GCSE MARKING SCHEME

MATHEMATICS - UNITISED

SUMMER 2015

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INTRODUCTION

The marking schemes which follow were those used by WJEC for the Summer 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

June 2015 UNIT 1 Foundation	✓	Mark	Comments
1. **Ribbon marking for 1(a) and 1(b).** (a) (Two adult tickets = 2 × £15 =) (£)30 (One child's ticket =) (£)7.5(0) (Three child's tickets = 3 × £7.50 =) (£)22.5(0) (Total cost =) (£)52.5(0) Look for • spelling • 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 • 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	✓ ✓ ✓ ✓ ✓ ✓	B1 B1 B1 B1 QWC 2	Sight of (£)7.5(0) or may be implied in further work. F.T. 3 × 'their £7.50' , but **not** 3 × £15 F.T. 'their amounts' but not if simply £15 or £7·50. Correct answer gains B4. 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. <u>An unsupported answer is QWC0.</u>
Ribbon marking for 1(a) and 1(b). 1(b) (£)47.25		B2	F.T. 0·9 × 'their total cost'. B1 for (£)5.25 OR a correct evaluation of 0·1 × 'their total cost'.
2. (170 – 199) (200 – 229) **230 – 259** (260 – 289) Using a tally convention. (7) 6 11 4	✓ ✓ ✓ ✓	B1 B1 B2 	 Need not be accurate. B2 for all three correct. B1 for 1 or 2 correct.
3. (Total cost =) 45 × 12 + 50 = (£)590 (Each paid) £590 ÷ 8 = (£)73.75	✓ ✓ ✓ ✓	M1 A1 M1 A1	M0 if 45 × 12 not attempted. E.g. '45×12+50 = 45×62 OR '45×12+50 = 107' are both M0. F.T. 'their 590' ÷ 8.
4. 4 3 5 2		B2	B1 for 4325 or 4235 or 4253 OR B1 for any even number using all given digits once only.
5. 13:21 train from Sheffield chosen. Attempt to find time difference between 14:02 and 13:21 = 41 (min) (So total time =) 66 (min) or equivalent.	✓ ✓ ✓ ✓	B1 M1 A1 B1	May be implied in further work. F.T. for 'their chosen train' (Other trains take 1hr 31m, 1hr 11m, 1hr 1m, 1hr 31m) F.T. time for 'their train journey' + 25min. *<u>Alternative method</u>* *(Arrives at Leeds station) 14:02 B1* *F.T. 'their train arrival' + 25min* *(Arrives at hotel) 14:27 B1* *F.T. 'their times'* *Attempt to find time difference between 14:27 and 13:21 M1* *(So total time =) 66 (min) or equivalent. A1*

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June 2015 UNIT 1 Foundation	✓	Mark	Comments
6(a)(i) 52 + 29 + 78 + 56 + 24 + 37 (= 276) 276 ÷ 6 = 46		M1 m1 A1	For an attempt to add the scores. Allow if one score 'missed'. F.T. 'their total'. C.A.O. Mark final answer.
6(a)(ii) (Range =) 54		B1	
6(b)(i) Group A AND Reference to higher scores in group A		B1	B0 if full calculation (2×22 + 2×25 + 1×26 + 1×28) / 6 is seen
6(b)(ii) Group A AND Reference to group B's scores only between 22 and 28.		B1	Allow 'Group A, they are more spread out'. Accept 'B's range is (only) 6
7(a) 5500		B1	
7(b) 6:40 (a.m.)		B1	
7(c) Graph extended to show zero litres 1 (hr) 50 (min) or equivalent		M1 A1	Allow M1 for sight of 7:50(a.m.) ± 2min. *Alternative method* *Correct rate of flow given e.g. 50litres per minute M1* *110 minutes or equivalent A1*
8. (Volume of cuboid =) 2 × 3 × 5 = 30(m^3) (Weight of cuboid =) 7200 (kg) 0·95 × 7200 or 7200 – 0·05 × 7200 = 6840 (kg) (Weight of each shape =) 1710(kg)	✓ ✓ ✓ ✓ ✓ ✓	M1 A1 B1 M1 A1 B1	F.T. 'their volume' × 240. F.T. 'their weight' including 240(kg). F.T. 'their 6840' ÷ 4. *Alternative method for final three marks.* *Sight of 1800(kg) F.T. 'their 7200' /4 B1* *0·95 × 1800 or 1800 – 0·05 × 1800 M1* *= 1710 (kg) A1* *Alternative method* *2 ×3 × 5 M1* *= 30(m^3) A1* *0·95 × 30 M1* *= 28·5(m^3) A1* *(× 240) 6840(kg) B1 0R (÷ 4) 7·125(kg)* *(÷ 4) 1710(kg) B1 OR (× 240) 1710(kg).*
9. Use of 0·625 × 1760 or equivalent (Approximately) 1100		M1 A1	Allow answers between 1090 and 1110 inclusive.
10(a) Use of 'Distance' / 'Time' (Average speed =) 225 / 4·5 OR 225 / 270 = 50 (mph) OR 0·83(…) miles per min.		M1 m1 A1	Allow time as 4(h) 30(min) or 4:30 or 4·3 or 270 for M1 '25 miles per ½ hour' gains M1m1. C.A.O. Units must be given if in miles per min.
10(b) 450 / 40 = 11·25 (gallons) 11·25 × 4·546 (Litres bought =) 52	✓ ✓ ✓ ✓ ✓	M1 A1 M1 A2	SC1 for 5·625 (gallons). Do not allow the A1 (or SC1) if 'rounded' value used for next calculation. F.T. 'their 11·25' × 4·546. A1 for 51(·1425). Similarly A1 for a 'correct' F.T. answer that is not rounded up to nearest whole number.

