

GCSE MARKING SCHEME

MATHEMATICS - UNITISED

JANUARY 2015

INTRODUCTION

The marking schemes which follow were those used by WJEC for the January 2015 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.

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UNIT 1 - FOUNDATION TIER

January 2015	Mark	Final Mark Scheme
UNIT 1 Foundation		Comments
1(a) 25068	B1	
(b) 4932	B1	Also allow F.T. 30000 – 'their 25068'.
(c)(i) 31000	B1	
(ii) 1/2	B1	
	4	
2. (a) Comedy 18	B2	For all four correct. B1 for two or three correct.
Adventure 10		Allow unambiguous indication in either 'Tally' or
Science Fiction 9		'Frequency' column (Frequency column takes
Romantic 13		precedence).
(b) Labelled bars of equal width for Comedy,	B1	Labels may be indicated on the bars themselves or
Adventure, Science Fiction and Romantic.		underneath the axis. Accept C, A, SF and R.
AND vertical axis labelled 'Frequency' (or equivalent)		Accept 'Number (of films)' as a label.
Uniform scale starting at 0.	B1	B0 for ambiguous placing of numbers between grid
		lines.
Four bars at correct heights.	B2	B1 for three correct heights. F.T. their frequencies.
6		If no scale assume one square to represent a frequency
		of 1. Mark heights on uniform scale that does not start at
		0 (e.g. starts at 1 or -1) accordingly.
	6	
3(a)(i) $7(litres)$	B1	
(ii) Height of water shown at 4.5 litres.	B1	Allow any unambiguous indication between 4 and 5
		litres (not inclusive)
(b) Indicates ' 1^{st} notch to the right of 27'.	B1	Allow unambiguous intent.
	3	
4(a) (Points gained =) $13 \times 3 + 7 \times 1$	M2	M1 for $13 \times 3 + k \times 1$ ($k \neq 0$) if seen.
= 46	A1	C.A.O.
(b) $\frac{30-9}{3}$	M1	
5		
= 7 (games won)	A1	
	5	
		Mark with overlay. Allow ± 0.2 cm in any direction.
5. 3 correct locations marked.	B3	B1 for each correct point.
(One per 'tolerance range')		Penalise any incorrect 'extras' –1, once only
		If no marks gained, allow SC1for an arc, radius 6cm,
		centred at point P OR an arc of a different radius with 3
		points marked
	3	

January 2015 UNIT 1 Foundation	Mark	Final Mark Scheme Comments
6 Sight of 30 adults AND 30 children.	B1	May be implied.
(Portions ordered for the children =) 15	B1	F.T. 'their number of children'.
(Total number of portions required =) 45	B1	F.T. 'their number of adults' + 'their number of child portions'. No F.T. if 'number of child portion' = 30
(Total number of portions ordered $=$) 50	B1	F.T. rounding up to nearest 10 from 'their number of portions required'. B0 if already a multiple of 10.
(Total cost =) $(\pounds) 600$	B1	An unsupported answer of 50 implies all four B marks. F.T. 'their number of portions ordered' \times £12. Note: Sight of (£)360 and (£)180 implies first three B1s. Sight of (£)540 as final answer implies B1B1B1B0B1.
Look for	QWC	
• spelling	2	
 clarity of text explanations and correct units shown the use of notation (watch for the use of '=', '+' and '-' being appropriate) QWC2: Candidates will be expected to 		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.
 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. 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
QWC1: Candidates will be expected to • present work clearly, with words explaining process or steps		acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar.
 OR make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer 		QWC0. Evident weakness in organisation of material and errors in use of mathematical form, spelling, punctuation and grammar.
	7	An unsupported answer is QWC0.
7(a) 500 / 74 OR 5 / 0.74	M1	Allow M1 for any attempt to find how many '74p in \pounds 5'. M0 for 5 \div 74 or 500 \div 0.74 unless rectified.
(She can buy) 6 (pots)	A1	Allow unambiguous embedded answer e.g. 6×74=444. 6·7(56) implies M1.
(b) $6 \times (\pounds)0.74 \text{ OR } 6 \times 74(p) \text{ OR } (\pounds)4.44 \text{ OR } 444(p)$ OR 56(p) OR $(\pounds)0.56$	M1	F.T. 'their whole number of pots bought'.
NO because change is 56p (and there is no 56p coin)	A1	'NO' must be stated and the correct change for their number of pots shown or indicated. If number of pots >6 then only M1A0 possible.
	4	In number of pots >0 then only WIA0 possible.
8(a) Strategy of having 'four sets of $4 + 1$ other'	51	Allow any indication of attempt at correct strategy.
$(\pounds)^{24} + (\pounds)^{24} $	M1 A1	Accept any unambiguous intention.
(b) Trialling <u>both</u> offers for an <u>equal</u> number of boards. A correct value for the cost of their stated number	M1 A1	A correct method must be attempted for ' <i>Get Noticed</i> '. (if ordering 17 boards this is £108 and gains M1A1.)
of boards at ' <i>Get Noticed</i> '.		SC1 for a correct cost for ' <i>Get Noticed</i> ' for a number of boards not considered for ' <i>Boards for All</i> '.
<u>Correct</u> costs for <u>both</u> offers for an <u>equal</u> number of boards that show the cost at ' <i>Get Noticed</i> ' is lower than the cost at ' <i>Boards for All</i> '.	A1	(This will require 19 or 21 or more boards to be costed.)
	6	

