

GCSE MARKING SCHEME

MATHEMATICS - UNITISED

JANUARY 2014

INTRODUCTION

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

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

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

	Page
Unit 1 - Foundation Tier	1
Unit 1 - Higher Tier	4
Unit 2 - Foundation Tier	8
Unit 2 - Higher Tier	13
Unit 3 - Foundation Tier	16
Unit 3 - Higher Tier	19

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UNIT 1 - FOUNDATION TIER

	UNIT 1		Maula	FINAL MARK SCHEME
	Foundation Ti	er	магк	Comments
1.(a)	(2 tins of salmon)	(£5.38)		
	(3kg of potatoes)	(£)3.45	B1	
	(3 boxes of matches)	(£)0.96	B1	Accept 96 unless total amount implies £96.
				Do not accept 0.96p unless total amount implies £0.96
	(¹ / ₂ kg of sausages)	$(\pounds)2.8(0)$	B1	
	TOTAL	(£)12.59	B1	F.T. their amounts. B0 if any 'cost space' left blank.
(b)	$(\pounds)20(.00) - (\pounds)12.59$		M1	F.T. $\pounds 20$ – 'their total'. M0 if their total $\ge \pounds 20$.
	$\mathbf{t} = \mathbf{t}$	2)7.41	A1	An unsupported answer of (£)8.41 implies M1A0.
			6	
2.(a)	Showing '20 to 24' AND	'25 (to 29)'	B1	
	Showing a tally method us	sed.	B1	These need not be correct number of tallies.
	Showing (6) 8 5 13		B2	FT their intervals, provided not overlapping. For the 8, 5 and 13. B1 for one or two of them correct.
(b)	Uniform scale for the frequent Four bars at correct height	ncy axis starting at 0.	B1 B2 7	B0 for ambiguous placement of scale numbers. B1 for three correct heights. F.T. their numbers in (a). If no scale shown, assume intervals of 1 from 0 to 15. Penalise uneven bar widths -1 .
3.	Karim Bob Elin Alic	e Dewi	B1	For a correct order. Strictly F.T. their scores.
				There must be at least two different negative scores.
	-8 -6 -4 (+)5	(+)7	B3	For all five correct scores.
				B2 for three or four correct scores.
				B1 for two correct scores.
L			4	
4.	(Total distance travelled) 57	I (miles)	B1	May be implied by sight of $2595(.7)$ or 2596
	Compation (571	1 516) (62	M	$\begin{bmatrix} (1.6. 5/1 \times 4.546) \\ ET & \text{their } 571^2 \text{ if hotseen } 200 \text{ and } 950 \text{ inclusion } OD \\ \end{bmatrix}$
	Correct substitution $(5/1 \times$	4.340) / 62	MII	F.1. their 5/1 if between 300 and 850 inclusive OR an
	40 (4.2	attempt at a sum of distances seen. A 1 for $41.8(67)$
	42 (f	n.p.g.)	AZ	A1 10F 41·0(0/)
1			4	1

UNIT 1 Foundation Tier	Mark	FINAL MARK SCHEME
5.(a) (Blue =) $6(m^2)$ (Orange =) $1(m^2)$	B2 B2	If no marks gained, allow a B1 for use of Area = length × width. Allow 2×1 or $2 \times (1+1+1)$ or $(2+2+2) \times 1$. OR 0.25×1 or $0.25 \times (1+1+1+1)$ or $(0.25+0.25+0.25+0.25) \times 1$ to illustrate understanding. Also allow B1 for (Blue =) $2 \times 3 \times 3$ (=18) or (Orange =) $0.25 \times 4 \times 4$ (=4). Clear use of perimeter instead of area is B0.
 Look for spelling clarity of text explanations, the use of correct units. For QWC2 blue and orange areas must be clearly identified AND the correct units must be given for the areas. QWC2: Candidates will be expected to present work clearly, with words explaining process or steps AND make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer QWC1: Candidates will be expected to present work clearly, with words explaining process or steps OR make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer 	QWC 2	 QWC2. Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. QWC1. Presents relevant material in a coherent and logical manner, but with some errors in use of mathematical form, spelling, punctuation or grammar. OR Evident weakness in organisation of material but using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. QWC0. Evident weakness in organisation of material and errors in use of mathematical form, spelling, punctuation and grammar.
(b) $6/3 \times 2.50$ (£)5	M1 A1	FT 'their blue area' /3, rounded to the nearest whole number above, and then multiplied by 2.5
	8	
6.(a) 90(litres) (b) A correct method shown 80(litres)	B1 M1 A1 3	e.g attempt to read graph at 64 yellow and \times 10. OR attempt to read graph at 80 yellow and \times 8.
7. C B A D	B1 B1 B1 B1 4	
8. (Aled) $12 \times 14 + 8$ (Thomas) $85 \times 2 \cdot 2$ = 187(lbs) Thomas by 11lbs	M1 A1 M1 A1 A1	M1A0 for 176kg. M1A0 for 187kg. F.T. only if 160lbs \leq Aled's weight \leq 190lbs . Name and correct units must be given. <u>Alternative methods:</u> $12 \times 14 + 8$ $85 \times 2 \cdot 2$ M1 = 176(lbs) $= 187(lbs)$ A1 $176/2 \cdot 2$ $187/14$ M1 $= 80(kg)$ $13 \cdot 35(7)(st)$ A1 Thomas by 5kg Thomas by $0 \cdot 78()st$ A1(FT) (accept $0 \cdot 8 st$) ISW (allow 10.9lb to 11.2lb inc.)

UNIT 1	Mark	FINAL MARK SCHEME
Foundation Tier		Comments
9.(a) Mode value given as (£)1.	B1	For each B mark, do not award if an incorrect reason is clearly shown. Must be unambiguously shown as the mode value.
Median value given as $(\pounds)2$.	B1	Must be unambiguously shown as the median value.
(Mean =) $15 \times (\pounds)1 + 10 \times (\pounds)2 + 5 \times (\pounds)5 + 2 \times (\pounds)10$	M1	M1 for a clear attempt at finding Σfx .
$ \frac{32}{(\pounds)2.5(0)} $	ml A1	C.A.O.
(b) $32 \times (\pounds)3 - 32 \times (\pounds)2.5(0)$ or equivalent. = $\pounds 16$ AND 'Profit'	M1 A1	F.T. 'their mean'.
		Also M1 for $32 \times (\pounds)3 - `their \Sigmafx' OR$ $15 \times (\pounds)2 + 10 \times (\pounds)1 - 5 \times (\pounds)2 - 2 \times (\pounds)7$ $(= (\pounds)30 + 10 - 10 - 14 = (\pounds)16)$ SC1 for sight of 96 and 80.
	7	<u> </u>
10. (a)		Alternative method
$720 - \frac{1}{4} \times 720 - \frac{2}{5} \times 720$	MI D1	$1 - \frac{1}{4} - \frac{2}{5}$ or equivalent M1
Signt of $(t)180$ Sight of $(f)288$	B1 B1	= 7/20 or equivalent AI $7/20 \times 720$ or equivalent M1
Sight of (2)200	DI	$= (\pounds)252$
(Amount left) (£)252	A1	For A1, F.T. (£)720 – 'their (£)180' – 'their (£)288' provided at least one B1 gained. Two amounts must be subtracted from (£)720.
(b) $252 / 720 \times 100 = 35(\%)$	M1 A1	F.T. 'their £252'
	6	$\frac{\text{Alternative method}}{100(\%) - 25(\%) - 40(\%)} \qquad M1 \\ = 35(\%) \qquad A1$
11.(a) A valid explanation that shows an understanding that the 35 was not included in the divisor.	E1	Do not accept 'he pressed the wrong buttons'. Allow e.g. 'He forgot the brackets'. Also allow a correct explanation (an explanation, not just a calculation) of what Asif should have done.
(b) 70·3	B2 3	B1 for 70·2(8846)
12.Least ValueGreatest Value		
0050 10050		BI for each correct entry.
9950 10050	B4	Accept 10049.9 recurring but not 10049.9.
72.5 73.5	DI	Accept 73.49 recurring but not 73.49. Allow 72min. 30(sec). and 73min 30(sec).
10 0010	4	
13. 8240 247.2(0)	B1	For the evaluation of a correct 3% OR Sight of 1.03
8487.2(0)	DI	(494.4 implies 2×247.2 and gains B1).
<u>254.61(6)</u>	M1	For attempting to find 2 different 3%. OR 8240×1.03^2 .
8741.81(6) or 8741.82 OR 247.2(0) and 254.61(6)	A1	
(£)501.82	A1	 F.T. one error. Must be given correct to the nearest penny. (£)501.81 is B1M1A1A0. Treat depreciation as a mis-read.
	4	

