

GCSE MARKING SCHEME

MATHEMATICS UNITISED

NOVEMBER 2013

INTRODUCTION

The marking schemes which follow were those used by WJEC for the November 2013 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.

UNIT 1 - FOUNDATION TIER

NOVEMBER 2013 UNIT 1 Foundation	Mark	Final MARK SCHEME (14/11/13) Comments (Page 1)
1. (a) 3 024 756	B1	
(b) 63 000	B1	
(c) (i) 408	B1	
(ii) $\frac{2}{3}$ or equivalent. ISW.	B1	Accept if given in words.
	4	
2. 200 grams	B1	Accept any unambiguous indication in each case.
324m	B1	
600m ²	B1	
2000m ³	B1	
	4	2
$3. (a) \qquad \text{Thursday.} $	BI	Do not accept 11.
(b) 43	BI M1	
(c) $13 \times (t) 12.5(0)$	MI	
-(f)1625(0)	Δ 1	SC1 for (f)225 or (f)127 5(0) or (f)200 or (f)227 5(0)
(d) Any indication that the orders taken on	E1	For any commont that refers to 'prices' as opposed to
Thursday were worth more money		number of orders
e g 'Prices were higher (on Thursday)'		number of orders.
'She gave discounts on Wednesday'		
'The size of each order was smaller on Wednesday'	5	
4.	5	Penalise consistent attempt in (a) and (b) to differentiate
		between driver and passengers —lonce only
(a) $12 \times 30(p) + (\pounds)5$ AND an attempt to multiply	M1	Do not penalise 'mixed units' at this stage
'12 by 30' or '12 by 0.3' AND adding 500 or 5.		
$= (\pounds)8.6(0)$ or $860(p)$	A1	Allow £8.60p but £860 or 8.60p is A0.
		I I I I I I I I I I I I I I I I I I I
(b) $(\pounds)7.4(0) - (\pounds)5$ or equivalent.	M1	For correct substitution with subtraction and division.
0.3(0)		Allow division by 30 for M1.
= 8 (passengers)	A1	Accept an embedded answer.
	4	
5.		a.m. and p.m. not required but penalise once if incorrect
Correct start time for 2 nd programme.	B1	F.T. 'their first programme'.
First two programmes 'Nature Trails' and either	B1	In either order. Accept unambiguous indication.
Theatre Review' or 'The Comedy Slot'.		
2 rd more second starts at 12.10	D1	
5 programme starts at 12:10	BI D1	FT 'their third programme'
Einel two programmes 'Vour Songe' and remaining	D1	In either order Accent unambiguous indication
one of 'Theatre Paviay' or 'The Comedy Slot'	DI	in chief order. Accept unanorguous indication.
one of Theade Review of The Conledy Slot.	5	
$6 (\text{Shop } A) (f) \geq 0$	B1	
(Shop R) $6 \times 4 \times 0.8$ or equivalent.	M1	
= (f)19.2(0)	A1	
(Difference of) $80p \text{ or } \pounds 0.8(0)$	B1	F.T. their stated amounts.
		Units required otherwise B0. Allow £0.80p
	4	r i i i i i i i i i i i i i i i i i i i
7.		Allow ± 0.2 cm and $\pm 2^{\circ}$. Use overlay.
(a) Accurate drawing with lines of 6 cm and $4 \cdot 5$ cm	B2	For all 3. B1 for 2 of them.
meeting at 90°.		
'Steel cable' line drawn to top of mast.	B1	Must be in correct orientation.
-		
(b) Actual length of steel cable given (75m)	B2	B0 for 45m or 60m. Otherwise
		F.T. an unambiguous line or distance from their drawing
		that represents the cable \times 10. Must give units.
		B1 if no units or incorrect units given OR length on
		diagram given (7.5cm).
		B1 for an incorrect measurement seen to be correctly
	_	multiplied by 10 AND correct units given. Ignore sight
	5	of $75m + 60m = 135m$ and allow B2 for the 75m.

NOVEMBER 2013	Mark	Final MARK SCHEME (14/11/13)
UNIT 1 Foundation		Comments (Page 2)
8. (a) Labelling of BOTH axes.	B1	Units need to be given in both cases else B0.
Uniform scale for BOTH axes.	B1	
All / correct plots.	PI C1	May be implied by their curve (or line).
Appropriate curve drawn.	CI	F.1. their plots if at least 4 are correct.
(b) Correct reading from their curve (or line).	B1 5	Allow within '1/2 a small square'.
9. (Area of lawn) 9×3	M1	
$= 27(m^2)$	A1	
		F.T. 'their area' (may be implied) for further B marks $1 + i c_{1} + i c_{2}$
For any connect maniful shairs AND its and	DO	only if $\geq 12(m^2)$
For one correct possible choice AND its cost.	D2	incorrect cost
		B1 for an incorrect combination of at least four
		containers with a correct cost.
For a different correct possible choice AND its cost.	B2	B1 for a different correct possible choice with no cost or
		an incorrect cost.
		B1 for a different incorrect combination of at least four
		containers with a correct cost.
		Area (m ²) Large Medium Small Cost
		28 2 1 1 (£)25
		28 1 3 1 (£)27
		28 0 5 1 (£)29
		28 1 0 6 (£)32
		28 0 2 6 (£)34
		29 2 0 3 (£)28
		29 1 2 3 (£)30
		29 0 4 5 (t)32 20 0 1 8 (f)27
Look for • spelling • clarity of text explanations,	QWC2	
• the use of notation (watch for the use of '=', ' \pounds ', ×		QWC2. Presents relevant material in a coherent and
and m ² being appropriate)		logical manner, using acceptable mathematical form,
OWC2: Candidates will be expected to		and with lew it any errors in spenning, punctuation and
• present work clearly with words explaining process		
or steps		OWC1 Presents relevant material in a coherent and
AND		logical manner, but with some errors in use of
• make few if any mistakes in mathematical form,		mathematical form, spelling, punctuation or grammar.
spelling, punctuation and grammar and include units		OR
OWC1: Candidates will be expected to		Evident weakness in organisation of material but using
 present work clearly, with words explaining process 		acceptable mathematical form, and with few if any
or steps		errors in spelling, punctuation and grammar.
 OK make few if any mistakes in mathematical form 		OWC0. Evident weakness in organisation of material
spelling, punctuation and grammar and include units		and errors in use of mathematical form, spelling,
in their final answer	0	punctuation and grammar.
	0	

NOVEMBER 2013	Mark	Final MARK SCHEME (14/11/13)
UNIT 1 Foundation		Comments (Page 3)
10. Sight of (Won) 15, (Drew) 12 and (Lost) 9	B1	May be implied by a correct pie chart.
		F.T. their amounts. Allow $\pm 2^{\circ}$. Use overlay.
Correct pie chart drawn	B3	B3 for all correct and labelled. B2 for all correct but not
(Angles are 150°, 120° and 90°)		labelled. B1 for one correct and labelled.
		If no marks awarded for pie chart, then award M1 for
	4	equating 1 match to the correct number of degrees (10°) .
11 (a) The question is biased or leading	4 B1	Accept any statement that implies question is biased or
11. (a) The question is blased of reading.	D 1	leading. Do not accept an answer that implies the
		question is biased because of the location.
(b) Any two from, e.g.		1
'No box for those who have never been',	B2	B1 for each different reason (maximum of 2 marks).
'10 times is not exclusive',		
'No time period indicated'.		
	3	
12.	N/1	$\pm 2^{\circ}$ (use overlay).
(a) Bearing of 040° from Moenre.	IVI I	Allow the M marks for dots, crosses or any
Bearing of 335° from Hoylake	M1	been offered
Dearing of 555 non noyake.	1411	been onered.
Position marked or two lines intersecting.	A1	F.T. if at least M1 and two intersecting lines. (Lines
		must originate from Moelfre and Hoylake respectively
		and intersect at sea.)
(b) Correct three figure bearing given.	B1	F.T. their ship's position. Allow $\pm 2^{\circ}$.
$12 (a) (Valuma =) \pi \times 2^2 \times 4$	4 M1	$\Delta lao = \times 300^2 \times 400$
15. (a) (volume –) $\pi \times 5 \times 4$ – 113.1 (m ³) OR 36 π (m ³)		Also $\pi \times 500^{\circ} \times 400^{\circ}$ Accept answers in the range 113 m ³ to 113.2 m ³ or
= 113.1 (m) OK 30 m (m)	AI	equivalent in cm^3 (e.g. 113 000 000)
(b) Correct strategy.	S 1	Allow S1 for sight of 'their volume' ÷ 'digits 18'
<u>113100 (<i>l</i>)</u> OR <u>113.1 (m³)</u> OR <u>113100000 (cm³)</u>	M1	F.T 'their volume' from (a). Incorrect 'compensating'
1800 (l) 1.8 (m3) 1800000 (cm3)		conversion errors that may lead to an answer of $62 \cdot 8$ is
	A 1	M0A0A0.
$= 62 \cdot 8(\dots) \text{OR} 20 \pi$		
= 62(minutes)	AI 6	For truncating to nearest whole number of minutes.
14. 17000	B1	For the evaluation of a correct 12% OR Sight of 0.88
_2040		(6120, 10880 or 23120 implies 3× 2040 and gains B1).
14960		
<u>1795.2(0)</u>	M1	For attempting to find and subtract 3 different 12%.
13164.8(0)		OR $17000 \times 0.88^{\circ}$.
$\frac{1579.77(6)}{11595.02(4)}$	A 1	
(£)11600		ET one error
(L)11000	AI	Trat calculation for 2 or 4 years as a misread
		Penalise an appreciation calculation -1
	4	renance an appreciation calculation 1.