January 2015	Mark	Final Mark Scheme
UNIT 1 Foundation9 (a)Uniform scale on vertical axis.	B1	Comments P0, L0 if no <u>attempt</u> at uniform scaling.
Plotting (12,340).	P1	\pm '1/2 a small square'. Allow P1 if attempt made at uniform scaling.
Correct line drawn from $(0,0)$ to $(12,340\pm5)$	L1	Allow line starting at $(2,57\pm1)$. Correct line implies P1L1.
(b) (50 lb =) 800 (oz) Any correct strategy, e.g. 100 times their value at 8oz. OR $\frac{340}{12} \times 800$	B1 M1	B0 for incorrect units e.g. 800 lb or 800 kg. F.T. 'their graph' and also F.T. 'their 800oz'.
A correct answer <u>for their line</u> OR 22666(·6) (gm)	A1	If using their graph allow \pm '1/2 a small square' in reading of grams at 8oz.
= 22.667 (kg)	B1	F.T. 'their answer in grams' / 1000 Accept unsupported answers between 22.5 and 22.8. Similarly with F.T. answers. <u>Alternative method</u> : $lkg \approx 2.2lb$ B1
		$50 \div 2 \cdot 2$ M1
	7	= 22.7() ISW A2
10. 9×24 (= 216) $\frac{9 \times 24}{45}$	M1 M1	
5 (tins)	A1 3	C.A.O. M1,M1,A0 for an answer of $4 \cdot 8$. Allow <u>unambiguous</u> embedded <u>final</u> answer e.g. $5 \times 45 = 225(m^2)$ for all three marks.
 Position at 035° from Aberdeen. Position at 290° from Stavanger. Position marked OR two intersecting lines. 	M1 M1 A1 3	 ± 2° (use overlay). Allow the M marks for dots, crosses or any unambiguous indication that the correct bearings have been offered. F.T. if at least M1 and two intersecting lines. (Lines must originate from Aberdeen and Stavanger respectively)
12. 0.2×800 OR 0.3×300	M1	
= 160 = 90	A1 A1	
$\frac{90}{250} \times 100$ = 36(%)	M1 A1	F.T. 'their 90' and 'their 160 + 90'. Do not F.T. 300 / 1100.
	5	
13. 5×4 (+) $\frac{10 \times 5}{2}$ (+) $\frac{\pi \times 2^2}{2}$	M2	M1 for one or two correct.
= 20 (+) 25 (+) 6.28()	A2	A1 for 20 AND 25, A1 for 6.28() or 6.3
$= 51.3(m^2)$	A1 5	F.T. provided M1A1 gained and three values added with an answer given to 1 d.p.
14. Least Value Greatest Value		
7.5 8.5		B1 for each correct entry. Accept 8.49 recurring but not 8.49.
15 25	B4 4	Accept 24.9 recurring but not 24.9.

UNIT 1 - HIGHER TIER

January 2015	Mark	Final Mark Scheme
UNIT 1 Higher		Comments
1. (Fuel cost =) $\frac{160}{10} \times (\pounds)6.24$	M1	
40	A 1	
$= (\pounds)24.96$	A1 B1	SC1 for (£)12.48 F.T. 'their £24.96 '+ £23.75.
(Total cost of travel =) $(\pounds)48.71$ or $(\pounds)49$	DI	F.1. then $\pm 24.90 \pm \pm 25.75$.
(Cost of computer in pounds =) 1500	M1	
1.18		
$= (\pounds)1271.18() \text{ or } (\pounds)1271.19 \text{ or } (\pounds)1271$	A1	
(Total spent =) $(\pounds)1319.89()$ or $(\pounds)1319.90$ or $(\pounds)1320$	B1	F.T. 'their derived £48.71' + 'their derived £1271.18'
(Amount saved to the nearest $f = (f)$ (f)330	B1	ET_{1650} (their f1210.80())
(Amount saved to the heatest $x = f(x) = 550$	DI	F.T. £1650 – 'their £1319.89()'. B0 if not given to the nearest pound.
		Alternative method
		MIA1B1 then (Total in euros)=48.71×1.18 +1500 M1
		= 1557.48 A1
		$(Total in \pounds) = (1557.48 \div 1.18 =) (\pounds) 1319.20$ B1
		(Amount saved to the nearest $\pounds = $) (\pounds)330 B1
Look for		
• spelling	QWC	QWC2. Presents relevant material in a coherent and
• clarity of text explanations and correct units shown	2	logical manner, using acceptable mathematical form,
• the use of notation (watch for the use of '=', '+' and		and with few if any errors in spelling, punctuation and
'-' being appropriate)		grammar.
QWC2: Candidates will be expected to		
• present work clearly, with words explaining process		QWC1. Presents relevant material in a coherent and
or steps		logical manner, but with some errors in use of
AND		mathematical form, spelling, punctuation or grammar. OR
• make few if any mistakes in mathematical form,		Evident weakness in organisation of material but using
spelling, punctuation and grammar and include units 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		QWC0. Evident weakness in organisation of material
OR		and errors in use of mathematical form, spelling,
• make few if any mistakes in mathematical form,		punctuation and grammar.
spelling, punctuation and grammar and include units in their final answer		
	9	
2. Desition at 025° from Abardeen	N/1	$\pm 2^{\circ}$ (use overlay).
Position at 035° from Aberdeen. Position at 290° from Stavanger.	M1 M1	Allow the M marks for dots, crosses or any
Position at 290° from Stavanger. Position marked OR two intersecting lines.	A1	unambiguous indication that the correct bearings have been offered.
i osition market OK two intersecting illes.		F.T. if at least M1 and two intersecting lines. (Lines
		must originate from Aberdeen and Stavanger
		respectively)
	3	
3. 0.2×800 OR 0.3×300	M1	
= 160	A1	
= 90	A1	
00 100		
$\frac{90}{250} \times 100$	M1	F.T. 'their 90' and 'their $160 + 90$ '.
250 - 26(9()	A 1	Do not F.T. 300 / 1100.
= 36(%)	A1	
	5	

	ry 2015	Mark	Final Mark Scheme
UNIT 1	Higher	Mark	Comments
4. Points (0) (1) (2) (3)	No. Games 12 6 30 24	B2	B2 for all four correct. B1 for 2 or 3 correct. If no marks gained allow B1 for indicating that 1 game is equivalent to 5° .
Attempt at $\sum f$ Division by $\sum f$		M1 m1	F.T. their completed table. Or 690 (M1) ÷ 360 (m1)
(Mean =) 1	9 (points) ISW	A1 5	C.A.O. for 'their table'.
$\begin{array}{ccc} 5(a) & 3.71 \\ (b) & 4^{4}/_{5} \end{array}$		B2 B1 3	B1 for $3.7(05)$ Accept equivalent such as $4^{48}/_{60}$. B0 for 4.8 .
6. 5440 × (7/8	$)^2$ or equivalent = 4165	M2 A1 3	M1 for $5440 \times (7/8)$ or equivalent. M1, A1 for sight of 4760. Treat increase as a mis-read.
7(a) (i) A statement that ind		B1	
started to make a pro (ii) A statement that ind by the company has	licates that the profit made	B1	Accept any equivalent statement that shows an understanding of the nature of the curve drawn from year 4 onwards.
(iii) A statement that inc was losing money.	licates that the company	B1	Allow use of the word 'profit' in e.g. 'the profits are getting less' or 'the profits are plummeting'.
(b) $\frac{1220 + 0.18 \times 0.18}{2.75}$		M1	M1 awarded at this stage.
	= 576	A1 5	
$\begin{array}{ccc} 8 & 10 \times \underline{150} \\ & 100 \end{array}$		M1	M2 for the correct use of the '10' with all four of the numbers 150, 100, 3 and 5.
$\times \frac{3}{5}$		M1	M1 for the correct use of the '10' with any two of the numbers 150, 100, 3 and 5.
= 9 (hour	rs)	A1 3	C.A.O.
9. $108\% \equiv 69.93$ (Previous best throw)	$\frac{69.93}{108} \times 100$	B1 M1	Accept any indication. Or equivalent.
	= 64·75 (m)	A1 3	