UNIT 1 - HIGHER TIER

UNIT 1	Mark	FINAL MARK SCHEME
Higher Tier		Comments
1. (a) A valid explanation that shows an understanding	EI	Do not accept 'he pressed the wrong buttons'.
that the 55 was not included in the divisor.		Allow e.g. The folgot the blackets .
		iust a calculation) of what Asif should have done
		Just a calculation) of what rish should have done.
(b) 70·3	B2	B1 for 70.2(8846)
	3	
2.(a)		For each B mark, do not award if an incorrect reason is clearly shown.
Mode value given as (£)1.	B1	Must be unambiguously shown as the mode value.
Median value given as $(\pounds)2$.	B1	Must be unambiguously shown as the median value.
(Mean =) $15 \times (\pounds)1 + 10 \times (\pounds)2 + 5 \times (\pounds)5 + 2 \times (\pounds)10$	M1	M1 for a clear attempt at finding Σfx .
÷ 32	ml	
$=(\pounds)2.5(0)$	Al	C.A.O.
(b) $32 \times (f) = 32 \times (f) = 5(0)$ or equivalent	M1	F.T. 'their mean'.
$= \pounds 16 \text{ AND 'Profit'}$	A1	
		Also M1 for $32 \times (\pounds)3$ – 'their Σfx ' OR
		$15 \times (\pounds)2 + 10 \times (\pounds)1 - 5 \times (\pounds)2 - 2 \times (\pounds)7$
		$(=(\pounds)30 + 10 - 10 - 14 = (\pounds)16)$
	7	SC1 for sight of 96 and 80.
3 (Milk required 1 st week) $7 \times \frac{3}{2}$	/ M1	
5. (White required 1 week) $7 \times 7_5 = 4^{1}/\epsilon$ OR $^{21}/\epsilon$	A1	
(Needs to buy) 5 (cartons)	B1	F.T. only if there is a requirement to round up.
(Milk required 2^{nd} week) He has $4/5$ of a litre left over.	B1	Sight of 4/5 gains B1. F.T. 'their 5 cartons'.
(Requires an extra) $4^{1}/_{5} - 4^{4}/_{5}$ (= $3^{2}/_{5}$)	M1	F.T. 'their $4^{1}/5'$ – 'their $4^{4}/5'$
(Needs to buy) 4 (cartons)	A1	and and a
		<u>Alternative method for 2^m week</u>
		Required for 14 days $14 \times 7_5$ M1
		So extra 4 cartons required for 2 nd week B1
		so exita reations required for 2 week B1
Look for	QWC	QWC2. Presents relevant material in a coherent and
• spelling	2	logical manner, using acceptable mathematical form,
• clarity of text explanations,		and with few if any errors in spelling, punctuation and
• the use of correct units.		grammar.
QWC2: Candidates will be expected to		OWC1 Presents relevant material in a scherent and
• present work clearly, with words explaining process		logical manner, but with some errors in use of
or steps		mathematical form, spelling, punctuation or grammar.
AND • make few if any mistakes in mathematical form		OR
spelling, punctuation and grammar and include units		Evident weakness in organisation of material but using
in their final answer		acceptable mathematical form, and with few if any
QWC1: Candidates will be expected to		errors in spelling, punctuation and grammar.
 present work clearly, with words explaining process or steps 		OWC0. Evident weakness in organisation of material
OR		and errors in use of mathematical form spalling
• make few if any mistakes in mathematical form,		punctuation and grammar
spelling, punctuation and grammar and include units		r
in their final answer		
	8	

UNIT 1 Higher Tier	Mark	FINAL MARK SCHEME Comments
4. 8240		
247 2(0)	B1	For the evaluation of a correct 3% OR Sight of 1.03
8487 2(0)	DI	$(494.4 \text{ implies } 2 \times 247.2 \text{ and gains B1})$
254.61(6)	M1	(4)4.4 implies $2 \wedge 247.2$ and gains B1).
	IVI I	For altempting to find 2 different 5%.
		$OR 8240 \times 1.03$.
8/41.81(6) or 8/41.82 OR 24/.2(0) and 254.61(6)	AI	
(£)501.82	AI	F.T. one error. Must be given correct to the nearest penny.
		(£)501.81 is B1M1A1A0.
		Treat depreciation as a mis-read.
	4	
5. (Area of square =) 400 (cm^2)	B1	Or consistent algebraic equivalent
(Area of circle =) $\pi \times 10^2$	M1	
100π OR 314 to 314.3 inclusive	A1	
(Percentage visible -) $400 - 100\pi \times 100$	M1	FT their two values for area
$\frac{400 - 100\pi}{400} \times 100$	1411	1.1. then two values for area.
+400 $-21(46.0)$	A 1	Accort answers between 21(%) and 22(%) inclusive
= 21(.40%)	AI	Accept answers between21(%) and 22(%) inclusive.
		Alternative consistent algebraic method
		e.g Use of side length = $2 \times radius$ B1
		(Area of square =) $4r^2$ BI
		(Area of circle =) πr^2 B1
		$(\% visible =) \frac{4r^2 - \pi r^2}{2} \times 100 \qquad M1$
		$4r^2$
		= 21(.46%) A1
	5	
6. $(\pounds)151.68 \equiv 120\%$	B1	Accept any indication.
(Original cost) 151.68×100 or equivalent	M1	
120		
$=(\pounds)126.4(0)$	A1	
	3	
7(a) (i) A comment that states or implies that we do not	B1	Accent e.g. 'they might have looked at different numbers'
know the number of teenagers and number of 75 year	DI	recept e.g. they might have looked at anterent numbers .
alds considered		
(ii) A common t that states an implies that me do not	D1	A second a second and and an an an the free second se
(ii) A comment that states of implies that we do not	DI	Accept e.g. there are no numbers on the frequency axis.
know the actual number of women nor the actual		
number of men		
(iii) A comment that states or implies that we do not	B1	Accept e.g. 'they might have been different in 2007'.
know the percentage pass rate between 2005 and 2010.		
(b) Evidence of looking at values in Year 6.	B1	This may be implied e.g. sight of '(£)400 difference' or
		'(£)1300 AND (£)1700'.
A statement that $(\pounds)400$ is 40% of $(\pounds)1000$.	B1	40% alone is B0. e.g. 'Its 40% in Year 6' gains B1B0.
	5	