UNIT 1 - HIGHER TIER

NOVEMBER 2013	Mark	Final MARK SCHEME (14/11/13)
UNIT 1 Higher		Comments (Page 1)
1. (a) The question is biased or leading.	B1	Accept any statement that implies question is biased or
		leading. Do not accept an answer that implies the
		question is biased because of the location.
(b) Any two from, e.g.	D0	
No box for those who have never been',	B 2	B1 for each different reason (maximum of 2 marks).
10 times is not exclusive,		
No time period indicated .	2	
2	5	$\pm 2^{\circ} (uga avarlav)$
(a) Bearing of 040° from Moelfre	M1	$\perp 2$ (use overlay). Allow the M marks for dots, crosses or any
(d) Dealing of 010 nom moente.		unambiguous indication that the correct bearings have
Bearing of 335° from Hoylake.	M1	been offered.
Position marked or two lines intersecting.	A1	F.T. if at least M1 and two intersecting lines. (Lines
		must originate from Moelfre and Hoylake respectively
		and intersect at sea.)
(b) Correct three figure bearing given.	B1	F.T. their ship's position. Allow $\pm 2^{\circ}$.
2 (50 10 0	4	
3. 650×43.2	MI	
= 28080 (roubles)	AI D1	ET (their 20000) = 21240
(Roubles left) 0040 6840 · 40 5	M1	F.1. their $28080 - 21240$.
-(f)138.18	A1	f_{138} 1818 is AO Mark final answer
- (2)130.10	5	
4. $9C + 32 \times 5 = 140 \times 5$ OR $9C = 140 - 32$	M1	For correct substitution in this form.
5		
$C = 140 \times 5 - 32 \times 5$ OR (C =) $140 - 32 \times 5$	M1	
9 9		
$= 60(^{\circ}\mathrm{C})$	A1	Accept an embedded answer.
	3	
5. Correct method to find area of trapezium.	M1	Area of trapezium OR Area of (rectangle + triangle).
$(\text{Trapezium area} =) 34(\text{cm}^2)$	A1 D1	C.A.O.
(Area of whole shape =) $59(\text{cm}^{-})$	BI	F.1. their $34^{\circ} + 25$.
$59 \times 600 \div 250 \times (\pounds)6$	INI2	F.1. their 59. M1 for any one of the operations
-(f)840.6(0)	Δ1	Dependent on the M2
-(t)649.0(0)		Dependent on the M2.
Look for	OWC2	
• spelling	C	
• clarity of text explanations,		QWC2. Presents relevant material in a coherent and
• the use of notation (watch for the use of '=', £ and		logical manner, using acceptable mathematical form,
cm ² being appropriate)		and with few if any errors in spelling, punctuation and
OWC2: Candidates will be expected to		grammar.
• present work clearly with words explaining process		
or steps		QWC1. Presents relevant material in a coherent and
AND		mathematical form spelling punctuation or grammer
• make few if any mistakes in mathematical form,		OR
spelling, punctuation and grammar and include units		Evident weakness in organisation of material but using
OWC1: Candidates will be expected to		acceptable mathematical form, and with few if any
• present work clearly, with words explaining process		errors in spelling, punctuation and grammar.
or steps		
OR		QWC0. Evident weakness in organisation of material
• make few if any mistakes in mathematical form,		and errors in use of mathematical form, spelling,
spening, punctuation and grammar and include units	-	punctuation and grammar
	8	

NOVEMBER 2013	Mark	Final MARK SCHEME (14/11/13)
$\frac{\text{UNIT I Higher}}{6}$	M1	Comments (Page 2)
$57 \times \frac{17}{5}$ $= 125^{4}/_{5} \text{ or equivalent}$ 2 hours 5 minutes 48 seconds	A1 B1	F.T. only if time in minutes greater than 60 and includes a fraction $\neq \frac{1}{2}$. Accept F.T. answers to nearest second.
$\overline{7}$ (a) (Volume -) $\pi \times 2^2 \times 4$	5 M1	$\Delta \log \pi \times 300^2 \times 400$
$= 113 \cdot 1 \text{ (m}^3) \text{ OR } 36 \pi \text{ (m}^3)$	A1	Also $n \times 300^{\circ} \times 400^{\circ}$ Accept answers in the range 113 m ³ to 113.2 m ³ or equivalent in cm ³ (e.g. 113 000 000)
(b) Correct strategy.	S 1	Allow S1 for sight of 'their volume' ÷ 'digits 18'
$\frac{113100 (l)}{1800 (l)} \begin{array}{c} \text{OR} \frac{113 \cdot 1 (\text{m}^3)}{1 \cdot 8 (\text{m}^3)} \begin{array}{c} \text{OR} \frac{113100000 (\text{cm}^3)}{1800000 (\text{cm}^3)} \\ 1800000 (\text{cm}^3) \end{array}$	M1	F.T 'their volume' from (a). Incorrect 'compensating' conversion errors that may lead to an answer of $62 \cdot 8$ is M0A0A0.
$= 62 \cdot 8()$ OR 20 π	A1	
= 62(minutes)	A1 6	For truncating to nearest whole number of minutes.
8. Showing 8 sheep with 1 lamb 10 sheep with 2 lambs 6 sheep with 3 lambs	B1	
$8 \times 1 + 10 \times 2 + 6 \times 3$ (46)	M1	F.T. their values.
÷ 24	m1	
= 1.9	A1	Must be to 1 decimal place with no errors in working.
		<u>Alternative method</u>
		$1 \times 120 + 2 \times 150 + 3 \times 90$ M1
		$\div 360 m^2$
	4	- 1.9 AI
9. 86% = 3655	B1	Accept any indication.
(Last year) $\underline{3655} \times 100$	M1	Or equivalent e.g. 3655 / 0.86.
86		
= 4250	A1 3	
10. (a) Sight of $305(cm)$ or $3.05(m)$ AND $3.95(cm)$ or $0.0395(m)$	B1	The B1 may be awarded if these values are seen in (a) or in (b) and need not be of the same units.
$\frac{305}{3.95}$ or $\frac{3.05}{0.0395}$	M1	FT 'their 305', provided it is > 300 and \leq 310 AND 'their 3.95', provided it is > 3 and < 4
= 77	A1	77·2 is A0.
(b) Sight of 295(cm) or $2.95(m)$ AND $4.05(cm)$ or $0.0405(m)$	B1	The B1 may be awarded if these values are seen in (a) or in (b) and need not be of the same units.
$\begin{array}{cccc} \underline{295} & \text{or} & \underline{2.95} \\ 4.05 & & 0.0405 \end{array}$	M1	FT 'their 295', provided it is \geq 290 and $<$ 300 AND 'their 4.05', provided it is $>$ 4 and \leq 5
= 72.8 AND NO	A1	
		<u>Alternative methods</u>
		73×4.05 M1 = 205 6(5) AND (NO) A1
		= 295.0(5) AND NO AI
		295/73 M1
		= 4.04 AND 'NO' A1
	6	