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June 2015 UNIT 1 Foundation	✓	Mark	Comments
11. Three different valid comments. e.g. 'Not representative of population'		B3	*Ignore irrelevant statements.* B1 for each different valid comment. Accept equivalent statements e.g. 'Biased' (by interest group). Do not give more than one mark for similar criticism(s).Reference to location should only be credited once.
'Fitness not defined' or 'Vague' or 'No options given'.			(criticisms of question (i)) Treat these three as similar comments.
'Might not have a dog' or 'No room for 'Never''			(criticisms of question (ii)) Treat these two as similar comments.
'Does not specify over what period of time', 'Can tick one of two boxes if answer is 10'			These are different comments.
'People might have left the show before 4p.m.' 'People might arrive later than 10a.m.'			(criticism of the method of distribution / collection) Treat these two as similar criticisms.
12. 1 person represented by 6° OR (B =) $10 \times \frac{90}{60}$ OR (Total =) $10 \times \frac{360}{60}$	✓	M1	
(B =) 15	✓	A1	Implies M1.
(Total =) 60	✓	A1	Implies M1.
(D =) 5 (people)	✓	A1	F.T. 'their 60' – 'their 15' – 10 – 30. *Alternative method* *C total represented by 180° B1* *D total represented by 360 – (60 + 90 + 180) M1* *= 30° A1* *(D =) 5 (people) A1*
13. 130		B2	B1 for sight of 129(·4...) or 129·5
14. 3500 52·50	✓	B1	For the evaluation of a correct 1·5% OR Sight of 1·015
3552·50 53.28(75)	✓	M1	(105 or 3605 imply use of 2× 52·5 and gain B1) For correctly attempting to find 2 different 1·5%.
	✓		OR $3500 \times 1{\cdot}015^2$.
3605.78(75)	✓	A1	C.A.O.
(£) 3605.79 OR 360579(p)		A1	F.T. one arithmetic error. Must be to nearest penny. Accept £3605.79p. Do not accept 3605.79p. Mark final value of investment (i.e. do not penalise if they continue to give £105.79 *If extra year OR depreciation mark accordingly, then penalise −1.*
15. $1{\cdot}20 \times 300 - 1{\cdot}17 \times 300$ or equivalent.	✓	M1	
= 9 (euros)	✓	A1	
$\frac{1{\cdot}20 \times 300 - 1{\cdot}17 \times 300}{1{\cdot}20 \times 300}$ (× 100) or equivalent.	✓	M1	F.T. 'their 9 euros' for numerator value.
= 2·5 (%)	✓	A1	*Alternative method* *$\frac{1{\cdot}20 - 1{\cdot}17}{1{\cdot}20}$ (× 100) M1* *= 2·5 (%) A1* *F.T. 'their 2·5%'* *0·025 × 300 × 1.2(0) or equivalent. M1* *= 9 (euros) A1*

