GCSE MARKING SCHEME

MATHEMATICS - UNITISED

NOVEMBER 2014

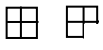
INTRODUCTION

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

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

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

UNIT 1 - FOUNDATION TIER

GCSE Mathematics - Unitised Unit 1 Foundation Tier November 2014	Mark	Final Mark Scheme Comments
1(a) January December February November March	B1	Accept any unambiguous indication of correct order including −8, −5, −2, 3, 7.
(b) 3	B1	Do not accept a list of months.
(c) 15(°C)	B1	Allow −15(°C)
(d) −2(°C)	B1	
	4	
2. Horizontal line 11cm long. Circle with radius 4cm. Midpoint unambiguously identified. Line drawn at an angle of 70° as per sketch.	 B1 B1 B1 B1 4	*Allow lengths to be ± 2mm and angle ± 2°.* Accept intent to be horizontal. Do not accept 'free hand' drawing. F.T. their line length. If <u>all</u> four marks gained but logo not as intended (e.g. centre of circle not at identified midpoint), penalise −1.
3. Finding (0·9) 0·82 and 0·75 OR 90% (82%) and 75% OR 90/100 82/100 and 75/100 or equivalent. OR three correct calculations for a common amount. AND stating 'NO'.	B3 3	All correct decimals, OR all correct %, OR all correct fractions <u>with common denominator</u>, OR correct work using a common amount for sales made, OR a valid combination AND stating 'NO'. (The 'NO' must follow from a correct reason). B2 for the above BUT with 'NO' not stated or stated for an incorrect reason. B1 for having only two correct values that may be compared (with or without a statement). Ignore subsequent working if marks gained.
4(a) 28	B1	
(b) 70	B1	
(c) Scotland 	B1	7 symbols. Ignore poor drawings.
England Ireland and Wales  or equivalent.	B1	1 full symbol plus ¾ of the symbol. F.T. their answer to (b), provided it is of equal difficulty, correct to the nearest 10. Penalise contiguous or disjointed symbol −1, once only.
	4	

GCSE Mathematics - Unitised Unit 1 Foundation Tier November 2014	Mark	Final Mark Scheme Comments
5. (Rented out first year =) ¾ × 60 = 45 (Rent collected first year 45 × (£)150 =) (£)6750 (Rented out second year =) 0·8 × 60 = 48 (Rent collected second year = 48 × 150 =) (£)7200 (Total collected over the two years =) (£)13950	M1 A1 A1 M1 A1 A1 B1	F.T. their number of allotments. F.T. 'their 48' × £150. Number of allotments rented must be different to number for first year. F.T. their two amounts. *Alternative Methods* *OR* *60 × (£)150 M1 ¾ × 60 M1* *= (£)9000 A1 = 45 A1* *¾ × (£)9000 M1 0·8 × 60 M1* *= (£)6750 A1 = 48 A1* *0·8 × (£)9000 M1 (45+48 =) 93 B1* *= (£)7200 A1 93 × (£)150 M1* *(Total =) (£)13950 B1 (Total =) (£)13950 A1*
Look for • spelling • clarity of text explanations, • the use of notation (watch for the use of '=', '£' and '×' being appropriate) QWC2: Candidates will be expected to • present work clearly, with words explaining process or steps AND • make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer QWC1: Candidates will be expected to • present work clearly, with words explaining process or steps OR • make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer	QWC2 9	QWC2. Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. QWC1. Presents relevant material in a coherent and logical manner, but with some errors in use of mathematical form, spelling, punctuation or grammar. OR Evident weakness in organisation of material but using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. QWC0. Evident weakness in organisation of material and errors in use of mathematical form, spelling, punctuation and grammar.
6. Nigel 2 Rhian 6	B2 2	Must be whole numbers. SC1 if reversed. B1 for 'their score for Rhian' = 'their score for Nigel' + 4. B1 for 'their score for Rhian' = 'their score for Nigel' × 3.
7(a) (Insurance =) (£)144 – (£)30 × 4 = (£)24 (b) (⅔ × £144 =) (£)96 (Each paid) $\frac{(£)144 - (£)96}{2}$ = (£)24	M1 A1 B1 M1 A1 5	Allow embedded answers. For sight of (£)96. F.T. 'their £96'. *Alternative Methods 7(b)* *(⅓ × £144 =) (£)48 OR Sight of $^1/_6$ B1* *(£)48 ÷ 2 OR $^1/_6$ × 144 M1* *= (£)24 A1*

GCSE Mathematics - Unitised Unit 1 Foundation Tier November 2014	Mark	Final Mark Scheme Comments
8(a) Use of Volume = length × width × height. (Volume =) $3 \times 2 \times 0{\cdot}5$ $= 3(m^3)$ (b) (Total length =) $3 + 2 + 3 + 2 + 4 \times 0{\cdot}5$ $= 12(m)$ (Cost =) (£)48	M1 m1 A1 M1 A1 A1 6	Allow $3 \times 2 \times 50$ Also accept $300 \times 200 \times 50$. C.A.O. For attempt to add at least 5 lengths. C.A.O. F.T. 4 × 'their total length'.
9(a) $480 \times 13{\cdot}25$ = 6360 (rand) (b) $795 \div 13{\cdot}25$ = (£)60 (A difference of) (£)8	M1 A1 M1 A1 A1 5	 F.T. 'their (£)60' – (£)8. *Alternative method.* *795 – (52 × 13·25) M1 (106 rand gains M1)* *÷ 13·25 m1* *= (£)8 A1*
10. $320 \times 1{\cdot}6$ OR $480 \times 0{\cdot}625$ = 512 (km) OR = 300 (miles) (Difference =) 32km OR 20 miles AND 'England'	M1 A1 A1 3	Or equivalent e.g. $320 \times 8/5$ OR $480 \times 5/8$. F.T. their calculation if M1 awarded. Correct units must be given and England identified as the country in which most distance was covered.
11. (a) A comment that refers to the fact that the gradient of the 'Llankavani line' appears to be greater than that of the 'Rossmuch line'. (b) Some reference made to the different scales used on either the vertical or the horizontal axis. (c) Uniform vertical scale of 1cm ≡ 100 complaints. Line from (2004, 500) to (2014, 600) AND labelled 'Llankavani'. Line from (2004, 500) to (2014, 1000) AND labelled 'Rossmuch'.	E1 E1 B1 L1 L1 5	A reference to 'gradient (steeper)' gains E1. A reference to '(different) scale' gains E1. Allow these marks whether given in (a) or (b). *Allow ± 2mm.* *Allow 'notches' with no values written.* *Allow intent for both L1 marks.* *Penalise −1 if <u>both</u> lines start from (2004,0) or <u>both</u> lines start from (year,500) year ≠ 2004.* *Penalise −1, once only, if lines continue significantly beyond 2014.* *B0, (possible)L1, L1 if no scale shown.* SC1 if <u>both</u> lines 'correct' but not labelled or incorrectly labelled.