UNIT 1	Mark	FINAL MARK SCHEME
Higher Tier		Comments
$\begin{array}{ccc} 8. & 36 \times \underline{70} \\ & 42 \end{array}$	M1	Or equivalent.
$\times \frac{10}{15}$	M1	Or equivalent (the 36 must have been used). M1 for correctly using two of the operators $(\times 70^2, -42^2)$
13		$\times 10^{\circ}$ and $\div 15^{\circ}$ with the 36
=40 (workers)	A1	C.A.O. Do not penalise pre-approximations as long as 40
		given as the final answer.
		Alternative presentation.
		<u>Area Time Workers</u>
		$\begin{array}{ccc} 42 & 10 & 36 \\ & & & & \\ & & & \\ & & & \\ & & & \\ & & & & \\ & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ & & & & \\ $
		Award M1 for correct step(s) to reach 15
		Inward Hill for correct step(s) to reach 15.
		70 15 <u>40</u> A1 C.A.O.
	3	
9. Correct substitution into formula.	MI m1	Do not penalise using $(\pounds)165.53$ at this stage.
$U = 16553/1.05 - 90 \times 31.48$ or equivalent	m1	The two 'm' marks may be awarded in either order
11.546		
(Units used =) 1120	A1	C.A.O. Accept answers of 1120 ± 1
	4	-
10. Sight of 7005 (metres)	B1	
Sight of 1523 (seconds) Sight of 1522 5 (seconds) or 25min 22 5sec	BI D1	ET their conversion to seconds, 1522, 5 implies 2 nd P1
Use of 'Distance' / 'Time'	M1	F1 their conversion to seconds. 1322.5 hippines 2 B1.
(Greatest av. Speed) 7005	M1	F.T. 'their greatest distance' / 'their least time' only if
1522.5		'greatest distance' >7000 AND 'least time' < their 1523.
$=4.6(009.~{\rm ms}^{-1})$	A1	Do not accept an answer unless the correct method has been
		shown. An answer of 4.6 found using values which are not
	6	their greatest distance and least time is MOA0.
11(a) (Angle subtended in the shaded sector =) $70(^{\circ})$	0 B1	May be implied by sight of 210°
Use of $70 \times \pi \times 8^2 \times 3$	M2	F.T. 'their 70°'.
360		M1 for $\underline{70} \times \pi \times 8^2$ A1 for 39(.09))
2		360
$= 117.28(6)(cm^2)$ or $112\pi/3$	A1	Allow answers between $117 \cdot 2$ to $117 \cdot 4$ inclusive.
		Do not penalise final answer of 11/(cm ⁻) if previous
		Note: Using 50° instead of 70° giving a final answer of
		83.7(7) is B0, M2(on follow through), A1.
		BUT if candidates then use $\pi \times 8^2 - 83.7(7) = 117.3$, then
		all marks awarded.
(b) Use of $70 \times 2 \times \pi \times 8$ OR sight of 9.77()	M1	F.T. 'their 70°'. (Note: Use of 50° gives 6.98)
360		····· ································
× 3	m1	
+48 - 77.2($A_{11} = 77$ (am) (Neter Here (500); (0.0.)
$= // \cdot 3(\text{ cm})$	AI	Allow // (cm) .(<u>Note:</u> Use of 50° gives 68.9) Mark their final answer
	8	

UNIT 1 Higher Tier	Mark	FINAL MARK SCHEME
Mark parts (a) and (b) together.		Take care that the length of the base of the pyramid(10cm) is not confused with the height of the cone (also10cm).If the height of the cone is found in part (a) then awardthe appropriate marks for this work in part (b).
12(a) Sight of $\frac{1}{3} \times \pi \times r^2 \times h_1$ AND $\frac{1}{3} \times (\text{area of base}) \times h_2$ A clear intention to use $h_1 = 2h_2$ in the above.	B1 B1	For B1 allow unconventional use of notation and symbols as long as accurate intent is clear (e.g. h_1 and h_2 may both be given as 'h' or 'height').
$\frac{1/3 \times \pi \times 4^2 \times 2h}{(\text{length})^2 = 32\pi} \frac{1/3 \times (\text{length})^2 \times h}{(\text{side length} =)} \frac{10(.0\text{ cm})}{10(.0\text{ cm})}$	M1 A1 A1	Accept 100.45 to 100.6 inclusive. SC1 for an answer of $7(.08cm)$ (using $h_1 = h_2$). [Note $10(cm) =$ height of cone for part (a) is MOAOAO (unless then used to find the length of the base of the pyramid) but will gain the M1m1A1 in part (b) and possibly go on to gain the final A1 in part (b)].
(b) $\frac{1}{3} \times \pi \times 4^2 \times (\text{cone height}) = 335 \cdot 1 \div 2$ OR $\frac{1}{3} \times 32\pi \times (\text{pyramid height}) = 335 \cdot 1 \div 2$ OR $\frac{1}{3} \times \pi \times 4^2 \times 2l/3 + \frac{1}{3} \times 32\pi \times l/3 = 335 \cdot 1$	M1	F.T. using ('their side length') ² for 32π . Or equivalent e.g. using '2h' and 'h' (where h = pyramid height).
(cone height =) $\frac{3 \times 167 \cdot 55}{16\pi}$ or equivalent OR (pyramid height =) $\frac{3 \times 167 \cdot 55}{32\pi}$ or equivalent OR $l = \frac{3 \times 3 \times 335 \cdot 1}{32\pi}$ or equivalent $\frac{32\pi + 32\pi}{32\pi}$	m1	Do not penalise approximating 32π as 100. (Pyramid height given as 5.026).
(cone height =) 10(cm) OR (pyramid height =) 5(cm)	A1	OR $l = 15$ is A2
Overall length $= 15(cm)$	A1 9	

UNIT 2 - FOUNDATION TIER

UNIT 2 (non calculator)	Marks	FINAL MARK SCHEME
Foundation Tier		Comments
1. (a) 12 756 (km)	B1	
(b) (i) 4670	B1	
(ii) 5000	B1	
(c) 1067	B1	
(d) 1,5,7,35	B2	B1 for 3 or 4 correct factors and no more
		than1wrong factor
(e) 5 hundred OR 500	B1	Accept hundred(s)
	7	
2. cm centimetres	B1	
km kilometres	B1	
g grams	B1	
m^3 or 1 cubic metres or litres	B1	Accept kl
	4	-
3. (a) 5(p)	B1	
(b)		Allow 7/10 and 2/10 to represent A and B
СВА		respectively.
		Use overlay.
	B1	A should be between 0.6 and 0.8 inclusive.
	B1	B should be between 0.1 and 0.3 inclusive.
	B1	C should be at 0.
	4	
4. (a) 2 <i>g</i>	B1	
(b) 11	B2	B1 for $7 \times 5 - 4 \times 6$ OR $35 - 24$
		OR 35 – OR – 24
		OR sight of both 35 and $(-)24$
(c) (i) $(x =) 4$	B1	Accept embedded answers
(ii) $(x =)$ 36	B1	Accept embedded answers
	5	*