January 2015	Mark	Final Mark Scheme
UNIT 1 Higher		Comments
10. Sight of 345(cm)	B1	
Sight of 20.5(cm)	B1	
Use of <u>345</u>	M1	F.T. 'their least base length' if < 350 , and 'their greatest
20.5		strip length' if > 20 .
(× 4)		
= 67.3(17)	A2	A1 if ' \times 4' not calculated (16.8)
(Least number required =) 68	Al	F.T. rounding up if of equivalent difficulty.
(Leust humber required –) 00	111	<u>Note</u> :Allow B0,B1,M1,A2,A1 for
		$\frac{1000}{1395 \div 20.5} \qquad \qquad B0, B1, M1$
		$=68(\cdot04) \qquad A2$
		69 (strips) A1
		If <u>no marks</u> gained,
		SC2 for an answer of 73
		OR SC1 for sight of $355(cm)$ AND $19.5(cm)$
	6	
11. Correct use of Distance = Speed \times Time	M1	
75 (miles) AND 210 (miles) AND 15 (miles)	A1	One correct implies first M1.
Correct use of 'Fuel used' = Distance ÷ 'mpg'	M1	
1.5625 (gal) AND 5 (gal) AND 0.375 (gal)	Al	F.T. 'their distances'. One correct implies second M1.
1.5025 (gal) AND 5 (gal) AND 0.575 (gal)		Allow 1.6 and 0.4 .
7 (11)	A 1	
7 (gallons)	A1	F.T. 'their values' only if <u>all three</u> found using 'dist / mpg'.
		Must be to the nearest gallon.
	_	A correct answer gains the previous A1.
	5	
12(a) Sight of $\underline{\theta} \times \pi \times 10^2$ OR $\underline{\theta} \times \pi \times 6^2$	B1	
360 360		
$\underline{\theta} \times \pi \times 10^2 - \underline{\theta} \times \pi \times 6^2 = 48.03$	M1	
360 360		
$\theta = \frac{48.03 \times 360}{100}$	m1	Or equivalent.
$\frac{1005\times300}{64\pi}$		
$= 86^{(^{\circ})}$	A1	SC1 for $55^{(\circ)}$ OR SC1 for $152 \cdot 8 \dots {}^{(\circ)}$ or $153^{(\circ)}$ (as well as a
- 80	Л	
		possible B1)
	M1	$\mathbf{F} \mathbf{T} = (\mathbf{u}_{1}, \mathbf{u}_{2}, \mathbf{u}_{3})^{2}$
(b) Sight of $\underline{86} \times 2\pi \times 10$ OR $\underline{86} \times 2\pi \times 6$	M1	F.T. 'their 86°'.
360 360		
= 15 OR $= 9$	A1	Accept 15 to 15.02 inclusive. Accept 9 to 9.01 inclusive.
(PQSR =) 15 + 9 + 4 + 4	M1	F.T. 'their <u>evaluated</u> arc lengths' only if $86/360$ and π used.
= 32(cm)	A1	C.A.O. for 'their 86°'.
	8	
13. (a) Sight of $\pi \times 15^2 \times 30$ OR $\frac{2}{3} \times \pi \times 15^3$ OR	B1	
15. (a) Sign of $\pi \times 15^{-5} \times 50^{-5}$ or $\pi \times 15^{-5}$ or $\frac{4}{3} \times \pi \times 15^{-3}$		
$\pi \times 15^2 \times 30 - 2 \times \frac{2}{3} \times \pi \times 15^3$	М1	$(L_{22})_{L_{22}} = 14127$
	M1	(Look for 21205· – 14137·)
$= 7068(\dots)(\text{cm}^3) \text{ or } 2250\pi$	A1	Accept answers between 7065 and 7071.5 inclusive.
		2
(b) Sight of $\frac{1}{3} \times \pi \times (0.4x)^2 \times 0.9x$	B1	B0 if M1 awarded for use of $0.4x^2$
$x^{3} - \frac{1}{3} \times \pi \times (0.4x)^{2} \times 0.9x = 849.2$	M1	Only F.T. allowed is use of $0.4x^2$ instead of $(0.4x)^2$.
$x^3 = 1000$ or equivalent	A1	
x = 10(cm)	A1	F.T. their x^3 value.
	7	

2015 January	Mark	Final Mark Scheme
UNIT 2 (non-calculator) Foundation Tier 1. (a)(i) 27	B1	Comments
(ii) 64	B1	
(ii) 04 (iii) 26 and 52	B1	
(iv) 54	B1	
(v) 62	B1	
(b) $(f) (f) (f) (f) (f) (f) (f) (f) (f) (f) $	B1	
(c) 2796	B1	
(d) 4 thousand(s), 4000	B1	Accept thousand(s). B0 for 1000.
(e) 38·3	B1	
(,)	9	
2.	D.4	
X pentagon	B4	B1 for each correct pair.
hexagon		More than one line from any shape gets B0
X scalene triangle		for that pair.
X kite X equilateral triangle		
1 0		
X circle		
X chicle	4	
3. cricket 6	B1	
football 12	B1	
tennis 2	B1	Penalty – 1 if three correct sets of tally marks
		given only.
		If B0 then SC2 for 6/20, 12/20, 2/20.
		If B0 then SC1 for 3/10, 6/10, 1/10 or
		SC1 for 0.3, 0.6, 0.1.
	3	
4.(a)		
	B1	
	DI	
(b) (i) (£) $12g$	B1	Accept $12 \times g$, $g \times 12$
(ii) $h - 3$	B1	
(c) (i) $(x =) 60$	B1	Accept embedded answers.
(i) (i) (x =) 8	B1	
(d) $10k - 7m$	B2	Must be an expression for B2
		B1 for $10k + -7m$
		B1 for either $10k$ or $-7m$ seen
	7	
5. 180(°) – 47(°) – 39(°)	M1	
94(°)	A1	
	2	