GCSE Mathematics - Unitised Unit 1 Foundation Tier November 2014	Mark	Final Mark Scheme Comments
12.(a) Samir AND a valid reason given. (b) Catrin AND a valid reason given.	B1 B1 2	e.g. 'Most of his points were 3 or over', 'Samir had a mean of 3·5'. B0 if an incorrect mean given for Samir. e.g. 'Samir's range was (only) 3' also allow 'Samir's range was 2 to 5 (or 5 to 2)'. B0 if an incorrect range given for Samir.
13 (a) Question 2 because it is not relevant. (b) Two valid reasons given. E.g. "No box for 'Never'". "'More than 10' and 'less than 20' are not exclusive". "Less than 20 overlaps all the other three answers". "Over what period of time?"	B1 B2 3	Allow e.g. 'not valid' for 'not relevant'. Do not credit 'too personal'. Q2 with no reason, or an incorrect reason, is B0. B1 for each different reason (maximum of 2 marks). Ignore extra incorrect statements such as, '2^{nd} and 3^{rd} boxes overlap' or 'last box should be more than twenty' if marks have been awarded for correct reasons.
14(a) Use of 'Distance' / 'Time' (Average speed =) 30 / 1·5 = 20 (mph) (b) Correct strategy. Two different routes shown AND a correct distance given in each case.	M1 m1 A1 S1 B2 6	Allow 1(h)30(m) or 1·3 or 90(min) etc. for this M1. C.A.O. Shows understanding of table values with at least two distances correctly noted. B1 for each. A-B- D-C-A = 27(miles) A-C- B-D-A = 29(miles) A-C- D-B-A = 27(miles) A-D- B-C-A = 29(miles) A-D- C-B-A = 30(miles)
15. 3700 74 3774 75.48 3849.48 76.98(96) 3926.46(96) (£) 3926.47 OR 392647(p)	B1 M1 A1 A1 4	For the evaluation of a correct 2% OR Sight of 1·02 (222 and 3922 imply use of 3× 74 and gain B1) For attempting to find 3 different 2%. OR $3700 \times 1{\cdot}02^3$. Or sight of (£)74 AND (£)75.48 AND (£)76.98(..) F.T. one error. Accept £3926.47p. Do not accept 3926.47p. Mark final value of investment (i.e. do not penalise if they continue to give £226.47)

UNIT 1 - HIGHER TIER

GCSE Mathematics - Unitised Unit 1 Higher Tier November 2014	Mark	Final Mark Scheme Comments
1. (a) Question 2 because it is not relevant. (b) Two valid reasons given. E.g. "No box for 'Never'". "'More than 10' and 'less than 20' are not exclusive". "Less than 20 overlaps all the other three answers". "Over what period of time?"	B1 B2 3	Allow e.g. 'not valid' for 'not relevant'. Do not credit 'too personal'. Q2 with no reason, or an incorrect reason, is B0. B1 for each different reason (maximum of 2 marks). Ignore extra incorrect statements such as, '2nd and 3rd boxes overlap' or 'last box should be more than twenty' if marks have been awarded for correct reasons.
2 (a) A comment that refers to the fact that the gradient of the 'Llankavani line' appears to be greater than that of the 'Rossmuch line'. (b) Some reference made to the different scales used on either the vertical or the horizontal axis. (c) Uniform vertical scale of 1cm ≡ 100 complaints. Line from (2004, 500) to (2014, 600) AND labelled 'Llankavani'. Line from (2004, 500) to (2014, 1000) AND labelled 'Rossmuch'.	E1 E1 B1 L1 L1 5	A reference to 'gradient (steeper)' gains E1. A reference to '(different) scale' gains E1. Allow these marks whether given in (a) or (b). Allow ± 2mm. Allow 'notches' with no values written. Allow intent for both L1 marks. Penalise −1 if <u>both</u> lines start from (2004,0) or <u>both</u> lines start from (year,500) year ≠ 2004. Penalise −1, once only, if lines continue significantly beyond 2014. B0, (possible)L1, L1 if no scale shown. SC1 if <u>both</u> lines 'correct' but not labelled or incorrectly labelled.
3 (a) Samir AND a valid reason given. (b) Catrin AND a valid reason given.	B1 B1 2	e.g. 'Most of his points were 3 or over', 'Samir had a mean of 3·5'. B0 if an incorrect mean given for Samir. e.g. 'Samir's range was (only) 3' also allow 'Samir's range was 2 to 5 (or 5 to 2)'. B0 if an incorrect range given for Samir.
4. (Cost =) (£)27.50 × 1·2 or equivalent. = (£)33 (Change =) (£)7	M1 A1 A1 3	 FT 40 – 'their 33' If no marks, SC1 for sight of (£)18.

GCSE Mathematics - Unitised Unit 1 Higher Tier November 2014	Mark	Final Mark Scheme Comments
5. (Increase in population between 2001 and 2011 =) (14500 − 12500 =) 2000 (% increase ≈) $\frac{2000}{12500} \times 100$ or equivalent. = 16(%) Working with appropriate approximations <u>in calculation</u> of the percentage.	 B1 M1 A1 B1	 For sight of 2000. Accept sight of 1995. F.T. 'their increase'. Accept $\frac{1995}{12502} \times 100$ Accept 15·9(....)(%) *(Using inappropriate approximations, e.g. 13000 and 14000, would not gain either of the B marks but could gain an M1 and an A1)* Using given numbers and writing 15·9…% as 16% for final answer is B1,M1,A1,B0. *<u>Alternative method</u>* *$\frac{14500}{12500} \times 100$ OR $\frac{14497}{12502} \times 100$ M1* *= 116(%) = 115·9(..)(%) A1* *(% increase ≈) 16(%) (% increase =) 15·9..(%) B1* *Working with appropriate approximations <u>in calculation</u> of the percentage. B1* *If no marks gained <u>using this method</u>, allow SC1 for 13·8(%) or 14(%).*
Look for • spelling • clarity of text explanations (presented as a clear report) • the use of notation (watch for the use of '=' and % being appropriate) QWC2: Candidates will be expected to • present work clearly, with words explaining process or steps AND • make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer QWC1: Candidates will be expected to • present work clearly, with words explaining process or steps OR • make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer	QWC2 6	QWC2. Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. QWC1. Presents relevant material in a coherent and logical manner, but with some errors in use of mathematical form, spelling, punctuation or grammar. OR Evident weakness in organisation of material but using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. QWC0. Evident weakness in organisation of material and errors in use of mathematical form, spelling, punctuation and grammar
6. 3700 <u>74</u> 3774 <u>75.48</u> 3849.48 <u>76.98(96)</u> 3926.46(96) (£) 3926.47 OR 392647(p)	B1 M1 A1 A1 4	For the evaluation of a correct 2% OR Sight of 1·02 (222 and 3922 imply use of 3× 74 and gain B1) For attempting to find 3 different 2%. OR $3700 \times 1{\cdot}02^3$. Or sight of (£)74 AND (£)75.48 AND (£)76.98(..) F.T. one error. Accept £3926.47p. Do not accept 3926.47p. Mark final value of investment (i.e. do not penalise if they continue to give £226.47)