UNIT 2 (non calculator) Foundation Tier		FINAL MARK SCHEME Comments
5. (a) $(5 \times 1 \text{ pint costs } 5 \times \text{\pounds}0.50 = \text{\pounds})$		Only award these SC marks if combinations
2.5(0) or 250(p)	B1	have not already been credited with a B1:
$(3 \times 1 + 1 \times 2 \text{ pints cost } \pounds 1.50 + \pounds 0.85 = \pounds)$ 2.35 or 235(p)	B1	SC2 for all 4 correct combinations SC1 for 2 or 3 correct combinations.
$(1 \times 1 + 2 \times 2 \text{ pints cost } \pounds \ 0.50 + 1.70 = \pounds)$ 2.2(0) or 220(p)	B1	Example: '2 monies correct and 2 monies incorrect but with correct combinations of milk'
$(1 \times 1 + 1 \times 4 \text{ pints cost } \pounds 0.50 + 1.75 = \pounds)$ 2.25 or 225(p)	B1	MR -1 if consistent use of wrong milk
QWC: Look for	QWC	unoughout (u)
• relevance of work shown	2	
• generally correct spelling		
• clarity of text explanation		
• use of notation (appropriate use of '=', £, p,		
pints)		OWC2 Presents relevant material in a coherent
QWC2: Candidates will be expected to		and logical manner, using acceptable
• present work clearly, with words explaining		mathematical form, and with few if any errors in
process or steps (equivalent statements to		spelling, punctuation and grammar.
AND		
AND make forwif on winistely of in methometical		
• make lew it any mistakes in mathematical form spalling punctuation and grammar and		
include units in their working (correct use of		
= and f)		
OWC1: Candidates will be expected to		QWC1 Presents relevant material in a coherent
• present work clearly, with words explaining		and logical manner but with some errors in use
process or steps		of mathematical form, spelling, punctuation or
OR		
• make few if any mistakes in		evident weaknesses in organisation of material
mathematical form, spelling, punctuation		but using accentable mathematical form with
and grammar, and include units in their		few if any errors in spelling punctuation and
working		grammar.
		8- ·····
		QWC0 Evident weaknesses in organisation of
		material, and errors in use of mathematical form,
		spelling, punctuation or grammar.
		A final unsupported statement only gets QWC0
(b) Identifying abagnest option:		
(0) identifying cheapest option: $(2 \times 2 + 1 - f) (2 2(0)) \approx 220(m)$	D.	FT their answers to (a) provided more than one
$(2 \times 2 + 1 = 1) 2.2(0) \text{ of } 220(p)$ (Skimmed milk 2 + 1 pints - f) 1.55 or 155(p)	BI	answer
$(3x_{11111}x_{2} + 1 p_{111}x_{3} = x) 1.55 \text{ or } 155(p)$	B1	
$(\text{Total} = (\pounds) 2.20 + \pounds 1.55 =)(\pounds) 3.75 \text{ or } 375(p)$	B1	ET if somi skimmed mills used (i.e. their
		cheapest option' $\pm \pounds1.25$)
	9	· · · · · · · · · · · · · · · · · · ·

UNIT 2 (non calculator)		FINAL MARK SCHEME
Foundation Tier		Comments
6. (a) 163 + 285 (=448)	M1	<u>Alternative</u> : $285 - 163 (= 122)$ M1
÷ 2 (=224)	m1	÷ 2 m1
61 CAO	A1	61 CAO A1
		Trial and improvement method:
		Strategy to add and subtract the same numbers
		M1
		Full method which would lead to correct answer
		with one arithmetical mistake m1
		61 CAO A1
(b) 33	B2	
		B1 for sight of 8 and 25
(c) 0.8 o.e.	B1	OR 8+ OR+25
	6	
7. Correct rotational symmetry in each	B3	B1 for each correct quadrant, but
quadrant.		B0 if complete set of reflections only.
	3	
8. Correct cuboid drawn on isometric grid.	B2	B1 for two different pairs of correct parallel edges
Only cuboids can score.		or a correct cuboid with vertices not drawn on
		isometric paper.
		For B2 their cuboid must have sides along or
		parallel to the 3 directions usually associated with
		isometric paper i.e. the two diagonals and the
		vertical.
		Ignore how they treat hidden lines.
	2	

UNIT 2 (non calculator)		FINAL MARK SCHEME
Foundation Tier		Comments
9. (a) 32 34 36 38	B2	B2 for 8 correct entries and no extra
52 54 56 58		B1 for 8 correct entries and extra wrong values
		B1 for between 4 and 7 correct entries
(b) (i) 5/12	B2	FT their list provided at least one number greater
		than 37
		B1 for a numerator of 5 in a fraction less than 1.
		B1 for a denominator of 12 in a fraction less than
		1.
		Do not penalise incorrect reduction of fractions
		from a FT.
		NB Penalise –1 for use of words such as '5 out of
		12', '5 in 12'. or '5:12'.
		When both fraction and wrong notation seen, DO
		NOT penalise wrong notation.
(b) (ii) 1 or 100%	B1	Accept 12/12 o.e.
(c) Yes and statement saying all numbers on the	E1	Accept 'all the numbers in (a) are even'
second (square) spinner are even		There must be reference to (a) OR the 2^{nd} spinner
		OR the units digits in their answers to (a)
	6	
$10 - 4\hat{C}D = 00(2)$	0 D1	Angles mented in somest places on discuss on
10. $ACD = 90()$	DI	Angles marked in correct places on diagram are
		awarded appropriate marks.
		Accept method using sum of angles of a polygon.
$ACB = 140(^{\circ}) - 90(^{\circ}) = 50(^{\circ})$	B1	If 90(°) was not seen, awarding the second B1
2		mark implies the first B1.
$CAB = (180(^{\circ}) - 70(^{\circ}) - 50(^{\circ})) = 60(^{\circ})$	B1	FT from 'their ACB'
OR converse explanation that, for the triangle ABC to		
be isosceles, its 'base angles' need to be 55(°)		Be aware of alternative arguments e.g. showing
		that an isosceles triangle ABC contradicts the
		condition that ACDE is a rectangle
		condition that nobl is a rectangle.
	E1	F1 is dependent on at least 2 R1 marks being
Statement 'Since $ACB \neq CAB$ (or $DCB \neq EAB$)	E1	121 is dependent on at least 2 D1 marks being
then $AB \neq BC'$ or equivalent		awarded
		Accept 'triangle ABC is not isosceles'
		or 'diagram is not symmetrical' if B3
	4	