NOVEMBER 2013	Mark	Final MARK SCHEME (14/11/13)
UNIT 1 Higher	244	Comments (Page 3)
11. $120 \div 3$	MI	
= 40 (m.p.n.)	M1	ET $(180 - \text{'their } 120^{\circ}) / (0.75 \times \text{'their } 40^{\circ})$
$60 \div 30 (= 2)$	A1	$F.1.(180 - \text{ them } 120)/(0.73 \times \text{ them } 40).$
rotar time – 5 (nours)	4	
12. (a) One correct 70% calculated	B1	
At least 4 attempts at repeated 70% of different values. 5 correct values	M1	Allow only arithmetical errors.
7, 4.9 , 3.43 , $2.40(1)$ and $1.68(07)$	A1	All five correct (to 1dp)
All plotted correctly and not joined.	P1	F.T. their values if M1 awarded.
		Accept plots within 1/2 a 'small square'.
		Plotting (0,10) not required but P0 if incorrect plot.
		Correct plots imply previous B1,M1,A1.
(b) Some indication that the heights indicated	EI	E.g. 'there is no 1 ¹ / ₂ bounce',
between the bounces would not be correct.	5	We don't know what happens in-between (bounces).
13. (a) (Arc AB =) $\frac{70}{260} \times 2 \times \pi \times 12$	M1	Allow M1 for (Major arc AB =) $\frac{290 \times 2 \times \pi \times 12}{260}$
$= 14.6(6)(cm) \text{ or } \frac{14 \pi}{3}$	A1	Accept answers between 14.65 and 14.7 inclusive.
5		Allow A1 for (Major arc AB=) $60.7(3)$ or $\frac{58\pi}{2}$
		Accept answers between 60.7 and 60.8 inclusive for
		the major arc.
(b) Use of $\underline{70} \times \pi \times 12^2$ OR $\underline{70} \times \pi \times 8^2$	M1	
$\begin{array}{rcrcr} 360 & 360 \\ = & 87.9(6)(m^2) & OR & 39.0(9)(m^2) \\ OR & 28\pi & OR & 112\pi/9 \end{array}$	A1	Accept 87.9 to 88.0 inc. OR 39.0 to 39.15 inc.
(Shaded area) $\frac{70}{360} \times \pi \times 12^2 - \frac{70}{360} \times \pi \times 8^2$	M1	This implies both M marks. (70/360 $\times \pi \times 80$ is M1M1A1)
$= 48.8(7) (m^2) \text{ OR } \underline{140} \pi$	A1	F.T. their values.
9	-	
$14 - 2(x - x) \mathbf{P}^3 + 2(x - x) (\mathbf{P}/5)^3 - 456$	6 M2	M1 if $\mathbf{D}^3/5$ is used Allow M1 if $4/2$ used instead of $2/2$
14. $/3 \wedge \hbar \wedge \kappa + /3 \wedge \hbar \wedge (\kappa/3) = 430$	IVIZ	WIT II K /5 is used. Allow WIT II 4/5 used histead of /3.
$R^{3} = \frac{456 \times 125 \times 3}{2 \times \pi \times 126}$ or equivalent	A1	F.T. if M1 awarded.
= 216	A1	
(Radius =) 6(m)	A1	F.T. 'their R ³ ' if at least M1 awarded. Correct to 1dp. SC1 for an answer of $6 \cdot (01)$ found by using large hemisphere alone. <u>Note use of r for smaller radius</u>
		$ \begin{array}{cccc} 7_3 \times \pi \times r &+ & 7_3 \times \pi \times (\Im r) &= 450 \\ r^3 - & 456 \times 3 & \text{or equivalent} \\ \end{array} $
		$2 \times \pi \times 126$
		= 1.7279 A1
	5	$(5 \times r) = 6(m) \tag{A1}$
		Mark accordingly, but penalise premature approx -1.

UNIT 2 - FOUNDATION

2013 November	Marks	Mark Scheme (14.11.13)
Unit 2 (non calculator) Foundation Tier		(FINAL VERSION)
		Comments (Page 1)
1. (a) Three hundred and eighty four	B1	
thousand, (and) four hundred (km)	D1	
(b) 960	BI D1	
(c) 517 (d) (i) 20	DI D1	
(ii) 29 (iii) 36	DI DI	
(ii) 56	B1	
(in) 50 (iv) 8	B1	
(e) (Number of girls $-$) 6	B1	
(Total number of pupils = $18 + 6$)	DI	
(1000 number of puppes (1000) (=) 24	B1	FT 'their 6' if $18 \div 3 \circ e$ is seen
	9	
2. hexagon	B1	
cube	B1	
rhombus	B1	
cylinder	B1	
	4	
3. (a) impossible	B1	
(b) likely	B1	
	2	
4. (a) (i) multiply the previous term by 3	B1	Accept × 3
(11) subtract 8 from the previous term	BI	Accept – 8
(b) $20/100 \times (\pounds) 60$	MI	Any correct method for finding 20%
OR 10% of $(\pounds)60 = (\pounds)6$ and $2 \times (\pounds)6$	A 1	Imore further working AO for 120/
(£) 12	AI	SC1 for 48, provided M0
	1	SCI IOI 48 provided MO.
5 (a) $10/18$ LSW (= 5/9)	B2	B1 for a numerator of 10 in a fraction less than 1
		B1 for a denominator of 18 in a fraction less than 1.
		NB Penalise -1 once only for use of words such as
		'10 out of 18', '10 in 18', or '10:18'.
		When both fraction and wrong notation seen,
		DO NOT penalise wrong notation.
		SC1 for an answer of 13/21.
(b) 0 or 0/18	B1	Do not accept 'impossible'. FT 0/21 from (a) if
		denominator of 21 used in (a)
	3	
		In all parts, mark final answer.
6. (a) $13a - 2b$ as an expression	B 2	B1 for $ka + mb$ where $k = 13$ or $m = -2$
		B1 for $13a + -2b$
		B1 for both 13a and $-2b$ given separately but not
(b) (i) (f) $7n$	R1	as $13a - 2b$
(0)(1)(1)(1)/n	B1	Ignore units. Allow $7 \times n$ or $n \times 7$ or $n7$.
(II) $x = 4$ (III)	4	Ignore units.
7(a) 78 (am)	י 1 ת	
$(a) / \delta$ (CIII) (b) (0) 585 (litrae) 585/1000 e e	DI DI	
$(0) (0) \cdot 363 (\text{mues}) = 383/1000 \text{ o.e.}$		
8. Sight of 3/5	B1	Alternative methods: $(f)180 - 2/5 \times 180$ M1
$3/5 \times (f) 180$	M1	(180 - f) 72 R1
$(12 \times 9 = f)$ 108	Al	(100 - 2) 72 B1 (f) 108 A1
		OR
		$2/5 \times (\text{\pounds})20 (= 8)$ M1
		$(20 - 8 = \pounds) 12$ B1
		$(12 \times 9 = \text{f}) 108$ A1
	3	

2013 November Unit 2 (non calculator) Foundation Tier	Marks	Mark Scheme (14.11.13) (FINAL VERSION) Comments (Page 2)
9. If $x = number of cartridges$		Comments (1 age 2)
correct evaluation for $x \ge 3$ for Offer A correct evaluation for $x \ge 3$ for Offer B for $x = 3$, correct evaluation for A and B	B1 B1 B1	Offer A: £14 and Offer B: £21
OR working or a statement implying that at least 4 cartridges must be bought for Offer B for $x = 4$, correct evaluation for A and B OR implied correct evaluation for A and B e.g. a comparison between costs for $x = 4$	B1	Offer A: £21 and Offer B: £18
implied by correct extra amount of £4 for 4th cartridge for Offer B (rather than £7 for A) Conclusion that $x = 4$.	B1	SC2 for answer of 4 with no working
QWC: Candidates would be expected to	QWC2	
• show clearly how they arrived at their solution		
• have few errors in mathematical form, spelling, punctuation and grammar		QWC2 Presents relevant material in a coherent and logical manner, using
QWC2: Candidates will be expected to		acceptable mathematical form, and with few if any errors in spelling, punctuation and
 present work clearly, with words explaining process or steps AND 		grammar.
 make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units (£) in their working 		QWC1 Presents relevant material in a coherent and logical manner but with some
QWC1: Candidates will be expected to		errors in use of mathematical form, spelling, punctuation or grammar
 present work clearly, with words explaining process or steps OR make few if any mistakes in mathematical form spelling 		evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar.
punctuation and grammar, and include units (£) in their working		QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar. A final unsupported statement only gets
	7	QWC0
10. Given points correctly plotted on suitable axes	B2	B2 for 3 correct plots, B1 for 2 correct plots, B0 if all coordinates reversed. Penalty = 1 for unsuitable labelling of axes
Coordinates are $(-4, -3)$ OR $(6, -7)$	B1	FT 'their plots', if parallelogram drawn, for final B1 only.
UK (4, 11)	2	Allow B3 if coordinates of 4^{th} vertex given as $(-4, -3)$ or $(6, -7)$ or $(4, 11)$ with no drawing shown.
	5	