GCSE Mathematics - Unitised Unit 1 Higher Tier November 2014	Mark	Final Mark Scheme Comments
7(a) Use of 'Distance' / 'Time' (Average speed =) 30 / 1·5 = 20 (mph) (b) Correct strategy. Two different routes shown AND a correct distance given in each case.	M1 m1 A1 S1 B2 6	Allow 1(h)30(m) or 1·3 or 90(min) etc. for this M1. C.A.O. Shows understanding of table values with at least two distances correctly noted. B1 for each. A-B- D-C-A = 27(miles) A-C- B-D-A = 29(miles) A-C- D-B-A = 27(miles) A-D- B-C-A = 29(miles) A-D- C-B-A = 30(miles)
8. Sight of either $\pi \times 5^2$ OR $\frac{1}{2} \times 8 \times 6$ (Area =) $\pi \times 5^2 - \frac{1}{2} \times 8 \times 6$ = 54·5(...) m^2	B1 M1 A1 U1 4	$\pi \times 5^2$ must be for area of circle not semicircle. Allow B1 for $(\pi \times 5^2)/2$ if clearly area of semicircle. Look out for M0 for $\pi \times 5^2 - (6 + 8 + 10)$. Accept 54·5 to 54·6 inclusive. Correct units for final answer. Independent of all other marks.
9(a) $20^2 = 4^2 + 2 \times a \times 64$ $\frac{20^2 - 4^2}{2 \times 64}$ (= a) = 3(ms^{-2}) (b) (v^2 =) $4^2 + 2 \times 3 \times 100$ (= 616) (v =) 24·8(...)(ms^{-1}) (so velocity of 25ms^{-1} not reached)	B1 B1 B1 M1 A1 5	For correct substitution. F.T. their acceleration from part (a). A0 if 24·8 approximated to 25 and 'Yes' stated. *Alternative methods. (Using v = 25)* *$a = \frac{25^2 - 4^2}{2 \times 100}$ OR $u^2 = 25^2 - 2 \times 3 \times 100$* *M1* *= 3·045* *u = 5* *So a = 3 not enough. So u = 4 not enough* *A1* *('not enough' must be indicated for A1)* *Also (continuing from position reached in (a))* (v^2 =) $20^2 + 2 \times 3 \times 36$ (= 616) M1 (v =) 24·8(...)(ms^{-1}) A1 (so velocity of 25ms^{-1} not reached)
10. 125% ≡ 297(lb) (Initial weight =) $\frac{297 \times 100}{125}$ = 237·6(lb) ≈ $\frac{237·6}{2·2}$ (kg) or $\frac{237·6 \times 5}{11}$ = 108(kg)	B1 M1 A1 M1 A1 5	Accept any indication. Or equivalent e.g. 297 / 1·25. F.T. 'their 237·6'.

Alternative method

$\frac{297}{2·2}$ M1

= 135(kg) A1

125% ≡ 135 B1 F.T.

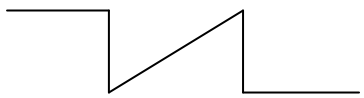
(Initial weight)

$\frac{135}{125} \times 100$ M1

= 108(kg) A1

GCSE Mathematics - Unitised Unit 1 Higher Tier November 2014	Mark	Final Mark Scheme Comments
11. $2 \times \frac{11}{8}$ or equivalent.	M1	M2 for correct use of the '2' with all four of the numbers 11, 8, 40 and 60. M1 for correct use of the '2' with any two of the numbers 11, 8, 40 and 60.
$\times \frac{40}{60}$ or equivalent	M1	
$= 11/6$ (hrs)	A1	C.A.O. or equivalent e.g. 1·83...(hrs).
= 1hrs 50min	B1	F.T. conversion from 'their 11/6' only if of equivalent difficulty (not ½ an hour). Allow 2hrs 11min or 2hrs 10min as FT from 2·18…hrs.
	4	
12. Sight of 19·5(min) AND 20·5(min)	B1	Accept 19min 30sec. AND 20min 30sec. for B1.
Sight of 24×60 (= 1440)(min)	B1	May be implied in calculations.
$\frac{24 \times 60}{19{\cdot}5}$ OR $\frac{24 \times 60}{20{\cdot}5}$	M1	F.T numerator only for $24 \times 60 \times 60$ or 60×60. F.T. if 'least $19 \leq t < 20$ OR greatest $20 < t \leq 21$'.
73·8(....) AND 70·2(...)	A1	
(Greatest number =) 74 AND (Least number =) 71	A1	F.T. 'their 73·8' AND 'their 70·2' rounded up. A0 for 73 and 70 (First capsule not considered).
	5	
13(a) $\frac{\theta}{360} \times \pi \times 20^2 - \frac{\theta}{360} \times \pi \times 7^2 = 199{\cdot}1$	M1	
$(\theta =) \frac{199{\cdot}1 \times 360}{\pi \times (20^2 - 7^2)}$	m1	Or equivalent.
$= 65(°)$	A1	SC1 for 57(°)
(b) Sight of $\frac{65}{360} \times 2 \times \pi \times 20$ OR $\frac{65}{360} \times 2 \times \pi \times 7$	M1	FT 'their 65' for all 4 marks
$= 22{\cdot}7$ OR $= 7{\cdot}9$	A1	Accept 22·6(...) and 7·9(...).
(Perimeter =) $22{\cdot}7 + 7{\cdot}9 + 13 + 13$	M1	F.T. their 'arc lengths' only if the method used for finding each of the arcs is correct.
$= 56{\cdot}6$(m)	A1	
	7	
14 Sight of $\frac{2}{3} \times \pi \times 20^3$ or 16755(·1...) or $16000\pi/3$	B1	B0 if $\frac{2}{3} \times \pi \times 20^3$ evaluated incorrectly and used in further work.
Sight of $\frac{1}{3} \times \pi \times 15^2 \times h$	B1	*'h' clearly being the height of the cone.* *May be written as (20 – d). Do not penalise lack of brackets at this stage.*
$\frac{1}{3} \times \pi \times 15^2 \times h = 9/40 \times \frac{2}{3} \times \pi \times 20^3$	M1	F.T. 'their cone vol.' = 9/40 × 'their hemisphere vol.' For M1. (l.h.s. =235·6..× h r.h.s. =3769·9 or 3770). *Allow M1only if (20 – d) is used without acknowledgement of the brackets.*
$(20 - d =)$ or $(h =) \frac{9 \times 2 \times \pi \times 20^3 \times 3}{40 \times 3 \times \pi \times 15^2}$ or equivalent.	A1	(3770 ÷ 235·6)
$= 16$(cm)	A1	
$(d =)$ 4(cm)	A1	F.T. 20 – 'their 16' if M1 gained.
	6	