UNIT 2 (non calculator) Foundation Tier		FINAL MARK SCHEME Comments
11. Method 1 (total profit = total selling price – total cost price)	D 1	
(Money taken for full-price fruit cakes =) $\frac{3}{4} \times 20 \times (\pounds)6$ (= (\pounds)90) (Money taken for reduced-price fruit cakes =) $5 \times 0.7 \times (\pounds)6$ (= (\pounds)21)	B1 B1	Or equivalent e.g. (£) $0.60 \times 5 \times 7$. FT from 'their $\frac{3}{4} \times 20$ '
(Total money taken for chocolate cakes =) $13 \times (\pounds) 2 + 2 \times (\pounds) 1$ (= (\pounds)28)	B1	Consideration of '+ 2 × (£)1' can be implicit
(Total cost =) $20 \times (\pounds)3 + 15 \times (\pounds)1$ (= (\pounds)75) (Profit =) (\pounds) [90 + 21 + 28] - (\pounds)75 = (\pounds) 64	B1 M1 A1	FT provided at least B2 awarded CAO
OR	OR	
<u>Method 2 (total profit = fruit cake profit + chocolate cake profit)</u> (Full-price fruit cake profit =) $\frac{3}{4} \times 20 \times (\pounds)6 - \frac{3}{4} \times 20 \times (\pounds)3$ OR $\frac{3}{4} \times 20 \times (\pounds)(6 - 3) = (-(\pounds)45)$	B1	
(Reduced-price fruit cake profit =) $5 \times 0.7 \times (\pounds)6 - 5 \times (\pounds)3$ OR $5 \times (0.7 \times (\pounds)6 - (\pounds)3)$ (=(\pounds)6)	B2	B1 for sight of $5 \times 0.7 \times (\pounds)6$ or $(\pounds)1.20$ FT from 'their $\frac{3}{4} \times 20$ '
(Full-price chocolate cake profit =) $13 \times (\pounds)2 - 13 \times (\pounds)1$ OR $13 \times (\pounds)(2 - 1)$ (=(\pounds)13) (Beduced price chocolate cake profit = 0)	B1	
(Reduced-price chocolate cake profit = 0)		
(Total profit =) (£) $[45 + 6 + 13 (+0)]$ = (£) 64	M1 A1	FT provided at least B2 CAO
	6	
12. $6x + 10 + 145 - 2x + 4x - 15 + 3x$	B1	Or equivalent statement for the sum of the 4 angles
= 360 (°)	M1	Allow provided the sum of at least 3 of the given angles is equated to 360°
11x = 220 (°)	A1	
(<i>x</i> =) 20 (°)	A1	FT
		FT ax = b if $a \neq 1$
		If MU, then allow SC1 and possible B1 for $40/11$ or $400/11$ (for 180° or 540°)
		4 marks for correct answer of 20° with no working
	4	or from trial and improvement method
13. (a) 0	B1	
(b) At least 5 correct plots	P1	Plots should be accurate to within one small
All 7 points correctly plotted and joined with curve	C1	FT 'their table'. C0 for a polygon
(c) Line drawn correctly	P1	
<i>x</i> -coordinate	B1	FT 'their curve' for point of intersection B1 does NOT imply P1
	5	

UNIT 2 - HIGHER TIER

UNIT 2	Mark	FINAL MARK SCHEME
Higher Tier		Comments
1. $3x + 34(^{\circ}) = 124(^{\circ})$	M1	Using alternate angles.
$3x = 90(^{\circ})$	A1	Correct method to solve equation.
$x = 30(^{\circ})$	A1 3	FT for $3x = k$, provided M1 awarded
2. (a) Correct reflection	B2	B1 for a reflection in any vertical line or in $y = -2$ or sight of the line $y = -2$
(b) Correct rotation	B2	B1 for anticlockwise rotation through 90° OB clockwise rotation through 90° about (2, 0)
	4	OK clockwise fotation through 90° about (2, 0)
3. Mathed 1 (dated and its dated calling price dated and price)		
<u>Method 1 (total profit = total selling price – total cost price)</u> (Meney taken for full price fruit cakes $=$) $\frac{3}{4} \times 20 \times (f)6$ (= (f)00)	B1	Or aquivalent a α (f) 0.60 × 5 × 7
(Money taken for reduced price fruit cakes =) $\frac{3}{4} \times 20 \times (10^{\circ} (-(1)^{\circ}))$	B1	ET from 'their $\frac{3}{4} \times 20^{\circ}$
(Money taken for chocolate cakes =) $13 \times (f) 2 + 2 \times (f) 1$ (= (f)28)	B1	Consideration of $(+2 \times (f))$ can be implicit
(10tal money taken for chocolate cakes –) $13 \times (2) 2 + 2 \times (2)1$ (– (2)26)	21	Consideration of $+2 \times (2)^{1}$ can be implicit
$(Total cost =) 20 \times (\pounds)3 + 15 \times (\pounds)1 (=(\pounds)75)$	B1	
$(Profit =) (\pounds) [90 + 21 + 28] - (\pounds)75$	M1	FT provided at least B2 awarded
= (£) 64	AI	C.A.O.
OR		
	OR	
<u>Method 2 (total profit = fruit cake profit + chocolate cake profit)</u>		
(Full-price fruit cake profit =) $\frac{3}{4} \times 20 \times (\pounds)6 - \frac{3}{4} \times 20 \times (\pounds)3$ OP $\frac{3}{4} \times 20 \times (\pounds)(6 - 3) = (-(\pounds)45)$	B1	
(Reduced-price fruit cake profit =) $5 \times 0.7 \times (f)6 = 5 \times (f)3$		
$OR 5 \times (0.7 \times (\pounds)6 - (\pounds)3) (=(\pounds)6)$	B2	B1 for sight of $5 \times 0.7 \times (\pounds)6$ or $(\pounds)1.20$ FT from 'their $\frac{3}{4} \times 20$ '
(Full-price chocolate cake profit =) $13 \times (\pounds)2 - 13 \times (\pounds)1$ OR $13 \times (\pounds)(2 - 1)$ (=(\pounds)13)	B1	
(Reduced-price chocolate cake profit = 0) $(2 - 1)^{-1}$		
(Total profit =) (£) $[45 + 6 + 13 (+0)]$ = (£) 64	M1 A1	FT provided at least B2 awarded
Look for		
• relevance		
• spelling in at least 1 statement/sentence	Q	QWC2 Presents relevant material in a coherent and
• clarity of text explanations	W	logical manner, using acceptable mathematical form,
• the use of notation (watch for the use of '=', t, % being	C	and with few if any errors in spelling, punctuation
appropriate).	2	and grammar.
QWC: Candidates would be expected to		QWC1 Presents relevant material in a coherent and
 clearly show how they arrived at their solution 		logical manner but with some errors in use of
 have few errors in mathematical form, spelling, punctuation and 		mathematical form, spelling, punctuation or grammar
grammar		OR avident weaknesses in organisation of material but
Count incorrect use of '-' in situations such as		using acceptable mathematical form, with few if any
$(0.7 \times (\pounds)6) = (\pounds)4.20 \times 5$ within the 'few errors in mathematical form'		errors in spelling, punctuation and grammar.
		OWC0 Evident weaknesses in organisation of
QwC2: Candidates will be expected to		material and errors in use of mathematical form
• present work clearly, with words explaining process or steps		spelling, punctuation or grammar.
• make few if any mistakes in mathematical form snelling		6, F
punctuation and grammar and include units (£) in their final answer		A final unsupported statement only gets QWC0
OWC1: Candidates will be expected to		
nresent work clearly with words explaining process or steps		
OR		
• make few if any mistakes in mathematical form, spelling,		
punctuation and grammar and include units (\pounds) in their final answer	8	
	0	