2013 November Unit 2 (non calculator) Foundation Tier	Marks	Mark Scheme (14.11.13) (FINAL VERSION)
		Comments (Page 3)
11. (a) (11) 14 16	B2	B1 for at least 4 correct entries
17 20 22		
21 24 (26)		
(b) (i) 4/9	B2	FT their table if complete
		B1 for a numerator of 4 in a fraction less
		than 1.
		B1 for a denominator of 9 in a fraction less
		than I.
		NB Penalise -1 for use of words such as
		4 out of 9, 4 in 9. or 4.9.
		NOT populies wrong notation
(ii) $A/0 \times 5A$	M1	ET their $(h)(i)$ if positive fraction less than 1
$(11) \frac{4}{9} \times \frac{54}{-24}$	A1	11 then (0)(1) if positive fraction less than 1.
- 27	6	
12 Angle ABC = 78 (°)	B1	Check for answers written on diagram
OR sight of correct obtuse angle at B of $102(^{\circ})$	21	
$(x =) [180 - 78] \div 2$	M1	Implies B1
		FT 'their 102' ÷ 2
$(x =) 51(^{\circ})$	A1	
	3	
13. (a) Correct reflection	B2	B1 for a reflection in any horizontal line
		or in $x = -1$ or sight of the line $y = -1$
(b) Correct tessellation of at least / additional	B 2	B1 for 3 additional correct interlocking kites
direction)	4	(each sharing at least one common side).
	4	
14. (a) $x + 3x + 16x = 1$	M1	Use of 'total probability = 1'
x = 1/20 or 0.05 or equivalent ISW	A1	Accept 5% only if specified as a percentage .
*		
(b) (Statement that Stephen is incorrect and) a	E1	Accept alternative explanations; e.g. 'It may
correct explanation e.g. fraction (proportion) of		decrease his chance of winning a prize as more
tickets bought would be the same.	2	people may be tempted to buy tickets'.
15 () () 10.9	3	4 9 9 10
15. (a) (1) $12t^{6}$	BI D1	Accept $12 \times t^2$ or $t^2 \times 12$
(II) p	BI	
		ET uptil 2 nd error
(b) $(r-2=) 8r + 12$	R1	Correct clearing of bracket
7r = -14 or $-7r = 14$	B1	Collecting terms correctly
r = -2	B1	FT ax = b where $a \neq 1$ and answer must be
	21	expressed as integer if fraction can be
		cancelled to an integer
		Ť
c) Method that produces at least 2 correct prime	M1	FT until 2 nd error.
factors.		
Sight of correct factors (2, 2, 3, 3, 11) in any order	A1	Ignore 1s seen.
$2^2 \times 3^2 \times 11$	B1	FT their factors (with at least one index > 1
		used). Do not ignore 1s within this product.
		BU for list or sum.
	8	

UNIT 2 - HIGHER TIER

Unit 2 GCSE Maths November 2013	Mark	Comment
Higher Tier Markscheme 14.11.13		
1. <u>Option A:</u> (Total cost using option A =) $580 + 580 \times 20/100$ or equivalent (Total cost using option A =) (£)696 <u>Option B:</u> (Total cost using option B =) (£)120 + 12 × (£)49.50 or equivalent (Total cost using option B =) (£)714	M1 A1 M1 A1	A complete correct method Correct total for Option A SC1 for sight of (\pounds) 116 if M0A0 A complete correct method Correct total for Option B SC1 for sight of (\pounds) 594 if 2 nd M0A0
Conclusion that Option A is cheaper AND by (£)18	B1	FT only if both M marks were awarded
 Look for relevance spelling in at least 1 statement/sentence clarity of text explanations, the use of notation (watch for the use of '=', £, % being appropriate) A clear conclusion statement must be made before QWC2 can be awarded. QWC: Candidates would be expected to clearly show how they arrived at their solution have few errors in mathematical form, spelling, punctuation and grammar Count incorrect use of '=' in situations such as '580 × 20/100 = 116 + 580' within the 'few errors in mathematical form' 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 	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. A final unsupported statement only gets QWC0
(£) in their final answer	7 D 1	Charle for answers written on discreme
2. Angle ABC = 78 (°) OR sight of correct obtuse angle at B of 102(°) $(x =) [180 - 78] \div 2$ (x =) 51(°)	ы М1 А1 З	Implies B1. FT 'their 102' ÷ 2
3. (a) Correct reflection	B2	B1 for a reflection in any horizontal line or in $x = -1$ or sight of the line $y = -1$
(b) Correct tessellation of at least 7 additional interlocking kites (not all in one row in one direction)	B2 4	B1 for 3 additional correct interlocking kites (each sharing at least one common side with another)

Unit 2	2 GCSE Maths November 2013	Mark	Comment
Fight	er mer Markscheme 14.11.15	D 1	4 10 9 9 10
4. ((i) $12t^{-1}$ (ii) p^{6}	B1 B1	Accept $12 \times t$ or $t \times 12$
(b) $8r < 72$ or $-72 < -8r$	B1	FT until second error
(r < 0	B1	B0 for use of $-$ sign unless replaced for final answer
	$\lambda < j$	4	bo for use of – sign, unless replaced for final answer.
		-	
5 ((a) Method that produces at least 2 correct prime factors	M1	FT until 2 nd error
5. (Sight of correct factors (2, 2, 3, 3, 11) in any order	A1	Ignore 1s seen
	$2^2 \times 3^2 \times 11$	B1	FT their factors (with at least 1 index >1 used) (provided 'their
	2	DI	factors' arise from an attempt to <i>divide</i>) Do not ignore 1s within
			the product B0 for a sum or list
(b) 11	B1	FT from (a)
(0) 11	4	
6 (Numerator is) 900×0.1 or appropriate approximations	B1	Accept 1000 and 0.108 respectively
0.	Denominator is) $0.09 \text{ or } 0.1$	B1	Accept 9 or 10 if an attempt has been made to multiply
, in the second s		DI	numerator by 100
1	000	B1	FT for answers from 900 to 1100 inclusive
-		21	Unsupported 900 or 1000 gets 3 marks, but do not ignore
			incorrect working.
		3	
7. ((a) $x + 3x + 16x = 1$	M1	Use of 'total probability = 1'
	x = 1/20 or 0.05 or equivalent ISW	A1	Accept 5% only if specified as a percentage .
((b) (Statement that Stephen is incorrect and) a correct	E1	Accept alternative explanations such as 'It may decrease his
	explanation e.g. fraction (proportion) of tickets bought		chance of winning a prize as more people may be tempted to buy
	would be the same.		tickets'
		3	
8. ((a) $\frac{3}{4}$	B1	$y = \frac{3}{4}x - \frac{5}{4}$ is insufficient, unless $\frac{3}{4}$ indicated (e.g. circled).
(h) (Correct gradient (- 1/2)	B 1	
	R correct <i>y</i> -intercent plotted $(0, 3)$	DI	
	OR any two other points calculated or plotted correctly		
	(with no incorrect points)		e.g. $(1, 2.5)$ $(2, 2)$ $(3, 1.5)$ $(4, 1)$ $(5, 0.5)$ $(6, 0)$
	(() in no mooreer points)		o.g. (1, 2 0) (2, 2) (0, 1 0) (1, 1) (0, 0 0) (0, 0)
Point	s joined by one correct straight line, no stray points	B1	Single straight line, do not ignore incorrect points joined. CAO.
	, , , , , , , , , , , , , , , , , , ,		Line should be of 'reasonable' sufficient length (halfway across
			grid)
		3	
9. ((a) (i) $8n-3$	B2	B1 for 8 <i>n</i>
	(ii) $(n-1)^2$ OR $n^2 - 2n + 1$	B2	B1 for $an^2 + b$, with $a \neq 0$ OR $(an + b)^2$, with $a \neq 0$
			OR $n^2 - 2n + k$
(b) \$	Strategy of solving an appropriate equation or inequality	S1	Accept a 'trial and improvement' approach provided at least two
130 -	4n < 0 or $130 - 4n = 0$ or equivalent		trials (one above and one below 33)
	130 / 4 or equivalent	M1	Trial and improvement gives rise to -2
	(position number of) 33	A1	
			SC2 for unsupported '33'. O marks for unsupported -2 with no
		_	reference to position number.
10		7	
10. 1	Enlargement	BI	A second alternative terminals are a first like in O?
	scale factor of 2	ы	Accept alternative terminology e.g. multiplier is 2
			bo not accept an incorrect statement e.g. snape B is twice the
	Centre of enlargement at $(2,3)$	P 1	SIZE OF SHAPE A
'	control of official at (2,3)		SC1 for 2 or more 'rays' correctly drawn intersecting at (2, 2) if
			B0 B0 B0
		3	20, 20, 20,