UNIT 2 - FOUNDATION TIER

GCSE Mathematics - Unitised Unit 2 (non calculator) Foundation Tier November 2014	Mark	Final Mark Scheme Comments
1. (a) (i) three hundred and forty six thousand, one hundred (ii) 42604 (b) 1122 (c) 32 (p) (d) 57 (e) 1, 3, 5, 15 (f) 56 (g) 6 × 20 (=) 120	B1 B1 B1 B1 B1 B2 B1 M1 A1 10	 B1 for any 2 correct and no incorrect factors OR 3 correct and no more than 1 incorrect OR all 4 correct and 1 incorrect Accept 6 × 21 or 6 × 22 126, 132 M0 A0 for 6 × 21·8 = 130.8
2. (a) perpendicular (b) (i) straight line drawn joining 2 points on circumference passing through centre (ii) straight line touching circumference (c) 	B1 B1 B1 B1 4	 Intention of one horizontal line of the correct length in the correct position
3.(a) 38 (b) – 15 (c) (i) (x =) 33 (ii) (x=) 100 (iii) 4x = 36 (x =) 9	B1 B1 B1 B1 B1 B1 6	 Accept embedded answers FT x = 'their 36'/4 Do not accept a final answer of 36/4.
4.(a) likely (b) 10/127 (c) 6 triangles shaded	B1 B1 B1 3	
5. (1000 ÷ 200) 5 (packets) 5 × (£)3.50 (£) 17.50	B1 M1 A1 3	 FT 'their 5' if 1000÷200 or equivalent seen.

GCSE Mathematics - Unitised Unit 2 (non calculator) Foundation Tier November 2014	Mark	Final Mark Scheme Comments
6. 6:38 (pm. Put in oven.) 7:13 (pm. Remove from oven and stir. Replace in oven.) 7:28 (pm. Remove from oven.) (7:30 pm. Serve)	B1 B1 B1	Do not penalise additional time added for removing from oven, stirring etc *Alternative method:* *Times given with gaps of* *35 minutes B1* *15 minutes B1* *2 minutes AND finish at 7:30 pm B1*
QWC: Look for • relevance of work shown • generally correct spelling • clarity of text explanation • correct use of notation for time QWC2: Candidates will be expected to • present work clearly, with words explaining process or steps e.g. show calculations with times given in the question AND • make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their working (include p.m. and = when appropriate) QWC1: Candidates will be expected to • present work clearly, with words explaining process or steps OR • make few if any mistakes in mathematical form, spelling, punctuation and grammar, and include units in their working.	QWC 2 5	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. Final unsupported statements only gets QWC0

GCSE Mathematics - Unitised Unit 2 (non calculator) Foundation Tier November 2014	Mark	Final Mark Scheme Comments
7. Pencil 40p or (£)(0).40 Biro 60p or (£)(0).60 Ruler 80p or (£)(0).80 Rubber 25p or (£)(0).25	B1 B1 B1 B1 4	 FT 'their pencil' FT 'their pencil and biro' FT 'their pencil and biro and ruler'
8. Attempt to set up list of all ordered pairs, possibly given as a list or in a table. × | 3 | 5 | 7 3 | 9 | 15 | 21 5 | 15 | 25 | 35 7 | 21 | 35 | 49 All nine possible correct scores, including repeated values OR all nine ordered pairs with no incorrect scores (P(16 < score < 36) =) 5/9	M1 A1 A2 4	At least 4 ordered pairs needed. Ordered pairs: 3,3 3,5 3,7 5,3 5,5 5,7 7,3 7,5 7,7 FT 'their table or list of 9 scores' for possible A2. Otherwise, FT for maximum of: A1 for a numerator of 5 in a fraction less than 1. A1 for a denominator of 9 in a fraction less than 1. Do not penalise incorrect reduction of fractions from a FT. **NB** Penalise −1 for use of words such as '5 out of 9', '5 in 9' or '5:9'. When both fraction and wrong notation seen, DO NOT penalise wrong notation.
9. (∠ACB = 180 − 136 =) 44(°) (x =) 180 − 2 × 44 OR (x =) 136 − 44 (x =) 92 (°)	B1 M1 A1 3	 FT 'their 44'
10. (£)5.10 − 2 ½ × (£)1.20 (£)2.10 210 ÷ 30 OR 2.1(0) ÷ 0.3(0) 7 (oranges)	M1 A1 M1 A1 4	Complete method FT 'their (£)2.10'
(a) 11. Correct reflection	B2 2	B1 for a reflection in any horizontal line or in $x = 3$ or sight of the line $y = 3$

GCSE Mathematics - Unitised Unit 2 (non calculator) Foundation Tier November 2014	Mark	Final Mark Scheme Comments
12. Basic Membership (Total cost for basic membership =) 10 × (£)32 + (£)4 × 2 × 52 or equivalent (Total cost for basic membership =) (£)736	 M1 A1	 A complete correct method Correct total for basic membership If no marks for 'basic membership calculation', award for SC1 for sight of (12 × (£)32 + (£)4 × 2 × 52 =) (£)800 OR award SC1 for (10 × (£)32 + (£)4 × 52 =) (£)528
Elite Membership (Total cost for elite membership =) 12 ×[(£)60 – 0·1 × (£)60] or equivalent (Total cost for elite membership =) (£)648	 M1 A1	 A complete correct method Correct total for elite membership SC1 for sight of (£)54 or (£)72 if 2nd M0A0
Conclusion that Elite Membership is cheaper AND by (£)88	B1 5	FT only if both M marks were awarded OR if first SC and second M marks were awarded.
13. 6 × ¾ (= 18/4) 4 ½ (kg) (Requires 2 × 2(kg) tins and 1× ½ (kg) tin) (2 × (£)5.20 + 1 × (£)1.70) (£)12.10	M1 A1 A1 3	Accept ¾ + ¾ + ¾ + ¾ + ¾ + ¾. FT 'their 4½' provided of equivalent difficulty If no marks, award SC1 for at least two correct costings of combinations (with at least 1 involving 2 or 3 sizes of tin and at least 1 involving a multiple).
14. (a) $7n - 2$ (b) $20x^5$	B2 B2 4	B1 for $7n \pm$ ..... or equivalent. B1 for $20x^m$ or nx^5 where m is an integer and m ≠ 0 or 1; n is an integer and $n \neq 0$.
15. (a) 108/360 or equivalent (e.g. 3/10)	B2	B1 for numerator of 108 or denominator of 360 in a fraction < 1 Mark final answer.
(b) Sight of 1 – 3/10 (= 7/10) or equivalent 7/10 × 720 504	M1 m1 A1	FT 'their 3/10' (but not for an answer of 1/2). If 0 marks, SC1 for sight of 216. *Alternative method:* *3/10 × 720 (=216) M1 FT 'their 3/10'* *720 – 216 m1* *504 A1*
	5	