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UNIT 1 - HIGHER TIER

June 2015 UNIT 1 Higher	✓	Mark	Comments
1. (Price reduction =) 0·15 × (£)720 = (£)108 (New price = £720 – £108 =) (£)612 (Monthly payment =) (£)612 ÷ 12 = (£)51	✓ ✓ ✓ ✓ ✓	M1 A1 A1 M1 A1	M2 for 0·85 × 720 F.T. £720 – 'their £108'. F.T. 'their £612'. <u>*Alternative methods*</u> *(Original monthly payment =) (£)720 ÷ 12* *M1* *= (£)60* *A1* *(Monthly reduction =)* 0·15 × (£)60 *M1 FT* *= (£)9* *A1* *(Monthly payment =) (£)51* *A1* *OR* *(Price reduction =) 0·15 × (£)720* *M1* *= (£)108* *A1* *(Monthly saving = £108/12 =) (£)9* *B1 FT* *(Monthly payment=) 720/12 – 9* *M1* *= (£)51* *A1* <u>*Note:*</u> *Allocate marks for <u>one method only</u> (do not 'mix and match'). Use method that maximises total mark.*
Look for • spelling • 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 • present work clearly, with words explaining process or steps AND • make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer QWC1: Candidates will be expected to • present work clearly, with words explaining process or steps OR • make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer	✓ ✓	QWC 2	QWC2. Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. QWC1. Presents relevant material in a coherent and logical manner, but with some errors in use of mathematical form, spelling, punctuation or grammar. OR Evident weakness in organisation of material but using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. QWC0. Evident weakness in organisation of material and errors in use of mathematical form, spelling, punctuation and grammar. <u>An unsupported answer is QWC0.</u>
2. Three different valid comments. e.g. 'Not representative of population' 'Fitness not defined' or 'Vague' or 'No options given'. 'Might not have a dog' or 'No room for 'Never'' 'Does not specify over what period of time', 'Can tick one of two boxes if answer is 10' 'People might have left the show before 4p.m.' 'People might arrive later than 10a.m.'		B3	*Ignore irrelevant statements.* B1 for each different valid comment. Accept equivalent statements e.g. 'Biased' (by interest group). Do not give more than one mark for similar criticism(s).Reference to location should only be credited once. (criticisms of question (i)) Treat these three as similar comments. (criticisms of question (ii)) Treat these two as similar comments. These are different comments. (criticism of the method of distribution / collection) Treat these two as similar criticisms.

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June 2015 UNIT 1 Higher	✓	Mark	Comments
3. 1 person represented by 6° OR (B =) $10 \times \frac{90}{60}$ OR (Total =) $10 \times \frac{360}{60}$	✓	M1	
(B =) 15	✓	A1	Implies M1.
(Total =) 60	✓	A1	Implies M1.
(D =) 5 (people)	✓	A1	F.T. 'their 60' – 'their 15' – 10 – 30. *Alternative method* *C total represented by 180° B1* *D total represented by 360 – (60 + 90 + 180) M1* *= 30° A1* *(D =) 5 (people) A1*
4. Sight of (area of ABCF =) $2000(m^2)$	✓	B1	
(Area of FCDE =) $\frac{(50 + 10)}{2} \times 20$	✓	M1	Allow M1 for correct intent, e.g missing brackets '50 +10 × 0·5 × 20'.
$= 600(m^2)$	✓	A1	C.A.O.
(Total area =) $2600(m^2)$	✓	A1	F.T. 'sum of their two values'.
5. 3500 52·50 3552·50 53.28(75)	✓	B1	For the evaluation of a correct 1·5% OR Sight of 1·015
	✓	M1	(105 or 3605 imply use of 2× 52·5 and gain B1) For correctly attempting to find 2 different 1·5%.
	✓		OR $3500 \times 1{\cdot}015^2$.
3605.78(75)	✓	A1	C.A.O.
(£) 3605.79 OR 360579(p)		A1	F.T. one arithmetic error. Must be to nearest penny. Accept £3605.79p. Do not accept 3605.79p. Mark final value of investment (i.e. do not penalise if they continue to give £105.79) *If extra year OR depreciation mark accordingly, then penalise −1.*
6. $1{\cdot}20 \times 300 - 1{\cdot}17 \times 300$ or equivalent.	✓	M1	
= 9 (euros)	✓	A1	
$\frac{1{\cdot}20 \times 300 - 1{\cdot}17 \times 300}{1{\cdot}20 \times 300}$ (× 100) or equivalent.	✓	M1	F.T. 'their 9 euros' for numerator value.
= 2·5 (%)	✓	A1	*Alternative method* *$\frac{1{\cdot}20 - 1{\cdot}17}{1{\cdot}20}$ (× 100) M1* *= 2·5 (%) A1* *F.T. 'their 2·5%'* *0·025 × 300 × 1.2(0) or equivalent. M1* *= 9 (euros) A1*
7. B D F		B3	B1 for each.
8.(a) An explanation that refers to enough (all) of the 162 people in the 18-25 group could be under 20 AND enough (all) of the 341 people in the 41-60 group could be under 50		B2	B1 if the explanation refers to only one of these facts. B1 for an explanation that only refers to the fact that we can't tell, e.g. 'Don't know how many under 20 and how many over 50'.
8.(b) (61 – 17 =) 44(years)		B1	Accept 43< range ≤ 44