UNIT 2 - FOUNDATION TIER

2015 January		Final Mark Scheme
UNIT 2 (non-calculator) Foundation Tier	Mark	Comments
6. Suitable method for comparison, such as:		
(Using £1 for 170g) 4×170 (g)	M1	For a correct method to compare two quantities
680 (g) OR (Using £4 per kg) 1000 (g) ÷ 4	A1	For a numerically correct answer to their calculation
$\begin{array}{c} 250 \ (g) \\ \text{Statement equivalent to } 680 \ (g) \neq 1000 \ (g) \\ \text{OR} & 170(g) \neq 250 \ (g) \end{array}$	E1	Accept approximations for all marks e.g. £6 buys 6 x 170g = 1020g So £6 buys about 1 kg, not £4
Look for	QWC2	
• relevance of work shown		
• generally correct spelling		
• clarity of text explanation		
 use of notation (appropriate use of '=', '×', '÷', £, g, kg) 		QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few
QWC2: Candidates will be expected to		if any errors in spelling, punctuation and grammar.
• present work clearly, with words explaining process or steps		
e.g. state clearly which quantities are being compared AND		
• 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 errors in use of mathematical form, spelling, punctuation or grammar
QWC1: Candidates will be expected to		OR evident weaknesses in organisation of
• present work clearly, with words explaining process or steps		material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar.
OR		QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical
• make few if any mistakes in	5	form, spelling, punctuation or grammar.
mathematical form, spelling, punctuation and grammar, and include units in their working.		A final unsupported statement only gets QWC0
7. Angle of 35° drawn in correct place AT drawn 7 cm long OR a point T marked 7 cm	B1 B1	Use overlay ± 2° ± 2 mm
from A	2	
8. 32.8 ÷ 8 (= 4.1)	 M1	OR 32.8 × 3 (= 98.4)
$\begin{array}{c} 6. \ 52.6 \div 6 \ (-4.1) \\ (4.1) \times 3 \end{array}$	M1 M1	$(98.4) \div 8$
$(4.1) \times 3$ 12.3 (g)	A1	(90.4) ÷ 6 CAO
12.5 (8)	3	

2015 January	Mark	Final Mark Scheme
UNIT 2 (non-calculator) Foundation Tier	M1	$\frac{\text{Comments}}{\text{If } M(0,0) \text{ then } S(1, for (1, -0, 18, -), 0, 82)}$
9. $1 - (0.3 + 0.15)$ 0.55	A1	If M0A0 then SC1 for $(1 - 0.18 =) 0.82$
0.55	2	
10. Enlargement scale factor 3	B2	B1 for at least 3 lines correct
		B1 for consistent use of wrong scale factor
	2	
11. (a)		Accept embedded answer.
5x = 45	B1	
x = 9	B1	FT 'their $5x = a$ '. Integer answers must be
		expressed as integers.
(b) (i) -1 and 7	B1	
(ii) Suitable axes drawn and labelled with <i>x</i> ,	B1	
y and numbers	DI	
2 or 3 points plotted correctly, with no	P1	FT 'their table'
incorrect points plotted	T 1	CAO L1 implies D1
Correct straight line drawn	L1 6	CAO. L1 implies P1.
12 (/ BAE -)	0	
12. $(\angle BAE =)$ 180(°) - 108(°) - 33(°) or equivalent	M1	
$= 39(^{\circ})$	A1	Check diagram for sight of 39(°)
$(x =) 60(^{\circ}) - 39(^{\circ})$	M1	FT 'their angle BAE ' (provided < 60°)
(x =)00() = 37()	Al	(provided < 00)
21()		ALTERNATIVE SOLUTION e.g.
		Angle $CBA = 120(^{\circ})$ (interior angles)
		Angle $CBD = 120(^{\circ}) - 33(^{\circ}) = 87(^{\circ})$ M1
		Angle $BDA = 87(^{\circ})$ (alternate angles) A1
		Angle $AED = 72(^{\circ})$ (straight line)
		$(x =) 180(^{\circ}) - 72(^{\circ}) - 87(^{\circ})$ M1
		$= 21(^{\circ})$ A1
	4	
13. Correct translation	B1	
14 (Deduced east of first out)	1	
14. (Reduced cost of first cottage =) (20, 0.85, OP, (20, 0.15, OP, (20, 0.25))	MI	Or aquivalant full mathed
620×0.85 OR 620 – 620×0.15 OR 620 – 93	M1 A1	Or equivalent full method
(Cost of second cottage =) $(= \pounds)527$	AI	
$(=\pm)69 \times 7$	M1	Complete method for finding 69×7
$(=\pm)483$	A1	CAO
(- 2)+03		
Considers £60 cancellation charge in an	S 1	e.g. 'their 527' – 60 (= 467)
appropriate calculation		or 'their 483' + 60 (= 543)
		ì í
Interpretation: e.g. 'No, more expensive to pay	E1	(either 483 > 467 or 543 > 527)
for the second cottage'		FT for a correct conclusion from 'their
		numbers'.
		Award of E1 depends on at least M1 and S1,
		no error in adding or subtracting 60, and no
	-	error in finding a price difference.
	6	

2015 January UNIT 2 (non-calculator) Foundation Tier	Mark	Final Mark Scheme Comments
15(a) (30) (40) (50)		
15 18 20	B1	CAO
<u>15 18 20</u>	B1	FT their <u>cumulative</u> 1^{st} line, provided fractions are < 1,
30 40 50	B1	and denominators are 30, 40, 50. FT their <u>cumulative</u> fractions as decimals, provided<
0.5 0.45 0.4		1, with accuracy to 2 d.p. where appropriate.
(b) All 5 points plotted correctly	P2	FT for their decimals (provided < 1). Ignore joining points, tolerance should show intention to be on grid lines. P1 for 3 or 4 points plotted accurately, must be from cumulative results. Do not award if bars are drawn (unless <u>with</u> points plotted).
(c) 'No' with reason e.g. <u>best</u> estimate of the probability is 0•4, or <u>final</u> relative frequency value is 0.4	E1 6	FT their final column entry in (a), fraction or decimal, provided final entry < 1. E0 for e.g. only 2 of the 5 trials gives a result less than 0.5 .
16. 200 (seconds) AND 168 (seconds)	B1	Both times correct OR correct time difference.
OR sight of 32 (seconds) $[200 - 168] \div 200 (\times 100\%)$ OR $[1 - 168/200] (\times 100\%)$ OR equivalent method. 16%	M1 A1	FT from 'their times' (with at least one correct).
	3	