UNIT 2 - HIGHER TIER

GCSE Mathematics - Unitised Unit 2 Higher Tier November 2014	Mark	Final Mark Scheme Comments
(b) 1. Correct reflection	B2 2	B1 for a reflection in any horizontal line or in $x = 3$ or sight of the line $y = 3$
2. <u>Basic Membership</u> (Total cost for basic membership =) 10 × (£)32 + (£)4 × 2 × 52 or equivalent (Total cost for basic membership =) (£)736 <u>Elite Membership</u> (Total cost for elite membership =) 12 ×[(£)60 – 0·1 × (£)60] or equivalent (Total cost for elite membership =) (£)648 Conclusion that Elite Membership is cheaper AND by (£)88 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. Count incorrect use of '=' in situations such as '4 × 2 × 52 = 416 + 320' 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 OR • make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units (£) in their final answer	M1 A1 M1 A1 B1 QWC2 7	A complete correct method. Correct total for basic membership. If no marks for 'basic membership calculation', award for SC1 for sight of (12 × (£)32 + (£)4 × 2 × 52 =) (£)800 OR award SC1 for (10 × (£)32 + (£)4 × 52 =) (£)528 A complete correct method. Correct total for elite membership. SC1 for sight of (£)54 or (£)72 if 2nd M0A0. FT only if both M marks were awarded OR if first SC and second M marks were awarded. 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.
(c) 3. (a =) 63 (º) (b =) 117 (º)	B1 B1 2	 FT 180 - 'their a'.

GCSE Mathematics - Unitised Unit 2 Higher Tier November 2014	Mark	Final Mark Scheme Comments
4. $6 \times \frac{3}{4}$ (= 18/4) 4 ½ (kg) (Requires 2 × 2 (kg) tins and 1 × ½ (kg) tin) (2 × (£)5.20 + 1 × (£)1.70 =) (£)12.10	M1 A1 A1 3	Accept ¾ + ¾ + ¾ + ¾ + ¾ + ¾. FT 'their 4 ½' provided of equivalent difficulty. If no marks, award SC1 for at least two correct costings of combinations (with at least 1 involving 2 or 3 sizes of tin and at least 1 involving a multiple).
5. $[4x + 12 + 5x - 10 + x + 18 + 90](^\circ) = 360(^\circ)$ OR $[4x + 12 + 5x - 10 + x + 18](^\circ) = 270(^\circ)$ $10x = 250(^\circ)$ $x = 25(^\circ)$ Attempt to substitute into either $4x + 12$ or $5x - 10$ (Largest angle =) 115(°)	M1 A1 A1 M1 A1 5	Using the angle sum of a quadrilateral. Accept informal notation throughout. FT until 2nd error provided M1 awarded. If M0, award SC1 for $x = 7(^\circ)$ (from equating angle total to 180º) or for $x = 34(^\circ)$ (from omitting 90º from angle total). Either appropriate substitution attempted. FT 'their x'. All substitutions must be correctly evaluated for the final mark.
6. (a) (i) $2p < -7$ $p < -7/2$ or $p < -3\frac{1}{2}$ or $p < -3.5$ (ii) -4 (b) $15x + 10 - 8x + 20$ $7x + 30$ (c) 100	M1 A1 B1 B1 B1 B1 6	Collecting terms. M0A0 for use of = sign, unless replaced by < ISW FT 'their (i)' (for a negative answer only). Correctly expanding both brackets. FT from 3 correct terms. Mark final answer. Accept 100/1
7. (a) 108/360 or equivalent (e.g. 3/10) (b) Sight of 1 – 3/10 (= 7/10) or equivalent $7/10 \times 720$ 504	B2 M1 m1 A1 5	B1 for numerator of 108 or denominator of 360 (or 180) in a fraction < 1. Mark final answer. FT 'their 3/10' (but not for an answer of 1/2). Do not accept 504/720. If no marks, SC1 for sight of 216. *Alternative method:* *3/10 × 720 (=216) M1 FT 'their 3/10'* *720 – 216 m1* *504 A1*
8. (a) $7n - 2$ (b) $(n + 1)^2 + 2$ or equivalent	B2 B3 5	B1 for $7n$ (± .....) or equivalent. B2 for $(n + 1)^2 + \ldots$ OR for $(n + k)^2 + 2$, $k \neq 0$ B1 for $(n + k)^2$, $k \neq 0$ OR for $n^2 + 2$ (or B1 for each correct term in $n^2 + 2n + 3$, within a quadratic with more than one term)
9. Method to find the first variable Correct first variable Method to find the second variable Correct second variable	M1 A1 m1 A1 4	Allow one slip but not in equated variable. FT their first variable. ($x = 3$, $y = -1$) An unsupported answer gets 0 marks.
10. 1 320 000 ÷ 400 $3{\cdot}3 \times 10^3$	M1 A2 3	Or equivalent. A1 for equivalent correct answer, not given in standard form, e.g. 3300 or 0.33×10^4 OR A1 for $a \times 10^n$ (with $3 < a < 4$ and n a positive integer) following through from 'their 3300'.