Unit 2 GCSE Maths November 2013	Mark	Comment
Higher Tier Markscheme 14.11.13		
11. $2s + 3a = 2550$, $s + 5a = 2500$	S1	Strategy of forming a pair of equations. (Do not penalise for not defining variables.)
Method to find the first variable	M1	Allow 1 slip in multiplication, but not in equated variable.
Correct first variable	A1	
Correct second variable	A1	FT 'their 1 st variable'
		$s = (\pounds) 750, a = (\pounds) 350$
(£) 1850	A1	FT their values (provided S1, M1 awarded)
	5	
12. (a) Angle ABC = $71(^{\circ})$	B1	Check for answers written on diagram.
Opposite angles in a cyclic quadrilateral add to 180(°)	E1	E marks depend on B marks having been awarded.
		Accept an alternative circle theorem quotation if it has been used
		appropriately.
(b) (obtuse) Angle AOC = $142(^{\circ})$	B1	FT twice 'their angle ABC'
		(OR reflex angle AOC = 218° and $360^{\circ} - 218^{\circ} = 142^{\circ}$
		Angle at the centre is twice the angle at the circumference)
Angle at the centre is twice the angle at the circumference	E1	Stating the use of an isosceles triangle is not enough (must quote
		correct circle theorem)
Angle ACO = $19(^{\circ})$	B1	FT 'their angle AOC'
	5	
13. (a) $x = 0.0888$ $10x = 0.8888$ with an attempt to	M1	Or an alternative method.
subtract		
8/90 or 4/45 or equivalent e.g. 88/990	A1	An answer of e.g. $0.8/9$ or $8.8/99$ gains M1 only.
		Mark final answer. Do not ignore incorrect cancelling.
(b) $\frac{1}{4}$ or 0.25	B2	B1 for 4 ⁻¹ or $1/\sqrt{16}$ or $1/16^{1/2}$ or $(1/16)^{1/2}$
(c) $(\sqrt{4\times 5}) - \sqrt{5}^2$ or $20 - \sqrt{20}\sqrt{5} - \sqrt{20}\sqrt{5} + 5$	M1	RHS method needs 3 of 4 terms correct; accept $\sqrt{100}$ as $\sqrt{20}\sqrt{5}$
$(\sqrt{5})^2$ middle term (<u>+</u>) 20	M1	
5 and rational	A1	
	7	
14. Translation horizontally to the right	B1	
(5, 0) indicated correctly on the <i>x</i> -axis with the correct	B1	Accept labelling of 5 on the <i>x</i> -axis.
translation.		SC1 for left shift with (-1, 0) or -1 indicated on the <i>x</i> -axis.
	2	
15. (a) either $6/10 \times 5/9$ or $3/10 \times 2/9$	B1	Must indicate 'no replacement'
$6/10 \times 5/9 + 3/10 \times 2/9$ with no incorrect additional terms	M1	
36/90 (=2/5)	A1	Do not ignore incorrect cancelling
		MR –1 for whole question for consistent use of incorrect total
		number of sweets (e.g. 9)
	14	
(b) $9/10 \times 8/9 \times 7/8$	M1	Or P(SSS) + 3P(SSL) + 3P(SLL) + P(LLL) (or its numerical
		equivalent)
= 1/10 OR $504/720$ or equivalent	AI	15 W
	5	

UNIT 3 FOUNDATION

2013 November UNIT 3 (calculator allowed) Foundation Tier Mark Scheme	Mark	Comments (page 1)
1. (a)(£) $3.5(0)$ or $350(p)$	B1	
(£)1·92 or 192(p)	B1	
(£)1·7(0) or 170(p)	B1	
(£) 2·25 or 225(p)	B1	FT one error.
(b) 20 – 9·37 or 2000 – 937	M1	Attempt to subtract or find the difference
(£) 10.63 or 1063(p)	A1	
(c) $5.49 \div 3$ or $549 \div 3$	M1	
(£)1·83 or 183(p)	A1	
	8	
2. (a) 127	B1	
(b) 138 000	B1	
(c) 14.2	B1	
2 Evidence of square counting	3 M1	E a data or marks in the squares
40-50 (squares)		E.g. dots of marks in the squares.
Candidate's area $\times 10 \text{ (cm}^2)$	B1	FT 'their area' × 10
	DI	Final answer of 400-500 gets 3 marks.
	3	
4. (a) Attempt to use 60 minutes = 1 hour in context.	M1	Sight of 290 (minutes) or 5.16(66) or 5.17 (hours) or 5
e.g. $4 \times 60 + 50$ OR $310 / 60$		hours 10 minutes
(Delay =) 20 (minutes)	A1	C.A.O.
(b) 13:50 + 3 hours 15 minutes.	M1	Attempt to add time
17:05 or 5:05 (pm)	A1	
(c) Attempt to find time between 6:30 a.m. and 5:55 p.m. with correct interpretation of a.m. and p.m.	M1	
11 hours and 25 minutes.	A1	Accept 11:25 or 11.25
	6	
5. (a) Drawing showing 2 and a half circles	B1 D2	D16 2 2
(b) Mon-30, Tues-10, wed-18, Thur-22 (c) Ordering data 16, 18, 22, 20, 26	Б2 М1	B Hor any 2 or 5 correct answers.
(c) Ordering data 10, 18, 22, 50, 50 Modian 22		FT condidate's values from table
	AI	Or indicated on the bars themselves.
(d) Mon, Tues, Wed, Thur, Fri (or equivalent) along one axis	B1	
Uniform scale and label for frequency or equivalent.	B1	FT from their table values.
Five bars at correct heights	B2	B1 for at least 3 correct bars on FT.
		B1 for unequal width bars.
	9	
6. Correct rectangle or square with sum of two sides equal to	B3	Any orientation.
12 and product of two sides greater than 32.		B2 for perimeter= 24 cm but area <32 cm ² eg. 3 by 9 or 2
e.g. 6 by 6 or 7 by 5		by 10 12^{2} by 10 12^{2} by 10 12^{2}
		B I for area >32 cm ⁻ but perimeter \neq 24 cm D1 for stating area = 22 (cm ⁸) and Davianter = 24(cm)
		B) for stating area = 52 (cm) and Perimeter = 24 (cm) B0 for 4 by 8 or 8 by 4
	3	