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June 2015 UNIT 1 Higher	✓	Mark	Comments
9. **Ribbon marking for 9(a) and 9(b).** (a) $-30\cdot6(0) = 2\cdot99 \times 60 - 0\cdot7M$ $M = \frac{2\cdot99 \times 60 + 30\cdot6(0)}{0\cdot7}$ $= 300$ (cards)		M1 m1 A1	C.A.O. If no marks gained allow SC1 for 212(·5…). SC2 for 213.
Ribbon marking for 9(a) and 9(b). (b) $\frac{300 \times 0\cdot7}{2\cdot99}$ or equivalent (Minimum number =) 71 (cards)		M1 A1	F.T. 'their 300'. Allow M1 for any attempt at finding how many '2·99 there are in 210'. E.g. 'Repeated additions of 2·99 aiming for 210.' OR 'trial and improvement of S × 2·99 aiming for 210.' M1, A0 for an answer of 70(·2...)
10. Sight of 275(cm) or 2·75(m) ('biggest shed') Sight of 3550(cm) or 35·5(m) ('smallest wall') $\frac{3550}{275}$ or $\frac{35\cdot5}{2\cdot75}$ $= 12\cdot9(...)$ Clear statement that 13 sheds will not always fit.	✓ ✓ ✓ ✓ ✓	B1 B1 M1 A1 A1	F.T 'their smallest wall' only if 'their biggest shed' 'their smallest wall if $3500 \leq w < 3600$ AND 'their biggest shed' if $270 < s \leq 280$. or equivalent in metres. *Alternative methods (for M1A1A1)* *13 × 2·75* *M1* *= 35·75(m)* *A1* *Clear statement that they will not fit.* *A1* *OR* *35·5* *M1* *13* *= 2·73....* *A1* *Clear statement that they will not fit* *A1*
11 Stating 5cm represents 44yards AND 3cm represents 24 metres. Equating a 'common cm. value' representing both yards and metres correctly. e.g. 1cm ≡ 8·8 yards and 1cm≡ 8 metres so 8metres = 8·8 yards 1 metre = 1·1 yards		B1 M1 A1	Accept any unambiguous statement. Implies previous B1. No F.T. from a B0. Allow sight of 'corresponding' values. E.g. sight of 8 and 8·8. Also e.g. 15cm ≡ 132 yards and 15cm≡ 120 metres so 120 metres = 132 yards. Allow equivalent fractions e.g. 11/10, 88/80, 132/120 etc.
12. $20 \times \frac{360}{420}$ or equivalent. $\times \frac{8}{5}$ or equivalent. $= 27\cdot4(....)$ 28 (people required).	✓ ✓ ✓ ✓	M1 M1 A1 B1	M2 for correct use of the '20' with all four of the numbers 360, 420, 8 and 5. M1 for correct use of the '20' with any two of the numbers 360, 420, 8 and 5. C.A.O. (to 1dp) F.T. rounding up.
13(a) Use of $310^{(o)}$ (Area =) $\frac{360 - 50}{360} \times \pi \times 12^2$ $= 389\cdot5(.....)(cm^2)$ or 124π.		B1 M1 A1	Must be used with π. M2 for $\pi 12^2 - \frac{50}{360} \times \pi \times 12^2$ Accept answers between 389·35 and 389·75 inclusive. Allow $390(cm^2)$ from correct work. SC1 for $62\cdot8(.....)(cm^2)$ or 20π.
13. (b) $\frac{50}{360} \times 2 \times \pi \times 12$ $= 10\cdot4(7..)(cm)$ or $10\cdot5(cm)$ or $10\pi/3$. (Perimeter =) $10\cdot4(7..) + 24$ $= 34\cdot4(7..)$ (cm)	✓ ✓ ✓ ✓	M1 A1 M1 A1	F.T. 'their derived $10\cdot4(7..)$' + 24. 'Their derived $10\cdot4(7..)$' must involve the use of π.