GCSE Mathematics - Unitised Unit 2 Higher Tier November 2014	Mark	Final Mark Scheme Comments
11. (a) $10x^2 + 5xy - 4xy - 2y^2$ $10x^2 + xy - 2y^2$ or equivalent (b) $2(2x - 1) + 3 = x - 5$ $3x = -6$ $x = -2$	B1 B1 M2 A1 A1 6	 FT from 3 correct terms. M1 for correctly cleared fractions by a valid method for any 2 terms. Collecting terms. FT provided at least M1 awarded.
12. Angle BAD = 180(°) – 2x(°) (angles in an isosceles triangle) Angle BCD = 180(°) – Angle BAD OR 180(°) – [180(°) – 2x(°)] (y) = 2x(°) (opposite angles in a cyclic quadrilateral add up to 180(°))	 B1 B1 B1 3	Check diagram. Allow first B1 without a full reason. Second B1 is for clear use of cyclic quadrilateral. Indication of correct circle theorem in words.
13. (a) 6 (b) $(\sqrt{(16\times 2)} - \sqrt{2})^2$ or $32 - \sqrt{32}\sqrt{2} - \sqrt{32}\sqrt{2} + 2$ $(3\sqrt{2})^2$ or middle term $= \pm 8 \pm 8$ 18 **and** rational	B3 M1 M1 A1 6	B2 for $((1/25)^{-\frac{1}{2}} =)$ 5 OR B2 for $1 + (1/5)^{-1}$ or $1 + 25^{\frac{1}{2}}$ or $1 + \sqrt{25}$ or $1 + 1/0{\cdot}2$ B1 for $(4^0 =)$ 1 OR for $(1/5)^{-1}$ or $25^{\frac{1}{2}}$ or $\sqrt{25}$ RHS method needs 3 of 4 terms correct; accept $\sqrt{64}$ as $\sqrt{32}\sqrt{2}$
14. (a) sight of 5/12 × 1/11 OR 1/12 × 5/11 5/12 × 1/11 + 1/12 × 5/11 OR 5/12 × 1/11 × 2 = 10/132 (= 5/66) (b) 1 – P(no red ball) OR other <u>complete</u> method = 1 – 7/12 × 6/11 (= 1 – 42/132) = 90/132 (= 15/22)	M1 M1 A1 S1 M1 A1 6	 Complete correct method. ISW P(RR) + P(RR') + P(R'R) or P(RR) + P(RW) + P(WR) + P(RG) + P(GR) or correct numerical equivalent. Calculations showing correct sum of products of probabilities (without replacement). ISW
15. Reflection in y axis Curve passes through (0, 4) AND (-3, 0)	B1 B1 2	Clear intention shown. Co-ordinates need not be stated.

UNIT 3 - FOUNDATION TIER

GCSE Mathematics - Unitised Unit 3 (calculator allowed) Foundation Tier November 2014	Mark	Final Mark Scheme Comments
1. (a) (£)8·5(0) (£)23·85 (£) 9·98 (£)42·33 (b) (£)7·67 (c) 6×1·99 (£) 11·94	B1 B1 B1 B1 B1 B1 B1 7	 FT candidate's values, provided equivalent difficulty FT 50 – 'their 42·33'. Or equivalent SC1 for (9×1·99=)(£)17·91
2. (a) 53000 (b) 67 (c) 37·8	B1 B1 B1 3	
3. 42− (38−12) 16	M1 A1 2	Or equivalent
4. (6435-5793)= 642 (units used) 642 ×15(p) (£)96·3(0) or 9630(p)	B1 M1 A1 3	 FT 'their 642' from working If given, £ and/or p must be correct
5 Evidence of counting squares 48-52 (squares) 240-260 (m^2)	M1 A1 B1 3	 F.T. 5× 'their number of squares'
6. (a) A and L OR F and J (b) H and C	B1 B1 2	
7. (a) (i) any correct combination using 5, 3, 12 and 20. (ii) any correct combination (b) (i) 11 (ii) 4×9÷(3−1) (c) −10 + −5 (d) −4 × −6	B1 B1 B1 B1 B1 B1 6	5+3 = 20 −12 12+5=20 − 3 12+3 = 20 −5 Accept answers in boxes or on lines 20 ÷ 5 = 12 ÷ 3 or 5 ÷ 3 = 20 ÷ 12 (incl reciprocals) Accept answers in boxes or on lines A pair of brackets inserted correctly around subtraction. Extra brackets accepted if correct. Eg. (4×9)÷(3−1) Select the two negative numbers. In any order

GCSE Mathematics - Unitised Unit 3 (calculator allowed) Foundation Tier November 2014	Mark	Final Mark Scheme Comments
8. Choosing a combination of 4 and 6 to make 16. 4, 4, 4, 4 or 6, 6, 4 Correct costing for one combination (£) 12 or (£) 11.6(0) (£) 11·6(0) and a convincing argument that 6, 6, 4 is cheapest OR both costings evaluated with a final answer of (£) 11·6(0)	B1 B1 B1	**Alternative method** Cost of 1 bottle from 6-bottle pack = (£)4·30÷6 = (£)0·71(6). Cost of 1 bottle from 4-bottle pack = (£)0·75. B1 for both. B1 for "Buy 2 6-bottle packs + 1 4 6-bottle pack". B1 for correct total price (£) 11·6(0)
Look for • Spelling • Clarity of text explanations, • Consistent and correct use of £ or p signs. 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 : Candidates will be expected to • Present work clearly, with words explaining process or steps OR • Make few, if any, mistakes in mathematical form, spelling, punctuation and grammar in their final answer.	QWC 2 5	QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar. OR Evident weakness in organisation of material but using acceptable mathematical form, with few, if any, errors in spelling, punctuation and grammar. QWC0 Evident weakness in organisation of material, and errors in use of mathematical form, spelling, punctuation and grammar.
9. A: 12 ('sides') (36÷12=) 3(cm) (Perimeter B= 10×3) 30 (cm)	B1 B1 B1 3	 Attempt to find the side length of a square. FT candidate's number of 'sides' on perimeter A. No FT for 36÷5 FT 10 × times 'their 3' If no marks awarded, SC1 for B has perimeter of 10 'sides'.
10. (a) 18 (b) 120=45+5*Y* 5*Y*=75 *Y*=15	B1 B1 B1 B1 4	 Correct substitution Isolating the Y. Accept 5*Y*=120−45 F.T if aY=b (a≠1)