UNIT 2 - HIGHER TIER

	М	
January 2015 Unit 2 Higher Tier	a r	Final Mark Scheme Comment
	k	
$1. \qquad 4x+4=3$	B1	Correctly expanding brackets (FT until 2 nd error).
4x = -1 x = -1/4 or -0.25	B1 B1	Collecting terms. Do not accept 1/–4. Mark final answer.
x = -1/4 or -0.23	DI	Accept embedded answer.
	3	
2. (Reduced cost of first cottage =)		
620×0.85 OR $620 - 620 \times 0.15$ OR $620 - 93$ (= £)527	M1 A1	Or equivalent full method.
(-1)521	111	
(Cost of second cottage =)		
$(= \pounds)69 \times 7$	M1	Complete method for finding 69×7 .
(=£)483	A1	CAO
Considers £60 cancellation charge in an appropriate calculation.	S1	e.g. 'their 527' - 60 (= 467) or 'their 483' + 60 (= 543)
Interpretation: e.g. 'No, more expensive to pay for the second	E1	(a;ther 193 > 167 ar 513 > 507)
cottage'.	EI	(either 483 > 467 or 543 > 527) FT for a correct conclusion from 'their numbers'.
		Award of E1 depends on at least M1 and S1, no error in adding
Look for:		or subtracting 60, and no error in finding a price difference.
accuracy of spelling		
• alouity of labola		QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few
clarity of labels	Q	if any errors in spelling, punctuation and grammar.
• correct units shown (£)	W	
	C	QWC1 Presents relevant material in a coherent and logical
• the use of notation (appropriate use of "=", "+", "-",	2	manner but with some errors in use of mathematical form, spelling, punctuation or grammar
"x").		OR
		evident weaknesses in organisation of material but using
QWC2: Candidates will be expected to		acceptable mathematical form, with few if any errors in
 present work clearly, with words explaining process or steps 		spelling, punctuation and grammar.
AND		QWC0 Evident weaknesses in organisation of material, and
• make few if any mistakes in mathematical form,		errors in use of mathematical form, spelling, punctuation or
spelling, punctuation and grammar and include units in		grammar.
their final answer.		
QWC1: Candidates will be expected to		
• present work clearly, with words explaining process or		
steps		
OR make faw if any mistakes in mathematical form	8	
• make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units (£)		
in their final answer.		
	.	
3. (a) Correct rotation.	B2	B1 for clockwise rotation about (0, 1) OR anticlockwise rotation about (1, 0)
		OR anticlockwise rotation about (1, 0) OR 2 correct vertices.
(b) Correct translation.	B1	Clear intention shown.
	3	

January 2015 Unit 2 Higher Tier	M a r k	Final Mark Scheme Comment
4. (Angle $BAE =$) $180(^{\circ}) - 108(^{\circ}) - 33(^{\circ})$ or equivalent = $39(^{\circ})$ (x =) $60(^{\circ}) - 39(^{\circ})$ = $21(^{\circ})$	M1 A1 M1 A1	Check diagram for sight of $39(^{\circ})$. FT 'their angle BAE ' (provided < 60°)ALTERNATIVE SOLUTION e.g. Angle $CBA = 120(^{\circ})$ (interior angles) Angle $CBD = 120(^{\circ}) - 33(^{\circ}) = 87(^{\circ})$ M1 Angle $BDA = 87(^{\circ})$ (alternate angles) Angle $AED = 72(^{\circ})$ (straight line) $(x =) 180(^{\circ}) - 72(^{\circ}) - 87(^{\circ})$ M1 $= 21(^{\circ})$
5. (a) $8x + 12 - 3x - 6$ = $5x + 6$	B1 B1	Correctly removing brackets. Collecting terms. FT for one error only. Mark final answer.
(b) 10 <i>n</i> – 7	B2	B1 for sight of 10 <i>n</i>
(c) $4x > 2$ $x > \frac{1}{2}$ (or $x > \frac{2}{4}$)	B1 B1 6	FT from $4x > a$. Mark final answer. B0 for use of = sign, unless replaced in final answer.
6. (a) $ \begin{array}{c} (30) & (40) & (50) \\ \hline 15 & 18 & 20 \\ \hline 15 & 18 & 20 \\ \hline 30 & 40 & 50 \\ \hline 0.5 & 0.45 & 0.4 \end{array} $ (c) All 5 points plotted correctly.	B1 B1 B1 P2	 CAO FT their <u>cumulative</u> 1st line, provided fractions are < 1, and denominators are 30, 40, 50. FT their <u>cumulative</u> fractions as decimals, provided < 1, with accuracy to 2 d.p. where appropriate. FT for their decimals (provided < 1). Ignore joining points, tolerance should show intention to be on grid lines. P1 for 3 or 4 points plotted accurately, must be from cumulative results. Do not award if bars are drawn (unless <u>with</u> points plotted).
(d) 'No' with reason e.g. <u>best</u> estimate of the probability is 0.4 , or <u>final</u> relative frequency value is 0.4 .	E1	FT their final column entry in (a), fraction or decimal, provided final entry < 1. E0 for e.g. only 2 of the 5 trials gives a result less than 0.5.
7. 200 (seconds) AND 168 (seconds) OR sight of 32 (seconds)	B1	Both times correct OR correct time difference.
$[200 - 168] \div 200 (\times 100\%)$ OR $[1 - 168/200] (\times 100\%)$ OR equivalent method.	M1	FT from 'their times' (with at least one correct).
16%	A1 3	
8. (a) 9.7×10^{-5} (b) 4.78×10^{9}	B1 B1 2	
9. Sight of $y = 4x + 5$ for 2^{nd} line OR finding both gradients Statement that 'gradient = 4' for both AND 'Yes'.	B1 B1 2	Equations must be correctly re-arranged. Allow statement that 'gradients are equal' provided 4 already seen. Allow second B1 after 1 error in re-arranging (provided no error in finding coefficient of x). (Award B0 for an unsupported statement of 'equal gradients'.)