2013 November UNIT 3 (calculator allowed)		
Foundation Tier Mark Scheme	Mark	Comments (page 2)
7. Set dinner discount (£)2.34	B1	Alternative $0.9 \times 23.40 = 21.06$ for B2
Set dinner cost after discount $(\pm)23\cdot40-(\pm)2\cdot34=(\pm)21\cdot06$ (Set dinner cost for each person f7.02)	BI	FT their $\pm 2.34^{\circ}$ from appropriate working.
(Set unifier cost for each person 27 02)		Ignore incorrect division if (f)21.06 seen
		Treat multiplication of price of set meal by 3 as misread.
		Alternative method if total cost not shown:
Total general Menu cost $2\times(5)450+2\times(5)185+(5)150$	M1	$(\pounds)1.59 \div 3 = (\pounds)0.53$ for M1A1
$5 \times (t)4 \cdot 50 + 5 \times (t)1 \cdot 85 + (t)1 \cdot 59$		(f) 4.50 + (f) 1.85 + (f) 0.52 - (f) 6.88 for M1 A 1
General menu cost for each person		$(z)^{4.50+}(z)^{1.65+}(z)^{0.55-}(z)^{0.86}$ for WIAI
$(\pounds)20.64 \div 3$	M1	FT their costs so that correct division of their lower total
=(\pounds) 6.88 (cheaper option)	A1	by 3 gets M1 A1.
Look for		OWC2 Design to the state of the state of the
• Spelling	OWC	QwC2 Presents relevant material in a concrete and logical manner, using acceptable mathematical form, and
• Clarity of text explanations,	2	with few if any errors in spelling, punctuation and grammar
• Consistent use of £ or p		S. d. minut
QWC2: Candidates will be expected to		QWC1 Presents relevant material in a coherent and
• Present work clearly, with words explaining		logical manner but with some errors in use of
process and steps		OR
AND		Evident weakness in organisation of material but using
• Make few, if any, mistakes in mathematical form.		acceptable mathematical form, with few, if any, errors in
spelling, punctuation and grammar in their final		spelling, punctuation and grammar.
answer.		OWCO Evident weakness in organisation of material and
QWC1 : Candidates will be expected to		errors in use of mathematical form, spelling, punctuation
• Present work clearly, with words explaining		and grammar.
process or steps		
OR		
• Make few, if any, mistakes in mathematical form,		
spelling, punctuation and grammar in their final	8	
answer.		
	D1	
8. Calculation A 3.46 Calculation B 2 (051828453 $)$	BI B1	CAU Rounded or truncated
Calculation C 3.65	B1	CAO
Order B, A, C	B1	FT candidate's values in ascending order.
	4	
9.(a) <i>a</i> =8	B1	Accept embedded answers throughout.
(b) $2y=16$	B1	
y=8	B1 B1	
(c) $x/3 = 10$ or $x + 13 = 43$ x = 30	B1 B1	
<i>x</i> 50	5	
10. Cubing whole numbers. Trial and improvement shown.	S1	Alternative method. Cube root of 2500 with appropriate
Answer of $(13 \times 13 \times 13 =) 2197(\text{cm}^3)$	B2	B1 for $13 \times 13 \times 13$ or 13 cubed without 2197
	3	
11. A triangle with at least two correct lengths $(\pm 2mm)$	B1	Any orientation.
One line drawn correctly AND two intersecting arcs drawn	M1	
from the ends of this line. Triangle correctly constructed using intersecting arcs with	A 1	
all 3 sides of the correct length (± 2 mm).		
č		
	3	

2013 November UNIT 3 (calculator allowed) Foundation Tier Mark Scheme	Mark	Comments (page 3)
12.Both heart rates correct AND Bethan identified as higher	B2	B1 for sight of one of 188(.8) or 201(.8)
Alan 188.(8) Bethan 201.(8)	2	
13. (a) All points plotted correctly	B2	B1 for at least 5 correct plots. Ignore line of best fit at this stage. Penalise -1 if joined point to point.
(b) Line of best fit with positive gradient and points above and below.	B1	
(c) (i)Identify worker C	B1	Worker C, named, described or identified on the graph.
(ii)Appropriate reading for 40 year old from candidate's line of best fit.	B1	Consistent with candidate's positive gradient line of best fit. FT 'their (c)(i)'.
	5	
14. a) Michael with reason, e.g. "Michael because he took less time", "Michael finished in 40 sec", "Michael, his line is steeper"	E1	Allow "Michael because he was faster"
b) $50 \div 40$ or equivalent OR $25 \times 60/20$	M1	M1A0 for use of e.g. $26 \div 20$ (misread from graph)
1.25 or equivalent OR 75	A1	If no marks awarded, SC1 for answers of 1.04 or 62.5 (Jordan's speed in m/s or m/min) or 0.9(speed for whole race)
m/s OR m/min	U1	Must be appropriate.
c) 8 (seconds)	B1 5	
15. One correct evaluation $4 \le x \le 5$	B1	$\underline{x} \underline{x^3 + 3x} \underline{x} \underline{x^3 + 3x}$
	D.	4 76 4.21 87.24
2 correct evaluations $4.2 \le x \le 4.35$	BI	5 140 4.22 87.81 4.1 91.221 4.22 89.27
One entiter side of 90		4.1 61.221 4.25 $66.574.2$ 86.688 4.24 88.94
2 correct evaluations $4.25 \le x \le 4.35$	M1	4.3 92.407 4.25 89.51
One either side of 90		4.4 98.384 4.26 90.08
		4.5 104.625 4.27 90.66
If evaluations not seen, accept 'too high' or 'too low'.		4.6 111.136 4.28 91.24
<i>x</i> = 4.3	A1	4.7 117.923 4.29 91.82
		4.8 124.992 4.9 132.349 4.35 95.36
		Watch for comparison to 0
	4	-
16. $(AB^2 =) 3 \cdot 3^2 + 5 \cdot 6^2$	M1	Addition of squares seen or implied
$AB^2 = 42.25$ OR $(AB =) \sqrt{42.25}$ OR	Al	$(AB=)$ $\sqrt{(3\cdot3^2+5\cdot6^2)}$ alone gets M1A0A0
(AB =) 6.3(cm)		
17. a) Points plotted at mid-points of groups and straight	B2	B1 at least 4 points plotted and joined correctly
lines connecting the points		OR for all points plotted correctly but not joined,
		OR consistent horizontal translation within the limits
		of the groups.
		outside the first and last points
b) Sight of the mid-points 125, 135, 145, 155, 165 125×2 + 135×8 + 145×13 + 155×22 + 165×10	B1 M1	FT their mid-points from within or at the bounds of the groups
(250 + 1080 + 1885 + 3410 + 1650 = 8275)		
'Their 8275' - 55	m1	
= 150(.45)	A1	
	6	

UNIT 3 - HIGHER TIER

Unitised Unit 3 – Nov 2013		
Higher Tier Mark scheme – Post Conference		
1. a) $x(x-6)$	B1	
b) $7x - 3x = 5 - 13$	B1	FT until 2 nd error
4x = -8	B1	
x = -2	B1	
	4	
2. Suitable arcs drawn for 60° angle	M1	Use overlay. Allow $\pm 2^{\circ}$.
60° angle drawn with line 8cm long	A1	Allow ± 2 mm for all lengths.
Arcs drawn 5.5cm from the ends of the 8cm lines	B1	
2 lines of length 5.5cm joining to complete the kite	B1	
	4	
3. a) Michael with reason, e.g. "Michael because he took less	E1	Allow "Michael because he was faster"
time", "Michael finished in 40 sec", "Michael, his line is		
steeper"		
b) $50 \div 40$ or equivalent OR $25 \times 60/20$	M1	M1A0 for use of e.g. $26 \div 20$ (misread from graph)
1.25 or equivalent OR 75	A1	If no marks awarded, SC1 for answers of 1.04 or 62.5 (Jordan's
		speed in m/s or m/min) or 0.9 (speed for whole race)
m/s OR m/min	U1	Must be appropriate.
c) 8 (seconds)	B1	
	5	
4. a) $(6.5 \times 7) + (\frac{1}{2} \times 7 \times 3)$ OR $2 \times \frac{1}{2}(9.5 + 6.5) \times 3.5$	M2	M1 for (6.5×7) + OR + $(\frac{1}{2} \times 7 \times 3)$
$= 56(m^2)$	A1	CAO
b) 56/15 (= 3.73)	M1	FT 'their 56'
4 (tins needed)	A1	Award provided rounding up required
	5	
5. a) $\pi \times 6^2$	M1	
Answers in the range 113 to 113.14(sq inches)	A1	
b) (Area of small pizza =) 38.4 to 38.5	B1	Sight of area of small pizza
Perform calculations that allow comparison	M2	FT <i>their</i> areas provided not 7 and 12. M1 for each calculation.
e.g. Large $113 \div 10 = 11.3$ to $11.314()$ (sq inch per £)		Alternative method to get £10 worth of small pizza or £4 worth of
$or \ 10 \div 113 = (\pounds)0.08(8)(\ per \ sq \ inch)$		large pizza
Small $38.4 \div 4 = 9.6$ to 9.625 (sq inch per £)		B1 sight of 2.5 as a multiplier or divisor
$or 4 \div 38.4 = (\pounds)0.10 \ (per \ sq \ inch)$		<i>M1</i> for $2.5 \times 38.4 (= 96)$ OR $113 \div 2.5 (= 45.2)$
		Alternative method to get comparable price for large or small
		pizza using similar areas:
		B1 for $(12/7)^2$ or 2.9(38) OR $(7/12)^2$ or 0.3(40)
		<i>M1 for 2.9(38)</i> × 4 <i>OR 0.3(40)</i> ×10
		A1 for £11.75(5) OR £3.40(2)
		SC2 for convincing argument e.g. 3 small pizzas give nearly the
		same area for £2 more
Statement implying that large pizza is better value	A1	If no marks awarded, SC1 for convincing statement after
		comparing costs or areas
	6	