GCSE Mathematics - Unitised Unit 3 (calculator allowed) Foundation Tier November 2014	Mark	Final Mark Scheme Comments
11.(a) 39	B1	
(b) D 5, C 9, B 6, A 4	B2	B1 for any two/three correct frequencies If frequencies score zero then B1 for all correct tallies.
(c) 21 to 30 or C	B1	FT from their frequencies
(d) **Use overlay**		
3 or 4 angles correct and correctly labelled	B4	Ft from their frequencies
	OR	
3 or 4 angles correct, labels not fully correct	B3	If only B1 is scored for the diagram, and all the angles given correctly, then cancel the B1 and award M1, A1.
2 angles correct and correctly labelled.	B3	If B0 scored for the diagram, check the angles and the method to see if the M1 and the A1 can be awarded.
2 angles correct, labels not fully correct.	B2	
1 angle correct and correctly labelled.	B1	(1 is) 15° gets M1.
OR	OR	Or SC1 for all correct percentages. 20·8, 37·5, 25, 16·7
<u>If 0 or 1 for the diagram or no diagram</u>		
360/24	M1	
Angles are 75, 135, 90, and 60.	A1	
	8	
12. 3 (or 4) arcs and the bisector of the angle drawn.	B2	B1 for the first arc crossing both lines (or two equal radius arcs crossing both lines) **and** an attempt at the next stage in the construction.
	2	
13. (a) 45×32×30	M1	Or equivalent
43200	A1	
cm^3	U1	Accept ml
(b) use of 1 litre = 1000 cm^3 (eg 43L = 43000 cm^3)	M1	
(43litres is less than the volume of the tank)		
The water will not overflow	A1	May be implied but not stated explicitly. Eg. 200 cm^3 space left. FT candidate's volume of tank provided M1 awarded in part (a).
	5	
14. 2/8 is 48(pupils) or ¼ is 48(pupils)	B1	
48×4 or equivalent	M1	
192	A1	
	3	
15. 180 – (360/5) OR ((5-2) x 180) / 5	M1	Or equivalent
108 (º)	A1	
	2	
16. Area of one rectangle correctly evaluated (e.g. whole mirror)	B1	*Possible calculation for the white pieces:* *4 corner pieces 4×2×2 (assuming squares)* *2 long rectangles 2×12×2* *2 tall rectangles 2×32×2* *Centre piece 12×32* *Or B1B1M1A1 for 36*×16=576(cm^2)
Area of two or more different white or black rectangles correctly evaluated	B1	
A complete method of subtracting or adding areas e.g. 800 – (2×20×2 + 2×40×2 – 4×2×2) mirror wooden strips overlap	M1	
= 576(cm^2)	A1	CAO
	4	
17 (a) All points plotted correctly.	B2	B1 for 3, 4 or 5 points plotted correctly, not joined, or B1 for all points plotted correctly but joined.
(b) Appropriate straight line of best fit drawn with some values above and below the line.	B1	Mark intention.
(c) from their line of best fit ± 0·05 (tonnes).	B1	FT from their line. B0 if no line drawn.
	4	

GCSE Mathematics - Unitised Unit 3 (calculator allowed) Foundation Tier November 2014	Mark	Final Mark Scheme Comments
18. Line or curve drawn from end of existing line to (08:30,0). Straight line drawn from (08:30,0) to (08:45, 15:00).	B1 B2 3	 FT their first line. B1 for straight line drawn from (08:30,0) with correct gradient (500m every 5min) but not finishing at (08:45 , 15: 00) , OR B1 for straight line finishing at the school with correct gradient but not starting immediately after the first line.
19. One correct evaluation $1{\cdot}5 \le x \le 1{\cdot}6$ 2 correct evaluations $1{\cdot}585 \le x \le 1{\cdot}6$ one either side of 0 2 correct evaluations $1{\cdot}585 \le x \le 1{\cdot}595$ one either side of 0 *If evaluations not seen, accept 'too high' or 'too low'.* $x = 1{\cdot}59$	B1 B1 M1 A1 4	$\underline{x}$ $\underline{x^3 + 10x - 20}$ $\underline{x}$ $\underline{x^3 + 10x - 20}$ 1·5 -1·625 1·591 -0·063 1·51 -1·457 1.592 -0.045 1·52 -1·288 1.593 -0.028 1·53 -1·118 1·594 -0·010 1·54 -0·948 1·595 0·008 1·55 -0·776 1·596 0·025 1·56 -0·604 1·597 0·043 1·57 -0·430 1·598 0·061 1·58 -0·256 1·599 0·078 1·59 -0·080 1·6 0·096 The second B1 can be gained by calculating one value that is too low in the range 1·585 to 1·6 AND stating clearly that 1·6 will be too high.
20. (Distance^2 =) $4{\cdot}9^2 - 4^2$ Distance^2 = 8·01 OR (Distance =) $\sqrt{8.01}$ (Distance =) 2·8(30…) (m)	M1 A1 A1 3	
21. Sight of the mid-points 77·5, 82·5, 87·5, 92·5 77·5×4 + 82·5×13 + 87·5×17 + 92·5×6 (=3425) (310 + 1072·5 + 1487·5 + 555) ÷ 40 = 85(·625) (yards)	B1 M1 m1 A1 4	 FT their mid-points from within or at the bounds of the groups

UNIT 3 - HIGHER TIER

GCSE Mathematics - Unitised Unit 3 Higher Tier November 2014	Mark	Final Mark Scheme
1. $-20 + 9.8\times5$ $= 29$	M1 A1 2	
2. All three amounts correct in comparable form e.g. 20%, 30%, 50%, OR 0.2, 0.3, 0.5 or equivalent 2:3:5	 B2 B1 3	Allow fractions of a sum of money. B1 for any 2 amounts correct in comparable form.
3. (a) All points plotted correctly. (b) Appropriate straight line of best fit drawn with some values above and below the line. (c) from their line of best fit ± 0.05 (tonnes).	B2 B1 B1 4	B1 for 3, 4 or 5 points plotted correctly, not joined, or B1 for all points plotted correctly but joined. Mark intention. FT from their line. B0 if no line drawn.
4. (a) Line or curve drawn from end of existing line to (08:30,0). Straight line drawn from (08:30, 0) to (08:45, 15:00). (b) 08:45 – 08:30 $= 15$ (min)	B1 B2 M1 A1 5	 FT their first line. B1 for straight line drawn from (08:30,0) with correct gradient. (500m every 5min) but not finishing at (08:45, 15:00), OR B1 for straight line finishing at the school with correct gradient but not starting immediately after the first line. FT 'their 08:45'.
5. 180 – (360/5) OR ((5-2) x 180) / 5 108 (º)	M1 A1 2	Or equivalent.
6. Suitable arcs drawn for 60° angle. 60° angle drawn with line 6cm long. Correct arcs drawn from the ends of the 10cm and 6cm lines. Lines of length 7cm and 4cm joining to complete the quadrilateral.	M1 A1 B1 B1 4	Allow ± 2º for the 60º angle, ±2mm for all lengths. Only award this B1 for the quadrilateral shown.
7.Area of one rectangle correctly evaluated (e.g. whole mirror) Area of two or more different white or black rectangles correctly evaluated A complete method of subtracting or adding areas e.g. 800 – (2×20×2 + 2×40×2 – 4×2×2) mirror wooden strips overlap $= 576(cm^2)$ QWC: Look for • correct units used i.e. cm^2 • correct use of mathematical notation e.g. +, −,=. • spelling in at least 1 statement/sentence • clarity of text explanations QWC2: Candidates will be expected to • present work clearly, with words or quantities shown for clarity of process or steps AND • make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer QWC1: Candidates will be expected to • present work clearly, with words or quantities shown for clarity of process or steps OR • make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer	B1 B1 M1 A1 QWC 2 6	*Possible calculation for the white pieces:* *4 corner pieces 4×2×2 (assuming squares)* *2 long rectangles 2×12×2* *2 tall rectangles 2×32×2* *Centre piece 12×32* *OR B1B1M1A1 for 36×16 = 576(cm^2)* CAO QWC2 Presents material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. QWC1 Presents material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar OR evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar. QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar.