UNIT 2	Mark	FINAL MARK SCHEME
Higher Tier		Comments
4. $\hat{ACD} = 90(^{\circ})$	B1	Angles marked in correct places on diagram are awarded appropriate marks
$A\hat{CB} = 140(^{\circ}) - 90(^{\circ}) = 50(^{\circ})$	B1	Accept method using sum of angles of a polygon.
^		If 90(°) was not seen, awarding the second B1 mark implies the first B1.
$CAB = (180(^{\circ}) - 70(^{\circ}) - 50(^{\circ})) = 60(^{\circ})$ OR converse explanation that, for the triangle <i>ABC</i> to be isosceles, its	B1	FT from 'their \hat{ACB} '
base angles' need to be 55(°)		Be aware of alternative arguments e.g. showing that an isosceles triangle <i>ABC</i> contradicts the condition that <i>ACDE</i> is a rectangle.
Statement 'Since $\hat{ACB} \neq \hat{CAB}$ (or $\hat{DCB} \neq \hat{EAB}$) then $AB \neq BC$ ' or equivalent	E1	E1 is dependent on at least 2 B1 marks being awarded Accept 'triangle ABC is not isosceles'
	4	or 'diagram is not symmetrical' if B3
5. $2a + 0.4 + 3a = 1$ OR $(5a =) 0.6$	- - M1	Use of 'total probability = 1'
(a =) 0.6/5 or 0.12	A1	
(Required probability =) 0.36	A1	If first 2 marks were M1A0, then FT 3 × 'their <i>a</i> ', provided $3a < 1$.
6. (a) 0 and 9	B2	B1 for either correct
(b) At least 5 correct plots	P1	Plots should be accurate to within one small square
All 7 points correctly plotted and joined with curve	C1	FT 'their table'. C0 for a polygon
(c) Line drawn correctly x-coordinate	B1	FT 'their curve' for point of intersection B1 does NOT imply P1
$7 \rightarrow 1$ or activalant	6 D1	Λ accent $\langle \gamma \rangle$
$y \le 2x$	B1 B2 3	Accept $>$ Accept '<'. B1 for $y = 2x$, $y > 2x$, $y \ge 2x$ B1 for $y \le kx$ (+ 0), with $k > 0$
8. (a) Attempting to sum both totals, with at least one correct	M1	128, 200
128/200 (= 64/100) or equivalent	m1	FT from their totals provided one was correct
	A1	C.A.O.
(b) Increase number of throws / Repeat process	E1 4	Any convincing suggestion
9. $5x - 1 - 2x = 1$	B1	Clearing fractions. FT until 2 nd error.
3x = 2 x = 2/2 or equivalent	B1 P1	Collecting terms. ET $ax = b$ with $a \neq 1$
x = 2/5 of equivalent	3	$r = ux - b$, with $u \neq 1$
10. (2×10^{27}) (5×10^{24})	B1	Suitable rounding of both numbers
$(2 \times 10^{27}) \div (5 \times 10^{24})$	M1	Correct division attempted.
400 or 4×10^2	Al 3	F1 their rounded numbers. Allow 0.4×10^3 . ISW An answer of 2.5×10^3 implies the B1 only.
11. $2k + 3p = 2.05$ and $3k + 5p = 3.20$	S1	Strategy of forming a pair of equations. (Do not
(or $2k + 3p = 205$ and $3k + 5p = 320$)		penalise for not defining variables.)
Method to find the first variable	M1	Allow one slip. Do NOT accept a trial and improvement method.
Correct first variable	A1	
Correct second variable	MI A1	F1 their first variable. k = (f) 0.65 or 65(n), n = (f) 0.25 or 25(n)
	5	If incorrect units are given, penalise -1 once only.
12. Angle BOD = 156°	B1	Accept correct alternative methods. Check for
Angle at the centre is twice the angle at the circumference	E1	answers on diagram.
Angle BCD = 24°	B1	
Tangent and radius are perpendicular (and angle sum of quadrilateral is 360°)	E1 4	Angle sum of quadrilateral alone is insufficient

UNIT 2	Mark	FINAL MARK SCHEME
Higher Tier		Comments
13. $6p + pq = 5 - t$	B1	Collecting terms. FT until 2 nd error (for equivalent difficulty)
p(6+a) = 5 - t	B1	Factorising
p(0+q) = 5-t	B1	Quotient
$p = \frac{3-1}{6+a}$ of equivalent	DI	Mark final answer
0 · q	3	
14. (a) ¹ / ₄ or 0.25	B2	B1 for 4^{-1} or $1/2^2$ or $1/3\sqrt{64}$ or $1/64^{1/3}$ or $(1/64)^{1/3}$
(b) $x = 0.004444$ $10x = 0.04444$ with an attempt to subtract	M1	Or 10 <i>x</i> and 100 <i>x</i> , or equivalent. Or an alternative method.
4/900 or 2/450 or 1/225 or equivalent	A1	An answer of $0.04/9$ gains M1 only.
		Mark final answer. Do not ignore incorrect
		cancelling.
(c) $16 + 4\sqrt{3} + 4\sqrt{3} + 3$	M1	3 of the 4 terms correct
$19 + 8\sqrt{3}$	A1	Do not ignore subsequent working
	6	
15. $4/8 \times 3/7 \times 2/6$	B1	
$4/8 \times 3/7 \times 2/6 \times 2$ or $4/8 \times 3/7 \times 2/6 + 4/8 \times 3/7 \times 2/6$	M1	
48/336 (=1/7)	A1	Do not ignore incorrect cancelling
		Do not ignore meetreet cancerning
		If no other marks awarded, SC1 for method 'with replacement'
		$4/8 \times 4/8 \times 4/8 \times 2$
		or $4/8 \times 4/8 \times 4/8 + 4/8 \times 4/8 \times 4/8$ (=1/4)
	3	
16. Inverted curve (no vertical or horizontal stretch) with vertex at the origin	B1	Clear intention
Vertical translation down	B1	FT their curve
Point $(0, -3)$ indicated in relation to 2^{nd} curve.	B1	Accept –3 indicated on y-axis
	3	

UNIT 3 - FOUNDATION TIER

UNIT 3 (calculator allowed)	Mark	FINAL MARK SCHEME
Foundation Tier		Comments
1. (a) 6(.00)	B1	
3.69	B1	
4(.00)	B1	
13.69	B1	FT candidate's values for at least one B1.
(b) 2 (rolls)	B1	F'I' candidate's total.
(c) 11.98÷2 or equivalent	M1	
(£) 5.99 ISW	Al	
	7	
2. (a) 57	B1	
(b) 57.4	B1	
	2	
3. (a) 1250 (millilitres)	B1	
(b) 1 (litre)	B2	B1 for sight of 1000(ml) as final answer or in working
		If units are given they must be correct. 1000 litres
() 270 00		without working gets B0
(c) $250 \div 80$	MI	FI their volume from (a)
3 full cups	AI	Amount left over, if given, must be correct for Al
		e.g. 3.125 with no working gets M1 A0.
	~	3 cups 10ml left over gets M1 A1.
	5	
4. (a) Evidence of counting squares	MI	
35-38 (square metres)	Al	
(b) 20 (m)		
5 (a) 31 36		
(b) 1024	B1	
(0) 1024 (c) 5.3	B1	
(c) 5.5	3	
6.(Cost of individual tickets=) 2×4.95 (£9.90) + 3×4.60 (£13	.80) M1	
= (f) 23.7(0)	Al	
(Saving = 23.7 - 14.5 =) (£) 9.2(0)	A1	ET "thoir (f) 22 $7(0)$ " (f) 14 $5(0)$
Look for		F I = then(L) 25.7(0) = (L) 14.3(0)
• Spelling		
 Clarity of text explanations 	OWC2	QWC2 Presents relevant material in a coherent and
 Consistent use of f or p signs 		logical manner, using acceptable mathematical
 Consistent use of mathematical symbols 		form, and with few if any errors in spelling,
• Consistent use of mathematical symbols.		punctuation and grammar.
OWC2: Candidates will be expected to		
Present work clearly with words explaining pro	Cess	QWC1 Presents relevant material in a coherent and
and steps		logical manner but with some errors in use of
AND		mathematical form, spelling, punctuation or
• Make few if any mistakes in mathematical for	m	grammar.
spelling nunctuation and grammar in their final	,	OR
answer.		Fyident weakness in organisation of material but
		using accentable mathematical form with faw if
OWC1 : Candidates will be expected to		any arrors in spalling punctuation and grammer
Present work clearly, with words explaining pro	ocess	any, errors in spennig, punctuation and grammar.
or steps		
OR		QWCU Evident weakness in organisation of
• Make few, if any, mistakes in mathematical for	n.	material, and errors in use of mathematical form,
spelling, punctuation and grammar in their final	,	spelling, punctuation and grammar.
answer.	_	
	5	