L 2017	М	
January 2015 Unit 2 Higher Tier	a r	Final Mark Scheme Comment
	k	Comment
10. $b + 4c = 310, 2b + 3c = 345$	B1	Strategy of forming a pair of equations. (Do not penalise for not defining variables.)
Method to find first variable	M1	FT for equations of equivalent difficulty.
Correct first variable	A1	
Correct second variable	A1	$b = (\pounds)90, c = (\pounds)55 OR (\pounds)345 + 2\times(\pounds)55.$ FT 'their first variable' for second A1.
(£)455 AND 'No'	B1	FT 'their derived b anc c'.
	_	An unsupported answer gets 0 marks.
11 (a) All connect entries	5 B2	B1 for three correct entries.
11. (a) All correct entries.	B2	B1 for three correct entries.
	B1	FT from their tree, probabilities must be < 1 but not equal to $\frac{1}{2}$.
(b) Sight of $\frac{1}{5} \times \frac{1}{3}$ or $\frac{4}{5} \times \frac{2}{3}$ $\frac{1}{5} \times \frac{1}{3} + \frac{4}{5} \times \frac{2}{3}$	M1	
	A1 5	
= 9/15 (= 3/5) 12. $5h + 3k = 2h + 8$	B1	Includes correct expansion. FT until 2 nd error.
12. $5h + 5k = 2h + 8$ 5h - 2h = 8 - 3k	B1 B1	includes correct expansion. F1 until 2 error.
3h = 8 - 3k	B1	
h = (8 - 3k)/3 or equivalent	B1	Mark final answer.
	4	
13. (a) (Angle $COA =$) 2 × 67(°) (= 134°)	M1	Check diagram.
$[180(^{\circ}) - 134(^{\circ})] / 2$ or equivalent	M1	FT 'their angle COA'.
(Angle $OAC =$) 23(°)	A1	
(b) 36(°) Alternate segment theorem	B1	
Alternate segment meorem	E1	Accept a correctly worded equivalent e.g. 'the angle between a tangent and a chord is equal to the angle in the alternate
		segment'.
		E1 is dependent on B1 having been awarded.
	5	
14. (a) $x = 0.2747474$ $100x = 27.47474$ with an	M1	Or $10x$ and $1000x$, or equivalent. Or an alternative method.
attempt to subtract		An answer of 27.2/99 gains M1 only.
272/990 or 136/495	A1	Mark final answer. Do not ignore incorrect cancelling.
(b) (i) 1	B1	
(ii) 1/9 or 0·111	B2	B1 for 9 ⁻¹ or $1/3^2$ or $1/_3\sqrt{729}$ or $1/729^{1/3}$ or $(1/729)^{1/3}$ or $_3\sqrt{(1/729)}$ Mark final answer.
		mark mai answet.
(c) $25 + 15\sqrt{2} - 15\sqrt{2} - 18$ or equivalent	M1	Do not ignore subsequent working.
= 7	A1	If no marks awarded, SC1 for 3 of the 4 terms correct.
		NB 25 + $\sqrt{30} - \sqrt{30} - 18 = 7$ counts as 2 errors and gets 0 marks.
	7	
15. (a) Sketch with reflection in x -axis. Vertex must touch the x	B1	Clear intention shown (to draw curve of same size and shape).
axis.		Must be a convex <u>curve</u> .
(b) Sketch with horizontal compression towards y-axis.	B1	Clear intention shown. Must be a convex <u>curve</u> .
Must pass through $(0,1)$.		
	2	

UNIT 3 - FOUNDATION TIER

January 2015	Mark	Final Mark Scheme
UNIT 3 (calculator allowed) Foundation		Comments
1. (a) $(\pounds)26.5(0)$	B1	
(£)2.97	B1	
$(\pounds)3.6(0)$	B1	
$Total = (\pounds)33.07$	B1	FT if at least B1 awarded.
1 (b) 40–(£)33.07	M1	FT candidate's total.
(£)6.93	A1	
1 (c) Two free tickets identified	M1	FT 'their (£)33.07'
(£) 10.6(0) ISW.	A1	Sc1 for ('their (£)33.07'- (£)15.9(0) =)(£)17.17
		where drinks and sweets have not been considered.
	8	
2. (a) 7240	8 B1	
	1	
2. (b) 37	B1	
	1	
3. Evidence of counting squares	M1	
24-28 inclusive (cm^2)	A1	
	2	
4. $5(p)$ and $2(p)$ coins	B2	B1 if candidate identifies 14(p) as the difference
	2	OR identifies 7(p) needs to be given.
5. (a) All letters correctly placed	2 B3	B2 for six or seven shapes correctly placed.
Regular Polygon C, E, F	0.5	B1 for four or five shapes correctly placed.
Irregular Polygon B,G,H		Duplication of letters counts as an error.
Not a Polygon A, D		Dupheuton of fetters counts us un error.
		Sc1 for three shapes correctly placed with one in
		each box with no shapes incorrectly placed.
(b) indicates B and H	B1	
(c) indicates F and C	B1	
f(a) (lemon luck-) 24	5 B2	B1 for one can $= 8$
6(a) (lemon lush=) 24	B2	Alternative: $3/10$ of 80 (=8×3)=24
		Anemative: $5/10 \text{ of } 80 \ (=8 \times 5)=24$
(b) difficult to show a part of the diagram with	E1	e.g. the data for Tuesday's sales needs to be a
accuracy. e.g. the symbol needs to be easily divided		multiple of 8
into 8 pieces.		··· r
	B1	
	B1	
(c) One row represented in symbols consistent with		
the key.	B1	
Two rows represented in symbols consistent with		Orange Fizz
the key.		
Three rows represented in symbols consistent with the key.		Lemon Lush
the Key.		
	6	

January 2015 UNIT 3 (calculator allowed) Foundation	Mark	Final Mark Scheme Comments
7. (a) Hands drawn to show twenty minutes to 5.	B1	Hour hand should be between 4 and 5 but accept at 4.
(b)(16:40 to 19:40 Total time) $3hrs = 180 min$ or 150 mins = $2\frac{1}{2} hrs$	B1	
$(180 - 150 =) 30 \text{ (mins) or } (3 - 2\frac{1}{2} =) \frac{1}{2} \text{ (hr)}.$	B1	
$(30 \div 2 =)15 \text{ (min)} \text{ or } (\frac{1}{2} \div 2 =) \frac{1}{4} \text{ (hr) or}$	B1	FT total 'their 180 mins'
8. (a) Median 58 (Thursday)	4 B1	B0 for Thursday without number.
(ii) Sum of the numbers (295)	M1	For attempt to add the numbers
Sum/5	m1	division by 5 of a number in the range 215-375
59	A1	(54+38+65+58+80)/5 gets M1, m1
(iii) 42	B1	
(b) Correct interpretation of the range of daily sales of at least one of milkshakes or smoothies, in context.	E1	FT interpretation of 'their range' if in context.On average sales of milkshakes are consistent/around the same each day but smoothies' sales are more varied.E0 if no interpretation. Eg the range is smaller and the mean is the same.
0. (module of a heli on a heli 240 (15)	6	
9. (number of adults needed 240÷15) 16 (adults needed)	B1	Any appropriate method that gives 16 adult places.
(240+16=)256 (total people on the trip)	B1 B1	
$256 \div 50(=5.12)$ or equivalent	M1	FT 'their 256' or 240
6 (buses needed)	A1	If no marks awarded, SC1 for use of 1 adult for every
Look for		15 students. e.g. 45 students and 3 adults per bus.
• Spelling in at least one statement or sentence		Award M1A1 for "240÷50 (=4.8), so 5 buses needed" only if neither B1 has been awarded.
• Clarity of text explanations,	QWC2	QWC2 Presents relevant material in a coherent and
• The use of notation (watch for the use of '=', '-' and '+' being appropriate.		logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar.
QWC2: Candidates will be expected to		
• Present work clearly, with words		
explaining process and steps AND		
• Make few, if any, mistakes in mathematical form, spelling, punctuation and grammar in their final answer.		QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or
QWC1 : Candidates will be expected to		grammar. OR
• Present work clearly, with words		Evident weakness in organisation of material but
explaining process or steps		using acceptable mathematical form, with few, if any,
OR		errors in spelling, punctuation and grammar.
• Make few, if any, mistakes in mathematical		QWC0 Evident weakness in organisation of material,
form, spelling, punctuation and grammar in		and errors in use of mathematical form, spelling,
their final answer.	6	punctuation and grammar.