GCSE Mathematics - Unitised Unit 3 Higher Tier November 2014	Mark	Final Mark Scheme
8. (a) 2.4 or 2⅖ (b) 8x – 20 = 3x – 5 5x = 15 x = 3 (c) One correct evaluation $1.5 \leq x \leq 1.6$ 2 correct evaluations $1.585 \leq x \leq 1.6$ one either side of 0 2 correct evaluations $1.585 \leq x \leq 1.595$ one either side of 0 *If evaluations not seen, accept 'too high' or 'too low'.* $x = 1.59$	B1 B1 B1 B1 B1 B1 M1 A1 8	FT until 2nd error. x $x^3 + 10x - 20$ x $x^3 + 10x - 20$ 1.5 -1.625 1.591 -0.063 1.51 -1.457 1.592 -0.045 1.52 -1.288 1.593 -0.028 1.53 -1.118 1.594 -0.010 1.54 -0.948 1.595 0.008 1.55 -0.776 1.596 0.025 1.56 -0.604 1.597 0.043 1.57 -0.430 1.598 0.061 1.58 -0.256 1.599 0.078 1.59 -0.080 1.6 0.096 The 2nd B1 can be gained by calculating a value that is too low in the range 1·585 to 1·6 AND stating clearly that 1·6 will be too high.
9. (First 2000 units cost) 13766(p) OR (£)137.66 (Remaining 16000 units cost) 47792(p) OR (£)477.92 1.05 × 61558 OR 1.05 x 615.58 (Total cost including VAT =) 64635.9(p) OR (£) 646.359 Monthly payment = £ 53.86	B1 B1 M1 A1 A1 5	 FT provided at least B1 awarded and both amounts considered. Accept rounded or truncated answer, to nearest penny. Must be correct to nearest penny.
10. (Distance^2 =) $4.9^2 - 4^2$ Distance^2 = 8.01 OR (Distance =) √8.01 (Distance =) 2.8(30…) (m)	M1 A1 A1 3	
11. Sight of the mid-points 77.5, 82.5, 87.5, 92.5 77.5×4 + 82.5×13 + 87.5×17 + 92.5×6 (=3425) (310 + 1072.5 + 1487.5 + 555) ÷ 40 = 85(.625) (yards)	B1 M1 m1 A1 4	 FT their mid-points from within or at the bounds of the groups.
12. 12/tan72º = 3.8(990…) AC = 7.79(80…) OR 7.8	M2 A1 A1 4	M1 for tan72º = 12/x Only accept 8 from correct working
13. Correct numerical representation of the numbers involved e.g. 500,000,000,000 or 5 x 10^{11} or 500 x 10^9 Multiplication using the correct numbers = 1.5 x 10^{23}	B1 M1 A1 3	Accept correct representation of one of the numbers. If no marks gained, SC1 for an answer expressed in standard form following through from their consistent representation of each number.
14. OA=OC (or OA=OD) and OB=OD (or OB=OC) (all radii) AND angle AOB = angle COD (vertically opposite angles) (Therefore the triangles are congruent) SAS	M2 A1 3	M1 for one correct statement. These may be seen on the diagram. *One alternative method: M2 angle BAO = angle DCO and angle ABO = angle CDO (angles in the same segment) AND AO = OC (both radii). M1 for 1 pair of equal angles and equal radii.* *A1 for triangles are congruent (AAS).*
15. (a) $3a^2(3ab + 2)$ (b) (x + 10)(x – 2) x = -10 AND x = 2	B2 M2 A1 5	B1 for $3a^2(3ab + \ldots)$ OR $3a^2(\ldots + 2)$ OR for correct partial factorisation. M1 for (x…10)(x…2) FT their brackets, providing M1 awarded
16. (Volume of cube =) 343 (cm^3) (Volume of a sphere =) 4/3 × π × 1.5^3 = 14.13 to 14.14 (cm^3) (Maximum number of spheres =) 343/14.1… = 24	B1 M1 A1 M1 A1 5	Accept sight of 343 in working. FT their values provided first M1 awarded. FT provided rounding required.

GCSE Mathematics - Unitised Unit 3 Higher Tier November 2014	Mark	Final Mark Scheme
17. (PQ =) (12.6/sin44) × sin28 (PQ =) 8.5(154…) (cm)	M2 A1 3	M1 for PQ/sin28 = 12.6/sin44 or equivalent
18. Volume scale factor = 3510/130 = 27 Length scale factor = 3 Height of water = 12/3 = 4 (cm)	M1 A1 M1 A1 4	FT cube root of their 27 provided M1 awarded. *Alternative:* *M2 for $h^3=12^3\times130/3510$. M1 for $(h/12)^3= 130/3510$ or equivalent.* *m1 for* $h = \sqrt[3]{12^3 \times \frac{130}{3510}}$ *. A1 for 4(cm).*
19. (a) 5(x + 1) + 4(x – 2) as numerator AND (x – 2)(x + 1) as denominator OR multiply throughout by (x – 2) and (x + 1) 5(x + 1) + 4(x – 2) = 2(x – 2)(x + 1) $0 = 2x^2 - 11x - 1$ (b) $x = \frac{11\pm\sqrt{(-11)^2-4\times2\times(-1)}}{2\times2}$ $x = \frac{11 \pm \sqrt{129}}{4}$ x = 5.59 and x = -0.09 (Answers to 2 d.p.)	M2 A1 A1 M1 A1 A1 7	Brackets required or implied later. M1 for either correct numerator or denominator, or multiply throughout with 1 error. convincing Allow one error, in sign or substitution, but not in the formula CAO CAO
20. (a) Uniform scale on the vertical axis starting at 0 in blocks of 0.5. Appropriate width bars of height 1.4, 2.6, 2. (b) 6	B1 B2 B1 4	 FT their scale for all remaining marks provided not frequencies used. B1 for 2 correct bars or B1for sight of correct frequency densities stated.
21. a) Tangent drawn at x = 1. Idea of increase in *y*/increase in *x*. Gradient from a reasonable tangent. (b) Split into 3 areas and attempt to sum (Area =) ½×1(3 + 2×5 + 2×11 + 21) = 28 (units^2)	S1 M1 A1 M1 M1 A1 6	*Alternative method: M1 for (dy/dx) = 4x* *A1 for 4×1* *A1 for 4* Or equivalent. Award for up to 1 error in reading scale. CAO

WJEC
245 Western Avenue
Cardiff CF5 2YX
Tel No 029 2026 5000
Fax 029 2057 5994
E-mail: exams@wjec.co.uk
website: www.wjec.co.uk