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June 2015 UNIT 1 Higher	✓	Mark	Comments
14. (Volume of cylinder =) $\pi \times r^2 \times 6r$	✓	B1	
(Volume of hemisphere =) $\frac{2}{3} \times \pi \times (2r)^3$	✓	B1	Or equivalent e.g. $16\pi r^3 / 3$
$6\pi r^3 + \frac{16\pi r^3}{3} = 3244{\cdot}48$ or equivalent	✓	M1	F.T. for 'their volumes' only if Vol. cylinder = a × πr^3 AND Vol. hemisphere = $b \times \pi r^3$ with $a \neq b$
$r^3 = 91(\cdot 1\ldots)$	✓	A1	C.A.O.
$r = 4{\cdot}5$	✓	A1	F.T cube root of 'their 91·1..'.
(Height of part =) 36(cm)	✓	B1	F.T. 8 × 'their 4·5'.
15. Use of Time taken = $\frac{\text{Distance travelled}}{\text{Speed}}$		M1	Allow numerical examples or use of symbols.
Sight of $\frac{\text{Distance} / 2}{\text{Speed} \times 2}$ (+) $\frac{\text{Distance} / 2}{\text{Speed} / 2}$		M1	'Distance' and 'Speed' used must be consistent with those of previous M1.
Convincing explanation of why Diego's statement is not correct.		A1	Sight of correct numerical calculations sufficient for A1. *Examples of acceptable solutions* *(i) (Time at constant speed =) D/V* M1 *Sight of* $\frac{½D}{2V} + \frac{½D}{½V}$ *M1* *Convincing explanation e.g.* $\frac{5D}{4V} > (\text{or} \neq) \frac{D}{V}$ or $\frac{D}{4V} + \frac{D}{V} > (\text{or} \neq) \frac{D}{V}$ *A1* *(ii) Using numerical values e.g.100 miles at 50mph* *(Time at constant speed =) 100/50 (=2hrs)* M1 *Sight of* $\frac{50}{100} + \frac{50}{25}$ *M1* *Convincing explanation e.g.* *2½(hrs) >(or≠) 2(hrs)* *A1* *Also accept a statement, e.g.* *'So they are not the same', if two correct calculations have been made.*

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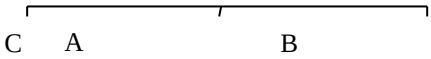
2015 June Unit 2 (non calculator) Foundation Tier	✓	**Marks**	**Comments**
1.(a) 566		B1	
1.(b) 253		B1	
1.(c) 54		B1	
1.(d) 50(%)		B1	
1.(e) 3 064 000		B1	
1.(f) (£)110		B1	
1.(g) 4600		B1	
2.(a) likely		B1	
2.(b)  		 B1 B1 B1	Allow 2/10 and 7/10 to represent A and B respectively. A should be between 0·1 and 0·3 inclusive. B should be between 0·6 and 0·8 inclusive. C should be at 0.
3. ml or cm^3 or cl km tonne or t m		B1 B1 B1 B1	 Do not accept 'ton'
4.(a) 72		B1	
4.(b) (i) (x =) 20		B1	Accept embedded answers
4.(b) (ii) (y =) 7		B1	Accept embedded answers
4.(c) 3p		B1	
4.(d) – 2		B1	
5. Strategy e.g. 3×20(p) + 1 × 10(p) (= 70(p)) 280(p) ÷ 70(p) (= 4) (Number of 20p coins= 4× 3 =) 12		M1 M1 A1	Allow M1 for at least two attempts at 'trial and improvement' method using both 20p and 10p coins; i.e. finding two of 70(p), 140(p), 210(p), 280(p) or equivalent. Sight of 240(p) + 40(p) or equivalent [i.e.4 lots of each of 60(p) and 10(p)]. Award 3 marks if answer of 12 given with no working. Accept sight of 12 × 20(p).
6. ¼ l = 250 ml 250 ÷ 5 50		B1 M1 A1	Can be seen in calculation FT 'their 250' ÷ 5 (but not ¼ of 250) CAO

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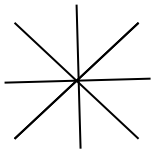
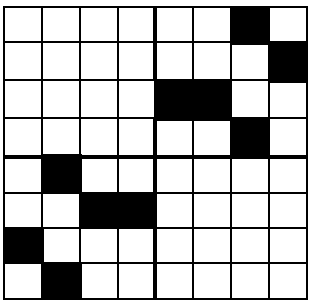
2015 June Unit 2 (non calculator) Foundation Tier	✓	Marks	Comments
7. 1500 (kg) ÷ 20 (=) 75(kg) 50 × 75 (=) 3750 (kg)	✓ ✓ ✓ ✓	M1 A1 M1 A1	FT 'their 75' Award M2 for 50/20 × 1500 or equivalent *Alternative method:* *1500 ÷ 2 M1* *(=) 750(kg) A1* *750 × 5 M1* *(=) 3750(kg) A1* *OR: 3000(kg) ≡ 40 (people) B1* *750 (kg) ≡ 10 (people) B1* *3000 + 750 (kg) M1* *(=) 3750(kg) A1*
8.(a) 		B2	B1 for 2 or 3 lines correct and no incorrect lines
8.(b) reflex		B1	
8. (c) 		B2	B1 for each quadrant