Unitised Unit 3 – Nov 2013		
Higher Tier Mark scheme – Post Conference		
6. (1 part =) 500/10	M1	
(Composite steel) = $350(kg)$ (Chromium) = $100(kg)$	A2	A1 for any 2 correct
(Nickel) = 50(kg)		
(Cost of Composite Steel =) (£) $(0.)50 \times 350$		FT their weights provided first M1 awarded
(Cost Of Chromium needed =) 1.90×100		
(Cost of Nickel needed =) 12.70×50		
(Total cost =) $(0.)50 \times 350 + 1.90 \times 100 + 12.70 \times 50$	M1	
(Total Cost =) $\pounds 1000$	A1	CAO
		Alternative method:
		Price of Tokg:
		$M4 \text{ for } 7 \times 50p \times 50 + 2 \times \pm 1.90 \times 50 + 1 \times \pm 12.70 \times 50$
0.11/2		OR M3 for any 2 correct with intention to add
QWC:		OR M2 for any 1 correct with intention to add
Look for		OR M1 for $7\times50p+2\times\pm1.90+1\times\pm12.70$ (= ±20)
• correct units used i.e. kg, £, p		AI for £1000 CAO
• spelling in at least 1 statement/sentence		
• clarity of text explanations		QWC2 Presents material in a coherent and logical manner, using
		acceptable mathematical form, and with few if any errors in
QWC2: Candidates will be expected to		spelling, punctuation and grammar.
• present work clearly, with words or quantities shown	QWC	
for clarity of process or steps	2	QWC1 Presents material in a coherent and logical manner but
AND		with some errors in use of mathematical form, spelling,
• make few if any mistakes in mathematical form,		punctuation or grammar
spelling, punctuation and grammar in their answer		OR
		evident weaknesses in organisation of material but using
QWC1: Candidates will be expected to		acceptable mathematical form, with few if any errors in spelling,
• present work clearly, with words or quantities shown		punctuation and grammar.
for clarity of process or steps		
OR		QWC0 Evident weaknesses in organisation of material, and errors
ORmake few if any mistakes in mathematical form,		QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar.
 OR make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer 	7	QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar.
OR • make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer 7. One correct evaluation $4 \le x \le 5$	7 B1	QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar. $\underline{x} \underline{x^3 + 3x} \underline{x} \underline{x^3 + 3x}$
OR • make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer 7. One correct evaluation $4 \le x \le 5$	7 B1	QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar. $\frac{x}{4} \frac{x^3 + 3x}{76} \frac{x}{4.21} \frac{x^3 + 3x}{87.24}$
 OR make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer 7. One correct evaluation 4 ≤ x ≤ 5 2 correct evaluations 4.2 ≤ x ≤ 4.35 	7 B1 B1	QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar. $\frac{x}{4}$ $\frac{x^3 + 3x}{76}$ $\frac{x}{4.21}$ $\frac{x}{5}$ 140 4.22 87.81
 OR make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer 7. One correct evaluation 4 ≤ x ≤ 5 2 correct evaluations 4.2 ≤ x ≤ 4.35 one either side of 90 	7 B1 B1	QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar. \underline{x} $\underline{x^3 + 3x}$ \underline{x} $\underline{x^3 + 3x}$ 4764.2187.2451404.2287.814.181.2214.2388.37
OR • make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer 7. One correct evaluation $4 \le x \le 5$ 2 correct evaluations $4.2 \le x \le 4.35$ one either side of 90	7 B1 B1	x $\frac{x^3 + 3x}{76}$ x $\frac{x^3 + 3x}{87.24}$ 5 140 4.22 87.81 4.1 81.221 4.23 88.37 4.2 86.688 4.24 88.94
OR • make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer 7. One correct evaluation $4 \le x \le 5$ 2 correct evaluations $4.2 \le x \le 4.35$ one either side of 90 2 correct evaluations $4.25 \le x \le 4.35$	7 B1 B1 M1	QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar. \underline{x} $\underline{x^3 + 3x}$ \underline{x} $\underline{x^3 + 3x}$ 4764.2187.2451404.2287.814.181.2214.2388.374.286.6884.2488.944.392.4074.2589.51
OR • make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer 7. One correct evaluation $4 \le x \le 5$ 2 correct evaluations $4.2 \le x \le 4.35$ one either side of 90 2 correct evaluations $4.25 \le x \le 4.35$ one either side of 90	7 B1 B1 M1	QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar. x $x^3 + 3x$ x $x^3 + 3x$ 4764.2187.2451404.2287.814.181.2214.2388.374.286.6884.2488.944.392.4074.2589.514.498.3844.2690.08
 OR make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer 7. One correct evaluation 4 ≤ x ≤ 5 2 correct evaluations 4.2 ≤ x ≤ 4.35 one either side of 90 2 correct evaluations 4.25 ≤ x ≤ 4.35 one either side of 90 	7 B1 B1 M1	QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar. x $x^3 + 3x$ x $x^3 + 3x$ 4764.2187.2451404.2287.814.181.2214.2388.374.286.6884.2488.944.392.4074.2589.514.498.3844.2690.084.5104.6254.2790.66
 OR make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer 7. One correct evaluation 4 ≤ x ≤ 5 2 correct evaluations 4.2 ≤ x ≤ 4.35 one either side of 90 2 correct evaluations 4.25 ≤ x ≤ 4.35 one either side of 90 <i>If evaluations not seen, accept 'too high' or 'too low'.</i> 	7 B1 B1 M1	QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar. \underline{x} $\underline{x^3 + 3x}$ \underline{x} $\underline{x^3 + 3x}$ 4764.2187.2451404.2287.814.181.2214.2388.374.286.6884.2488.944.392.4074.2589.514.498.3844.2690.084.5104.6254.2790.664.6111.1364.2891.24
OR • make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer 7. One correct evaluation $4 \le x \le 5$ 2 correct evaluations $4.2 \le x \le 4.35$ one either side of 90 2 correct evaluations $4.25 \le x \le 4.35$ one either side of 90 <i>If evaluations not seen, accept 'too high' or 'too low'.</i> x = 4.3	7 B1 B1 M1	QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar. \underline{x} $\underline{x^3 + 3x}$ \underline{x} $\underline{x^3 + 3x}$ 4764.2187.2451404.2287.814.181.2214.2388.374.286.6884.2488.944.392.4074.2589.514.498.3844.2690.084.5104.6254.2790.664.6111.1364.2891.244.7117.9234.2991.82
OR • make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer 7. One correct evaluation $4 \le x \le 5$ 2 correct evaluations $4.2 \le x \le 4.35$ one either side of 90 2 correct evaluations $4.25 \le x \le 4.35$ one either side of 90 <i>If evaluations not seen, accept 'too high' or 'too low'.</i> x = 4.3	7 B1 B1 M1	QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar. \underline{x} $\underline{x^3 + 3x}$ \underline{x} $\underline{x^3 + 3x}$ 4764.2187.2451404.2287.814.181.2214.2388.374.286.6884.2488.944.392.4074.2589.514.498.3844.2690.084.5104.6254.2790.664.6111.1364.2891.244.7117.9234.2991.824.8124.99291.82