UNIT 3 (calculator allowed)	Mark	FINAL MARK SCHEME
Foundation Tier		Comments
7. S and Q	B2	B1 for at least one correct answer and no more than one
	2	incorrect answer.
9 (c) 12	2 D1	Accept embedded energyers
(a) 15	B1 B1	Accept embedded answers
	2	
9. (a) April	B1	
(b) 11 (°C)	B1	
(c) 100 (mm)	B1	
(d) Spring, Summer, Autumn, Winter indicated along one axis AND vertical axis correctly labelled	B1	Or indicated on the bars themselves.
Uniform scale for frequency axis starting at 0	B2	B1 for at least 2 correct hars consistent with their scale
Four bars at correct heights	52	Bars must be of equal width.
		1
	6	
10. (a) $12 \times 5 - 5 \times 3 - 3 \times 2 (= 60 - 15 - 6)$	M1	Sight of two of $60, -15, -6$ and an attempt to combine
30	A 1	marks gets M1
57	AI	59 alone get 2 marks.
(b) Strategy to explore possible combinations.	S 1	Evidence of trial and improvement or correct answer gets
	51	S1.
$18 \times 5=90$ 90-3=87 so 18 correct answers (with one incorrect	B1	Sc2 for correct answer with no working
allswer). The mark drops to 85 from 87 so the 20th question scores -2	B1	Correct calculations infer correct answer
(so the last question was not answered).	51	
	5	
11. First arc(s) crossing the given line.	B1	Arc must be big enough for the second arc to cut it.
Final arc and line with angle of 60° at the point X	B1	B2 for correct construction at X
		Allow $\pm 2^{\circ}$. If no arc(s) B0 B0.
		B1 maximum for a correct construction elsewhere on the
		line.
	2	
12. (a) 5 (miles)	B1	
(b) 30 (mins)	B1	Accept half an hour
(c) Reference to decrease in steepness, gradient or	EI	Ignore calculations. Explanation should refer to gradient,
equivalent arter nonzontal section.		granh.
(d) A horizontal line stopping at the point (14:00, 7)	B1	B1 for a horizontal line that continues past (14:00, 7) so
		long as no other line is drawn.
Point at (16:12, 12)	B1	
Points joined with straight lines.	B1	FT their points, provided one point correct and walk
	6	ministres at 12 mines.
13. (a) Method of finding the number of whole blocks that fit	M1	May be implied by sight of two of 9, 5 or 4
in length, width and height.		
9×5×4	m1	Multiplication of three values, at least two correct
180 (blocks)	A1	C.A.O.
(b) $1600 - 400$	M1	SC1 10r 20910÷125 or 215.28 or 215
÷ 60	m1	
20 (blocks)	A1	C.A.O
× /	6	

UNIT 3 (calculator allowed)	Mark	FINAL MARK SCHEME
Foundation Tier		Comments
14. (a) $57 = 4 \times 3 + 5C$	B1	Correct substitution. FT until second error.
5C = 45	B1	Isolating the C.
C = 9	B1	FT if $aC = b$ and $a \neq 1$.
	51	Accept embedded answer.
(b) $6x - 2x = 12 + 19$	BI	TTT - 11 and
4x = 31	BI	F1 until 2 error.
x = 7.75 or 7.94	BI	Accept embedded answer.
		they are in simplest form
	6	mey are in simplest form.
15 25567 or 34558	0	
Median of 5	B1	Use of 2 digit numbers, mark as a misread.
At least two 5s entered with no other number occurring more	B1	
times.	21	
Difference of 5 between the highest and lowest numbers.	B1	
The total of the 5 numbers being 25, provided not all 5s.	B1	
	4	
16.(a) (Each share = £)5700 \div (1+2+3) (= £950)	M1	FT 'their 950' for A1 if all amounts correct.
(Alan receives £ $3 \times 950 =$ £) 2850,	A2	A1 for any 2 correct amounts.
(Ben receives £ $2 \times 950 =$) 1900 and		A1 for no labels or incorrect labels.
(Carwyn receives £) 950.		
	54	
(b) $5700 \div 3 = 1900$ OR Ben gets the same fraction ($2/6 = 1/3$)	BI	Do not award E1 if B1 not awarded.
No (it does not affect the amount Ben receives).	EI	FI Ben's share from (a).
	5	
17. (a) All points plotted correctly.	B2	B1 for 3, 4 or 5 points plotted, not joined or.
		B1 for all points plotted correctly but joined.
(b) Negative correlation OR "As engine size increases the	E1	The word correlation is needed if the first answer used.
distance travelled on one litre decreases".		Accept inverse relationship.
	3	
18. Sketch of circle of correct radius drawn.	B2	Allow freehand sketch. Use overlay. (±5mm)
		B1 for intention of sketching the correct circle using
		points, or arcs, OR
		B1 for intention of correct circle but outside the
		tolerance.
		Ignore other lines on the diagram drawn to find the
		centre of the circle.
		Penalise –1 for other loci drawn that are not intended to
	2	find the centre of the circle.
$19 \ \frac{1}{2} \times 5 \times 8 \times 14$	<u>ک</u> M1	
280		
cm^3	III	
	3	
20. Interior Angle of Hexagon $((6 - 2) \times 180) \div 6$	M1	Or $180 - (360 \div 6)$ Or $360 \div 3$ Or 60×2
		Working may be implied from diagram.
120(°)	A1	
$(x = (180 - 120)/2 =)$ or $(x = 120 - 90 =)$ or $(x = 120 \div 4 =)$		FT "their 120°"
30(°)	B1	B1 requires evidence of an appropriate method used
	2	
	5	

UNIT 3 - HIGHER TIER

Unit 3 Higher Tier		FINAL MARK SCHEME
1. (a) $4y(3+5y)$	B2	B1 for $4y(3)$ or $4y(+5y)$ or correct partial factorisation.
(b) 105	B2	B1 for answer of 15 OR B1 for adding 45 to their first term or for sight of +45
(c) $4x = 20 \times 5$ OR $\frac{x}{5} = \frac{20}{4}$	M1	101 Sight 01 +45.
(d) $6x - 2x = 12 + 19$ 4x = 31 $x = 7.75 \text{ or } 7\frac{3}{4}$	A1 B1 B1 B1	FT until 2 nd error. Mark final answer. Accept improper fractions provided they are written in simplest form.
2. (a) All points plotted correctly.	B2	B1 for 3, 4 or 5 points plotted correctly, not joined, or
(b) Negative correlation OR "As engine size increases the distance travelled on one litre decreases".	E1	B1 for all points plotted correctly but joined. The word correlation is needed if the first answer used. Accept inverse relationship.
(c) Appropriate straight line of best fit drawn through (1.8, 8.6), with some values above and below the line.	B2	B1 for unreasonable line of best fit drawn through (1.8, 8.6) B1 for reasonable line of best fit but not drawn through (1.8, 8.6).
(d) From their line of best fit ± 0.1 (km)	B1 6	If no line of best fit, accept answer of 9.4 to 9.6 inclusive.
3. 90 ÷ time 90 ÷ 2.5 = 36 (mph)	B1 M1 A1 3	Accept 90 ÷ 2.3 for B1 only
4. 2, 5, 5, 6, 7 or 3, 4, 5, 5, 8 Median of 5. At least two 5s entered with no other number occurring more times. Difference of 5 between the highest and lowest numbers. The total of the 5 numbers being 25, provided not all 5s 5. (a) (Each share = £) $5700 \div (1+2+3) (=$ £950) (Alan receives £ 3×950 = £)2850	B1 B1 B1 B1 4 M1 A2	Use of 2 digit numbers, mark as a misread. FT 'their 950' for A1 if all amounts correct.
(Alan receives $\pm 3 \times 950 = \pm 2850$, (Ben receives $\pm 2 \times 950 = \pm 1900$ and (Carwyn receives ± 950 .	A2	A1 for no labels or incorrect labels.
 QWC: Look for units £ spelling in at least 1 statement/sentence clarity of text explanations QWC2: Candidates will be expected to present work clearly, with words or quantities shown for clarity of process or steps AND make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer QWC1: Candidates will be expected to present work clearly, with words or quantities shown for clarity of process or steps QWC1: Candidates will be expected to present work clearly, with words or quantities shown for clarity of process or steps OR make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer. 	QWC 2	 QWC2 Presents material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. QWC1 Presents material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar OR evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar. QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar.
(b) $5700 \div 3 = 1900$ OR Ben gets the same fraction $(2/6 = 1/3)$ No (it does not affect the amount Ben receives).	B1 E1 7	Do not award E1 if B1 not awarded. FT Ben's share from (a).