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2015 June Unit 2 (non calculator) Foundation Tier	✓	Marks	Comments
9. (Loss =) 6/100 × (£) 150 (= £) 9 (Selling price = £150 – £9 = £) 141	✓ ✓ ✓	M1 A1 B1	Any correct method for finding 6% of £150 FT 'their £9' if M1 awarded *Alternative method:* (Selling price =) 94(%) (of original price) B1 (Selling price =) 94/100 × (£) 150 M1 (£)141 A1
QWC: Look for • relevance of work shown • generally correct spelling • clarity of text explanation (equivalent statements to those in brackets) • correct use of notation for money (full use of £ or p as appropriate)	✓ ✓	Q W C2	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.
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 working.			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.
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			QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar. Final unsupported statement only gets QWC0

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2015 June Unit 2 (non calculator) Foundation Tier	✓	Marks	Comments
10.(a) 7 **9** 13 **14** **13** 15 **19** 20 16 **18** 22 **23** **19** 21 **25** 26		B2	B1 for at least 4 correct entries
10.(b) 5/16		B2	FT their list. B1 for a numerator of 5 in a fraction less than 1. B1 for a denominator of 16 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 16', '5 in 16'. or '5:16'. When both fraction and wrong notation seen, DO NOT penalise wrong notation
11. $2x + 30 = 105 - x$ $3x = 75$ $x = 25$	✓ ✓ ✓	M1 A1 A1	Strategy of equating appropriate angles FT until 2nd error (for equivalent difficulty) FT $ax = b$, with $a \neq 1$ Sight of (x =) 25 gains M1A1A1. Otherwise, for an attempt at trial and improvement to equate the base angles, award M1A1 for 2 appropriate trials.
(Angle *ABC* or Angle *BCA* =) 80(°) (180(°) – 80(°) – 80(°) =) 20(°)	✓ ✓	B1 B1	FT 'their derived x'. Check diagram. FT 180 – 'their *ABC*' – 'their *ACB*' OR 180 – 2 × 'their *ABC*' OR 180 – 2 × 'their *ACB*' provided the base angles are obtained by substituting 'their x' and provided the sum of the base angles is less than 180. If no other marks awarded, SC2 for $45 - x$ SC1 for $180 - (2x + 30 + 105 - x)$ OR e.g. $2x + 30 + 105 - x + A = 180$

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2015 June Unit 2 (non calculator) Foundation Tier	✓	Marks	Comments
12. $(0{\cdot}6 + 0{\cdot}1)$ $(0{\cdot}7) \times 600 \quad (= 420)$ $600 - 420$ 180 (pupils)	✓ ✓ ✓ ✓	M1 M1 M1 A1	 Or M2 for equivalent working e.g. $0{\cdot}6 \times 600 + 0{\cdot}1 \times 600$ If neither M1 awarded, award M1 for $0{\cdot}6 \times 600$ or $0{\cdot}1 \times 600$ or 360 or 60 FT 600 – 'their 420' provided at least M1 already awarded AND 'their 420' is derived from the total travelling by bus or by car CAO Do not accept 180/600 (written as a fraction) *Alternative method:* $0{\cdot}6 + 0{\cdot}1$ M1 $1 - (0{\cdot}6 + 0{\cdot}1)$ M1 $(= 0{\cdot}3)$ $0{\cdot}3 \times 600$ M1 FT 'their 0·3' 180 (pupils) A1
13. (1, 0)		B2	Accept (x =) 1, (y =) 0 provided it is clear which co-ordinate belongs to which variable. B1 for either $x = 1$ or $y = 0$ OR B1 for a sketch which includes a clear indication of the midpoint OR B1 for $\left(\frac{-3+5}{2}, \frac{-6+6}{2}\right)$ or equivalent OR B1 for sight of 4 or 6 within appropriate working e.g. $5 - (-3) = 8$, $8 / 2 = 4$

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2015 June Unit 2 (non calculator) Foundation Tier	✓	Marks	Comments
14.(a) Method that produces at least 2 correct prime factors $2 \times 2 \times 2 \times 2 \times 5$ OR $2^4 \times 5$		M1 A1	 Do not ignore 1s within the product. A0 for sum or list
14. (b) $16 \times 5 \times 3$ or equivalent OR listing multiples of <u>both</u> 80 and 24 (LCM is) 240		M1 A1	FT 'their (a)' Attempt to add 80s and 24s, with at least 2 correct additions seen for each CAO
14.(c) 8		B1	Accept $2 \times 2 \times 2$ or 2^3
15. (a) Use overlay. Plots Curve		 P2 C1	 Accurate to within one 'small' square. P1 for 5, 6 or 7 correct plots. Clear intention. C1 is dependent on at least P1 being awarded. C0 for a polygon.
(b) 2·2 (metres)		B1	
(c) 0·53 to 0·54 (seconds)		B1	Accurate to within one 'small' square. FT from 'their curve'. Do not accept 0.55 unless followed through from 'their curve'.