January 2015 UNIT 3 (calculator allowed) Foundation	Mark	Final Mark Scheme Comments
10. 5.1	B2	B1 for 5.0(64417504) seen
		B0 for 5 alone.
	2 D1	
11. $(80 \times 3.50 =)$ (£)280 $(2/5 \times 80 =)$ 32	B1 B1	
$(2/3 \times 80-) 52$ 280 - 32 × 5	M1	FT 'their 280' and 'their 32' so long as B1 awarded.
(f)	A1	1 1 then 200 and then 52 50 long as D1 awarded.
120/(80-32)	M1	FT 'their 120' and 'their 32'
(£)2.5(0)	A1	
	6	
12. Intersecting construction arcs with radius 9cm	M1	Accuracy ±2mm
and 7.5cm drawn from A and B respectively.	A 1	M0 for freehand arcs or no arcs seen.
Completed triangle with vertex at intersection of construction arcs.	A1	
construction arcs.	2	
13. a = 5	B1	
Substitution of $a = 5$	B1	FT 'their a'.
e.g. $5+3 \times 5+b = 23$ or equivalent		
b=3	B1	Implies previous B1. Look for answers in table.
	3	
14. (a) 9:30 (am) or 09:30(b) horizontal line drawn stopping at point	B1 B1	
(10:20, 2)	DI	
(c) Draw a line with positive gradient from	B1	FT part (b) for start of line.
(10:20, 2) to (10:40, 3)		Ignore additional lines beyond 10:40.
Use of distance divided by time or gradient of line.	M1	FT positive gradient of 'their line'.
3 (km/h)	A1	'1 km in 20 mins', without further working, earns M1
	~	A0
$15.252 \div 6 \ (=42)$	5 M1	
13.252 ± 0 (2.42) 210 (kg) AND 42 (kg)	A1	
	2	
16. (a)		
$\begin{array}{c} 10. \ (a) \\ 3x - 21 = 21 \end{array} \qquad \text{OR} \qquad x - 7 = 21/3 \end{array}$	B1	Accept embedded answer. FT until 2 nd error.
3x = 42 OR $x = 7 + 7$	B1	
x = 14	B1	
(b) $9y - 5y = 12 + 2$	B1	FT until 2 nd error.
$4\mathbf{y} = 14$	B1	
y = 3.5	B1	Accept 7/2. Mark final answer.
17. a) Points plotted at mid-points of groups and	6 B2	B1 at least 4 points plotted and joined correctly
straight lines connecting the points	D2	OR for all points plotted correctly but not joined,
staught mes connecting the points		OR consistent horizontal translation within the limits
		of the groups.
		Accept intention of straight lines. Ignore any lines
		outside the first and last points.
b) Appropriate converse that accurate		E a "Mara law value runchagas an - Mandara
b) Appropriate comment that compares purchases made on Monday and Saturday.	E1	E.g. "More low value purchases on a Monday morning", "More money is spent on a Saturday
made on monday and Saturday.		afternoon".
	3	

January 2015 UNIT 3 (calculator allowed) Foundation	Mark	Final Mark Scheme Comments
18. $(x^2 =)$ 12.3 ² + 5.9 ²	M1	
$x^2 = 186.1$ OR (x =) $\sqrt{186.1}$	A1	
(x =) 13.6(418cm)	A1	
	3	
19. (Area of semi-circle =) $\pi \times 6.3^2/2$	M1	
$= 62.3 \text{ to } 62.4 \text{ (m}^2)$	A1	
(Number of tins of paint needed =) $(\pi \times 6 \cdot 3^2/2) \div 15$	M1	FT 'their area' provided π used in the calculation.
= 5(tins)	A1	Provided of equivalent difficulty.
	4	
	4	
20. Perpendicular bisector of line joining Aber and	B1	Use overlay with tolerances included.
Bont drawn.	DO	
Correct 2 points identified.	B2	B1 for 1 point identified Or correct circle or arc
		drawn within tolerance.
		If no marks awarded, SC1 for complete method but
		outside tolerances.
	3	

UNIT 3 - HIGHER TIER

January 2015 UNIT 3 Higher	Mark	Final Mark Scheme Comments
1. $\frac{27}{18}$ or equivalent.	B2	B1 for sight of 27 or 18.
= 1.5	B1	FT provided B1 already awarded. If no marks awarded, allow SC1 for answers of 18.72 (not used brackets) or 0.5 (used squared instead of cubed) as evidence of a
	3	correct numerator or denominator.
$2.252 \div 6 \ (= 42)$	M1	
210 (kg) AND 42 (kg)	A1	
	2	
3. (a) $x(x-9)$	B1	Accept embedded answer. FT until 2 nd error.
(b) $3x - 21 = 21$ 3x = 42 OR $x - 7 = 21/3OR x = 7 + 7$	B1 B1	Accept embedded answer. F1 until 2 error.
x = 14	B1	
(c) $9y - 5y = 12 + 2$	B1	FT until 2 nd error.
4y = 14	B1	
y = 3.5	B1	Accept 7/2. Mark final answer.
	7	
4. (Distance =) $90 \times 1000 \times 10^{-1000}$	M2	M1 for a distance conversion into m OR a speed conversion into
3600 – 250 (m)	A1	'per second' OR speed \times time. CAO. Allow M1 SC1 for 0.25 km.
= 250 (m)	3	CAO. Allow W11 SC1 101 0.25 Kill.
5. One correct evaluation $2 \le x \le 3$	B1	$\underline{x} \underline{5x^{3}-2x-60} \underline{x} \underline{5x^{3}-2x-60} \underline{x} \underline{5x^{3}-2x-60}$
	21	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
2 correct evaluations $2.25 \le x \le 2.4$ one either side of 0	B1	2.1 -17.895 2.26 -6.804 2.37 1.820
		2.2 -11.16 2.27 -6.055 2.38 2.646
2 correct evaluations $2.25 \le x \le 2.35$ one either side of 0	M1	2.3 -3.765 2.28 -5.298 2.39 3.480
If evaluations not seen, accept 'too high' or 'too low'.		2.4 4.32 2.29 -4.535 2.4 4.320
If evaluations not seen, accept too high of too tow .		2.5 13.125 2.3 -3.765
x = 2.3	A1	2.6 22.68 2.31 -2.988
		2.7 33.015 2.32 -2.204
		2.8 44.16 2.33 -1.413
		2.9 56.145 2.34 -0.615
	4	3 69 2.35 0.189
6. $(x^2 =)$ 12.3 ² + 5.9 ²	4 M1	5 67 2.55 0.107
6. $(x =)$ 12.5 + 5.9 $x^2 = 186.1$ OR $(x =)$ $\sqrt{186.1}$	A1	
(x = 13.6(418cm))	A1 A1	
(3	
7. (a) (Angle inside pentagon =) 540/5	M1	OR 180 – (360/5)
= 108 (°)	A1	
(b) Sight of 60 (°) as an angle in an equilateral triangle.	B1	
$360 - 60 - 60 - 108 \qquad (= 132)$	M1	FT 'their 108' for all remaining marks.
y = (180 - 132)/2	m1	
y = 24 (°)	A1 6	
	U	