Unit 3		FINAL MARK SCHEME
Higher Tier	D2	Comments
6. Sketch of circle of correct radius drawn.	B2	Allow freehand sketch. Use overlay. (±5mm) B1 for intention of sketching the correct circle using points, or arcs, OR B1 for intention of correct circle but outside the tolerance.
		circle. Penalise -1 for other loci drawn that are not intended to find the
	2	centre of the circle.
7. ¹ / ₂ ×5×8×14	M1	
280 cm ³	AI UI	Independent of other marks
Cili	3	independent of other marks.
8. (a) $((6 - 2) \times 180) \div 6$	M1	OR 180 - (360÷6) OR 360÷3 OR 60×2
	A1	
(b) (Angle at bottom of triangle = $120 - 90 =$) 30° (180 - 30) / 2	BI M1	May be indicated on the diagram. F1 'their $120^{\circ} - 90$. FT 'their $120^{\circ} - 90$
(100 - 50) / 2 75(°)	A1	
	5	
9. Strategy of multiplying h by $(h+2)$ either numerically or algebraically towards an answer of 70 or equivalent.	S1	
One correct evaluation $7 \le h \le 8$	B1	$\frac{h}{7}$ $\frac{h \times (h+2)}{63}$ $\frac{h}{735}$ $\frac{h \times (h+2)}{687225}$
2 correct evaluations $7.35 \le h \le 7.55$ one either side of 70	B1	8 80 7.36 68.8896 7.1 64.61 7.37 69.0569
2 correct evaluations $7.35 \le h \le 7.45$ one either side of 70	M1	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
If evaluations not seen, accept 'too high' or 'too low'.		$\begin{array}{cccccccccccccccccccccccccccccccccccc$
h = 7.4	A1	7.5 71.25 7.42 69.8964 7.6 72.96 7.43 70.0649
		7.7 74.69 7.44 70.2336
		7.8 76.44 7.45 70.4025 7.9 78.21 79 78.21
	5	1.5 10.21
10. (a) $(8 \div 5) \times 7$ or $7 \div (5 \div 8)$ 11.2 (cm)	M1 A1	Accept 11 from correct working.
(b) $20 \div (8 \div 5)$ or $20 \times (5 \div 8)$	M1	
12.5 (cm)	A1 4	Accept 13 from correct working.
11. a) $0.02 + 0.3$ or 0.32 or equivalent	M1	
3.2×10^{-1}	Al B1	
$20,000 \div 1.25$ or $2,000,000 \div 125$ (= 16000 or equivalent)	M1	FT with incorrect place value provided conversion attempted.
$1.6 imes 10^4$	A1	
12 tan (PPO) - 45/80 OP tan(PPO) - 80/45	5 M1	
$29(.35^{\circ})$ OR $60.6(42^{\circ})$ or $61.$	A2	A1 for $\tan^{-1}(45/80(=0.5625))$ or $\tan^{-1}(80/45(=1.77))$
(Bearing =) 029(.35°)	B1	FT from incorrect trigonometry AND
12 a) Intermentile manage Deadings from after a f.15 and 45	4	FT 'their angles' obtained from premature rounding.
(50 to 52) – (24 to 25)	M1	
= 25 to 28 inclusive	A1	SC1 for Kevin's IQR of 24 to 26 inclusive.
b) Valid reason e.g 'Kevin's median is higher than Sunil's',	E1	Accept sight of medians for both cricketers (36 and 60).
Kevin's graph is to the right of Sunil's' Kevin	R1	Provided E1 awarded Penalise –1 if incorrect medians are
	4	quoted.
14. a) $d \alpha t^2$ or $d = kt^2$	B1	
$4.9 = K \times 1^{-1}$ $d = 4 \operatorname{Qt}^2$		F 1 Ior non-linear only. Maybe implied by responses to (b)
b) $d = 19.6$ (when $t = 2$)	B1	FT from their non-linear (a).
$t^2 = 28.2/4.9 (= 5.755)$ or $(t =) \sqrt{(28.2/4.9)}$	M1	
t = 2.39(89) or 2.4(0)	A1	
	0	1

Unit 3		FINAL MARK SCHEME
Higher Tier		Comments
15. a) i)Correct expansion of both brackets $x^2 + 4x + 4 + 3x + 3 - 11$	M1	
(=) $x^2 + 7x - 4$	A1	
ii) (x =) $\frac{-7 \pm \sqrt{(7^2 - 4 \times 1 \times (-4))}}{2 \times 1}$	M1	Use of formula, allow one slip in substitution.
$(\mathbf{x} =) \frac{-7 \pm \sqrt{65}}{2}$	A1	CAO.
(x =) 0.53 and -7.53	A1	CAO. Must be correct to 2 decimal places.
b) $(5r-3)(r+5)$	B2	B1 for $(5r - 3)(r - 5)$
r = 3/5 or r = -5	B1	FT for their pair of brackets provided at least one bracket is of
	8	form (ax). Must come from factorising.
16. a) Cosine curve starting at 1 on the v axis	M1	
Maximum and minimum points at $(0,1)$, $(180, -1)$ and $(360,1)$	A1	
b) 113.578(°)	B1	Accept rounded or truncated answers for both B1's.
$246.42(^{\circ})$ with no other angles given.	B1	FT 360 – their first angle.
	4	
17. a) Frequencies: 14, 15, 21, 29, 46	B2	B1 for 2, 3 or 4 correct frequencies.
b) $14 + 0.4 \times 15$ or equivalent	M1	FT 'their 14' and 'their 15' provided not 0.7 and 1.5.
20	Al	
	4	
18. Overall strategy e.g. cosine rule & ¹ / ₂ absinC	S1	
$AC^2 = 9.9^2 + 7.2^2 - 2 \times 9.9 \times 7.2 \times \cos 75$	M1	
$AC^2 = 112.95$	A1	
AC = 10.6(279)	A1	FT provided M1 awarded.
Area ABC = $\frac{1}{2} \times 9.9 \times 7.2 \times \sin 75$ (= 34.425)	M1	
Area ADC = $\frac{1}{2} \times AC \times 4.9 \times \sin 24$ (= 10.590)	M1	FT their AC but not for 9.9, 7.2 or 4.9.
Area quadrilateral = $23.8(348cm^2)$	A1	Accept answers in the range 23.8 to 23.9.
	_	FT if one of the last M1 marks awarded, and their calculations are
	7	accurate to 1 d.p.

GCSE Mathematics - Unitised MS January 2014



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