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Unit 2 GCSE Maths June 2015 Higher Tier	**TICK**	**MARK**	**Comment**
1. Correct reflection		B2	B1 for a reflection in any horizontal line or in $x = -2$ or for sight of the line $y = -2$
2. (Reduced cost of holiday =) 840 – 840 × 0.2(0) OR 840 × 0.8(0) (= £)672	 ✓ ✓	 M1 A1	 Or equivalent full method
(Amount saved each week = 300 × 0.35 =) (£)105	✓	B1	Or sight of (4 × 105 or 1200 × 0.35 =) 420
Considers the time period of saving money e.g. 4 × 105 (= 420), 392 / 105 (< 4) or e.g. 4 × 300	✓	S1	FT 4 × 'their 105' Allow use of 3 weeks (interpreted as 'within 4 weeks')
Considers £280 already saved in an appropriate calculation	✓	S1	e.g. 'their 672' – 280 (= 392) or 280 + 'their 420' (= 700)
Interpretation: e.g. 'Yes , enough time to save' 'Yes, with £28 left over' 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)	✓	E1	(700 > 672 or 420 > 392) Do not FT for answers stating 'No' (unless using 3 weeks rather than 4). Allow FT from A0 or B0. Award of E1 depends on M1 and S2 and correct relevant calculations. ISW e.g. for an incorrect calculation of money left over.
A clear conclusion statement must be made before QWC2 can be awarded. Count incorrect use of '=' in situations such as '840 × 0·2 = 168 – 840' within the '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	 ✓ ✓	Q W C 2	 QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar. QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar OR evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar. QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar.

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Unit 2 GCSE Maths June 2015 Higher Tier	TICK	MARK	Comment
3. (0·6 + 0·1)	✓	M1	
(0·7) × 600 (= 420)	✓	M1	Or M2 for equivalent working e.g. 0·6 × 600 + 0·1 × 600 If neither M1 awarded, award M1 for 0·6 × 600 or 0·1 × 600 or 360 or 60
600 – 420	✓	M1	FT 600 – 'their 420' provided at least M1 already awarded AND 'their 420' is derived from the total travelling by bus or by car
180 (pupils)	✓	A1	CAO Do not accept 180/600 (written as a fraction) *Alternative method:* 0·6 + 0·1 M1 1 – (0·6 + 0·1) M1 (= 0·3) 0·3 × 600 M1 FT 'their 0·3' 180 (pupils) A1
4. TO BE VIEWED WITH DIAGRAM			
$2x + 30 = 105 - x$	✓	M1	Strategy of equating appropriate angles
$3x = 75$	✓	A1	FT until 2nd error (for equivalent difficulty)
$x = 25$	✓	A1	FT $ax = b$, with $a \neq 1$ Sight of (x =) 25 gains M1A1A1. Otherwise, for an attempt at trial and improvement to equate the base angles, award M1A1 for 2 appropriate trials.
(Angle *ABC* or Angle *BCA* =) 80(º)	✓	B1	FT 'their derived x'. Check diagram.
(180(º) – 80(º) – 80(º) =) 20(º)	✓	B1	FT 180 – 'their *ABC*' – 'their *ACB*' OR 180 – 2 × 'their *ABC*' OR 180 – 2 × 'their *ACB*' provided the base angles are obtained by substituting 'their x' and provided the sum of the base angles used is less than 180. If no other marks awarded, SC2 for 45 – x SC1 for 180 – ($2x + 30 + 105 - x$) OR e.g. $2x + 30 + 105 - x$ + A = 180

