their volume hemisphere
evaluated (7.1 cm^3)		
$7.1 = \pi \times 0.9^2 \times h$	M1	
$h = 7.1 / (\pi \times 0.9^2)$	M1	
Answers in the range 2.77 to 2.8 (cm)	A1	CAO
Overall height = 3.7 (cm)	B1	CAO
Rod length = $3.7/\sin 68^\circ$	M2	FT provided all M marks awarded
		FT their 3.7 provided >0.9
		M1 for $sin68^\circ = 3.7/rod$
Answers in the range 3.96 to 4 (cm)	A1	CAO
	10	

GCSE APPLICATIONS OF MATHEMATICS MS SUMMER 2013



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