OR • make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer 7. One correct evaluation $4 \le x \le 5$ 2 correct evaluations $4.2 \le x \le 4.35$ one either side of 90 2 correct evaluations $4.25 \le x \le 4.35$ one either side of 90 <i>If evaluations not seen, accept 'too high' or 'too low'.</i> x = 4.3	7 B1 B1 M1 A1 4	QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar. \underline{x} $\underline{x^3 + 3x}$ \underline{x} $\underline{x^3 + 3x}$ 4764.2187.2451404.2287.814.181.2214.2388.374.286.6884.2488.944.392.4074.2589.514.498.3844.2690.084.5104.6254.2790.664.6111.1364.2891.244.7117.9234.2991.824.8124.9924.3595.36
OR • make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer 7. One correct evaluation $4 \le x \le 5$ 2 correct evaluations $4.2 \le x \le 4.35$ one either side of 90 2 correct evaluations $4.25 \le x \le 4.35$ one either side of 90 If evaluations not seen, accept 'too high' or 'too low'. x = 4.3	7 B1 B1 M1 A1 4	QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar. \underline{x} $\underline{x^3 + 3x}$ \underline{x} $\underline{x^3 + 3x}$ 4764.2187.2451404.2287.814.181.2214.2388.374.286.6884.2488.944.392.4074.2589.514.498.3844.2690.084.5104.6254.2790.664.6111.1364.2891.244.7117.9234.2991.824.8124.9924.3595.36Watch for comparison to 0. $ -$
OR • make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer 7. One correct evaluation $4 \le x \le 5$ 2 correct evaluations $4.2 \le x \le 4.35$ one either side of 90 2 correct evaluations $4.25 \le x \le 4.35$ one either side of 90 <i>If evaluations not seen, accept 'too high' or 'too low'.</i> x = 4.3 8. a) Points plotted at mid-points of groups and straight lines	7 B1 B1 M1 A1 4 B2	QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar. x $x^3 + 3x$ x $x^3 + 3x$ 4764.2187.2451404.2287.814.181.2214.2388.374.286.6884.2488.944.392.4074.2589.514.498.3844.2690.084.5104.6254.2790.664.6111.1364.2891.244.7117.9234.2991.824.8124.9924.3595.36Watch for comparison to 0.B1 at least 4 points plotted and joined correctly
 OR make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer 7. One correct evaluation 4 ≤ x ≤ 5 2 correct evaluations 4.2 ≤ x ≤ 4.35 one either side of 90 2 correct evaluations 4.25 ≤ x ≤ 4.35 one either side of 90 <i>If evaluations not seen, accept 'too high' or 'too low'.</i> x = 4.3 8. a) Points plotted at mid-points of groups and straight lines connecting the points	7 B1 B1 M1 A1 4 B2	QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar. \underline{x} $\underline{x^3 + 3x}$ \underline{x} $\underline{x^3 + 3x}$ 4764.2187.2451404.2287.814.181.2214.2388.374.286.6884.2488.944.392.4074.2589.514.498.3844.2690.084.5104.6254.2790.664.6111.1364.2891.244.7117.9234.2991.824.8124.9924.3595.36Watch for comparison to 0.B1 at least 4 points plotted and joined correctly OR for all points plotted correctly but not joined,
OR • make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer 7. One correct evaluation $4 \le x \le 5$ 2 correct evaluations $4.2 \le x \le 4.35$ one either side of 90 2 correct evaluations $4.25 \le x \le 4.35$ one either side of 90 If evaluations not seen, accept 'too high' or 'too low'. x = 4.3 8. a) Points plotted at mid-points of groups and straight lines connecting the points	7 B1 B1 M1 A1 4 B2	QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar. \underline{x} $\underline{x^3 + 3x}$ \underline{x} $\underline{x^3 + 3x}$ 4764.2187.2451404.2287.814.181.2214.2388.374.286.6884.2488.944.392.4074.2589.514.498.3844.2690.084.5104.6254.2790.664.6111.1364.2891.244.7117.9234.2991.824.8124.9924.3595.36Watch for comparison to 0.B1 at least 4 points plotted and joined correctly OR for all points plotted correctly but not joined, OR consistent horizontal translation within 1 small square.
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Unitised Unit 3 – Nov 2013		
Higher Tier Mark scheme – Post Conference		
9. a) 1.5×10^9	B2	B1 for 1.4×10^9 or 1.49×10^9 or 15×10^8 or 1.488×10^9
b) 9.6×10^{-2} (mm)	B2	B1 for 0.096(mm) or 9.6×10^{-3} (cm)
	4	
10. a) $12 \times \cos 37^{\circ}$	M2	M1 for $\cos 37 = AC/12$
9.6 (cm) or 9.5(83cm)	A1	Accept an answer of 10 from correct working
b) (length ² =) $9^2 + 6.5^2$	M1	
$length^2 = 123.25$ OR (length =) $\sqrt{123.25}$	A1	
(length =) 11(.101)	A1	
(Perimeter =) 44(.407cm)	A1	FT 'their length' × 4
	7	
11. a) 4, 6, 7, 11, 23, 30	B1	
b) Idea, plotting the upper class boundary consistently with the	M1	FT, for all marks, provided frequencies are cumulative.
corresponding cumulative frequency.		
At least 3 points plotted correctly.	A1	
All points correct and joined by straight lines or a curve.	A1	SC1 if points plotted at mid-points.
c) Median = Answers in the range 63 to 64 inclusive	B1	FT their diagram provided frequencies are cumulative.
Interquartile range: $(69 \text{ to } 70) - (51 \text{ to } 53)$	M1	Intention to subtract must be clear
		Must FT from their calculation if shown. Allow a consistent
		misread of the horizontal scale.
Answers in the range 16 to 19 inclusive	A1	CAO
d) valid comment	E1	
e.g. more young people would use the bus at 4p.m		
fewer old people	8	
12. $6(x-1) + 4(4x-6) = 3 \times 1$ or equivalent	M2	For correctly clearing all 3 fractions
		M1 for clearing 2 fractions
22x - 30 = 3 or equivalent	A1	FT from M1
<i>x</i> = 1.5	A1	Mark their final answer.
		If no marks awarded SC1 for sight of $(11x - 15)/6$ or
	4	(22x - 30)/12
13. a) Frequency densities of 1.8, 2.6, 6, 2.2, 2	M2	M1 for any 3 or 4 correct.
Histogram of their frequency densities drawn	A1	Provided M1 awarded.
b) An attempt to add the areas of the bars	M1	
(5+4+5+14+8+6) = 42	A1	CAO
Search for the median within the 30-35 group	M1	FT their 42 provided a clear attempt made to add the areas of the
		bars
= 32.5	Al	
	7	
14. $(3x-1)(x-12)$	M2	M1 for $(3x1)(x12)$
x = 1/3 (or 0.33) or $x = 12$	AI	F1 provided at least M1 awarded.
	3	Do not accept solutions from use of the quadratic formula only.
15. Use of ¹ / ₂ absinC followed by cosine rule	81	Alternative strategy – Calculate the height, then base, then cosine
10.05 1/ 0.5 CH 1.1050		rule
$18.25 = \frac{1}{2} \times 9.5 \times \text{GH} \times \sin 125^{\circ}$	MI	
$GH = (2 \times 18.25)/(9.5 \times \sin 125^{\circ})$		
GH = 4.69() or 4.7	AI	
$FH = 9.5^{-} + GH^{-} - 2\times9.5\times GH^{-} \cos 125$		r 1 provided M11 awarded
$F\Pi = 105.55 \text{ IO} 104$		
FH = 12.7(8) or 12.8(cm)		
	/	

Unitised Unit 3 – Nov 2013		
Higher Tier Mark scheme – Post Conference		
16. a) Tangent drawn	S1	
Idea of increase in y /increase in x	M1	
Gradient from a reasonable tangent	A1	About 0.4 (ms ⁻²)
b) Split into 3 areas and attempt to sum	M1	
$(\text{Area} =) \frac{1}{2} \times 10(0 + 2 \times 17 + 2 \times 23 + 25)$	M1	Or equivalent. Award for up to 1 error in reading scale.
= 525	A1	CAO
c) (Total distance travelled =) $525 + (10 \times 25) + (\frac{1}{2} \times 20 \times 25)$	M1	FT 'their 525'
(=1025)		
(Average speed =) 'their $1025'/60$	M1	
= 17.(08) (m/s)	A1	CAO for 'their 525'
	9	

GCSE Mathematics Unitised Markscheme November 2013/HT/07/01/14



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