Mark	Final Mark Scheme
M1	Comments
A1	
M1	FT 'their area' provided π used in the calculation.
A1	Provided of equivalent difficulty.
	OWC2 Presents motorial in a schement and logical monner using
	QWC2 Presents material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in
	spelling, punctuation and grammar.
	spering, puretauron and grannar
QWC	QWC1 Presents material in a coherent and logical manner but
2	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.
6	
M1	FT their mid-points and frequencies. Mid-points need to be
	within the limits of each group, including the limits themselves.
m1	Dividing by 100 or their total frequency.
A1	
B2	B1 at least 4 points plotted and joined correctly,
	OR for all points plotted correctly but not joined,
	OR consistent horizontal translation within the limits of the groups.
	Accept intention of straight lines. Ignore any lines outside the
	first and last points.
E1	e.g. 'More low value purchases on a Monday morning.'
	'More money is spent on a Saturday afternoon.'
8	
B1	Use overlay with tolerances included.
вĵ	B1 for 1 point identified Or correct circle or arc drawn within
D2	tolerance.
	If no marks awarded, SC1 for complete method but outside
3	tolerances.
B2	B1 for 600 or 0.6×10^3 .
M1	Or equivalent.
A2	A1 for 2.992×10^{-23} or equivalent. SC1 for a correct answer to their calculation written instandard
5	form to 3 s.f., provided rounding required.
	B1 for $(x15)(x3)$.
B2 B1	FT for their pair of brackets. Both solutions needed for this B1.
3	B0 for solutions obtained from the quadratic formula.
M1	
A1	
	Independent mark.
	FT, for all marks, their cumulative frequencies, provided an
1411	attempt made to be cumulative.
A1	r
A1	If no marks awarded, SC1 if points plotted at mid-points.
	M0A0A0 for bars with or without plots.
B1	Answers are likely to be in the range 27.5 to 29.
E2	E1 for 'pupils got quicker' OR
	E1 for 'pupils got quicker' OR E1 for valid statement e.g. 'the spread of marks has not changed
	E1 for 'pupils got quicker' OR
	M1 A1 M1 A1 M1 A1 M1 A1 B2 B1 B1 M1 A1 B2 B1 B2 B1 B2 B1 B2 B1 A2 S B2 B1 3 M1 A2 S B1 M1 A2 S B1 M1 A1 U1 3 B1 M1 A1 U1 3 B1 M1 A1 C

January 2015		Final Mark Scheme
UNIT 3 Higher	Mark	Comments
15. Use of scale factor of (12/10) or (10/12)	B1	Sight of 1.2 or 0.8333
Area ACD/24 = $(12/10)^2$	M1	Or equivalent.
Area ACD = $24 \times 1.44 = 34.56 \text{ (cm}^2\text{)}$	A1	
Area of trapezium = $10.56 \text{ (cm}^2)$	A1	FT 'their 34.56' provided M1 awarded.
		Alternative method:
		Ratio of lengths 10:12 or 5:6 B1
		Ratio of areas 100:144 = 25:36 B1
		Area of trapezium = $11/25 \times 24$ M1
	4	$Area = 10.56 (cm^2) \qquad A1$
16. (a) $c = k x d^2$ or $c \alpha d^2$	B1	
$18 = k \times 1.5^2$	M1	
$c = 8d^2$	A1	
(b) 42.3(2)	B1	FT for their non-linear expression from (a), in (b) and (c).
(c) $98 = 8d^2$	M1	
$(d =) \pm 3.5$	A1	FT for their non-linear expression from (a) provided positive and
	6	negative roots required.
17. (Area of 1 triangle =) $\frac{1}{2} \ge 6 \ge 11 \ge 130^{\circ}$	M1	
x^2	m1	
(Area of kite =) $50.5(58cm^2)$ or $51 (cm^2)$	A1	An answer of 25(.279) gets M1m0A0.
	3	
18. (Angle inside triangle at A =) 72° BP ² = $147^{2} + 95^{2} - 2x147x95xcos 72^{\circ}$	B1	ET (their 70% monified it's loss than 100%
$BP^{2} = 147 + 95 - 2x147x95xc0872$ $BP^{2} = 22003(.15535) \text{ or } (BP =) \sqrt{22003(.15535)}$	M1 A1	FT 'their 72°' providing it's less than 122°.
(BP = 22005(.15555) of (BP =) (22005(.15555)) (BP =) 148(.334km)	A1 A1	FT their 22003(.15535) provided M1 awarded.
(Dr -) 146(.334Kiii)	4	FT then 22005(.15555) provided WT awarded.
19. "Area under a v-t graph gives the distance travelled."	M1	Could be implied by their calculations.
$(\frac{1}{2} \times 5 \times 8) + (5 \times 8)$	A1	OR Distance $A = \frac{1}{2} \times 10 \times 6$ AND Distance $B = \frac{1}{2} \times 10 \times 8$.
С	A1	
	3	
20. (a) $(3x^2 - 2)\sin 30^\circ = 3x$	M2	M1 for $\sin 30^\circ = 3x/(3x^2 - 2)$
$3x^2 - 6x - 2 = 0$	A1	Convincing work needed.
		Alternative method:
		<i>M2</i> for $6x = 3x^2 - 2$ with convincing argument for an equilateral
		triangle.
		$A1 \text{ for } 3x^2 - 6x - 2 = 0.$
(b) $\underline{-(-6)} \pm \sqrt{((-6)^2 - 4 \times 3 \times -2)}$	M1	Allow 1 slip in substitution for M1 only. Do not accept a part
2×3		trial and improvement method.
(b) $\frac{-(-6) \pm \sqrt{(-6)^2 - 4 \times 3 \times -2)}}{2 \times 3}$ $\frac{6 \pm \sqrt{60}}{6}$ $x = 2.29(-) \text{ or } 2.3 (\text{or} - x = -0.29 \text{ or } -0.3)$	A1	CAO.
x = 2.29() or 2.3 (or $x = -0.29$ or -0.3)	A1	CAO.
		If no workings shown, SC1 for $x = 2.29$ or 2.3 .
BC = 6.9 (cm)	B1	FT their value of x, provided M1 or SC1 awarded, and BC is
	7	positive.



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