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Unit 2 GCSE Maths June 2015 Higher Tier	TICK	MARK	Comment
5. RIBBON-MARKING FOR PARTS (a) TO (c) (a) Method that produces at least 2 correct prime factors $2 \times 2 \times 2 \times 2 \times 5$ OR $2^4 \times 5$		M1 A1	 Do not ignore 1s within the product. A0 for a sum or list.
(b) $16 \times 5 \times 3$ or equivalent OR listing multiples of 80 and multiples of 24 (LCM is) 240		M1 A1	FT 'their (a)' Attempt to add 80s and 24s, with at least 2 correct additions seen for each CAO
(c) 8		B1	Accept $2 \times 2 \times 2$ or 2^3
6. $11n - 1$		B2	B1 for sight of $11n$ or $11 \times n$ or equivalent
7. (1, 0)		B2	Accept (x =) 1, (y =) 0 provided it is clear which co-ordinate belongs to which variable. B1 for either $x = 1$ or $y = 0$ OR B1 for a sketch which includes a clear indication of the midpoint OR B1 for $\left(\frac{-3+5}{2}, \frac{-6+6}{2}\right)$ or equivalent OR B1 for sight of 4 or 6 within appropriate working e.g. $5 - (-3) = 8$, $8 / 2 = 4$
8. RIBBON MARKING (a) TO (c) (NOT (d)) (a) Use overlay. Plots Curve		 P2 C1	 Accurate to within one 'small' square. P1 for 5, 6 or 7 correct plots. Clear intention. C1 is dependent on at least P1 being awarded. C0 for a polygon.
(b) 2·2 (metres)		B1	
(c) 0·53 to 0·54 (seconds)		B1	Accurate to within one 'small' square FT from 'their curve'. Do not accept 0·55 unless followed through from 'their curve'.
(d) $h = 2{\cdot}2 + t - 5t^2$		B1	Accept any unambiguous indication e.g. circled formula.
9. Sight of line for either $x = -5$ or $y = 3$ Correct line drawn for $y - x + 2 = 0$ ($y = x - 2$) Correct region clearly identified		B1 B2 B1	Accept an unlabelled correct line provided unambiguous (e.g. the only vertical or horizontal line). Accept dotted lines throughout question. B1 for correct gradient (= 1) OR correct y-intercept plotted (0, –2) OR correct x-intercept plotted (2, 0) OR any two other points calculated or plotted correctly (with no incorrect points) FT for their lines (for equivalent difficulty)

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Unit 2 GCSE Maths June 2015 Higher Tier	TICK	MARK	Comment
10. Method to find the first variable Correct first variable Method to find the second variable Correct second variable	✓ ✓ ✓ ✓	M1 A1 m1 A1	Allow one slip (but not in the equated variable) FT 'their first variable' $x = -2$, $y = 2{\cdot}5$
11. Use overlay. Correct enlargement		B3	Otherwise B2 for 2 correct points (within an inverted triangle) OR inverted triangle of correct size in incorrect position OR consistent use of an incorrect **negative** fractional scale factor (in correct position) B1 for 1 correct point (within an inverted triangle) OR any 2 correct points (not within an inverted triangle) OR consistent use of scale factor + ½ (in correct position) OR consistent use of an incorrect **negative** fractional scale factor in incorrect position
12. (a) $x = 0{\cdot}74444.....$ $10x = 7{\cdot}4444.....$ with an attempt to subtract 67/90 or equivalent e.g. 737/990		M1 A1	Or $10x$ and $100x$, or equivalent. Or an alternative method. An answer of 6·7/9 gains M1 only. Mark final answer. Do not ignore incorrect cancelling.
(b) $18 + \sqrt{36} + \sqrt{36} + 2$ or $\sqrt{324} + \sqrt{36} + \sqrt{36} + \sqrt{4}$ or equivalent = 32		M1 A1	3 of the 4 terms correct. $\sqrt{18}\sqrt{2}$ is insufficient for $\sqrt{36}$. Do not ignore subsequent working *Alternative method:* $(3\sqrt{2} + \sqrt{2})^2$ M1 = 32 A1
(c) 1/125 or 0·008 or equivalent		B2	B1 for 125^{-1} or $1/5^3$ or $(1/5)^3$ or $1/\sqrt{15625}$ or $1/15625^{1/2}$ or $(1/15625)^{1/2}$

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Unit 2 GCSE Maths June 2015 Higher Tier	TICK	MARK	Comment
13. TO BE VIEWED WITH DIAGRAM $2x(^o) + 3x(^o) = 180(^o)$ or equivalent $x(^o) = 36(^o)$ OR Angle ABC = $72(^o)$ (Angle AOC =) $2 \times 72(^o)$ $144(^o)$	✓ ✓ ✓ ✓	M1 A1 M1 A1	Use of cyclic quadrilateral FT $4 \times$ 'their x' Check diagram for answers. If a final answer of $216(^o)$ is given, with or without sight of $144(^o)$, award SC1 in place of final 2 marks *Alternative method:* Reflex angle AOC = $6x$ OR Obtuse angle AOC = $4x$ M1 $360(^o) - 6x = 4x$ or equivalent M1 $x(^o) = 36(^o)$ A1 AOC = $144(^o)$ A1

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Unit 2 GCSE Maths June 2015 Higher Tier	TICK	MARK	Comment
14. RIBBON MARKING PARTS (a) AND (b) (a) 5/15 × 4/14 = 20/210 (= 2/21) or equivalent		M1 A1	Complete correct method ISW Method <u>with</u> replacement gets 0 marks
(b) 1 – P(both the same colour) = 1 – [5/15 × 4/14 + 9/15 × 8/14] (= 1 – 92/210) = 118/210 (= 59/105)	✓ ✓ ✓	M1 M2 A1	 <u>Complete</u> correct method. M1 for 1 error. FT 'their (a)' if used ISW Penalise once only (throughout whole question) for a repeated incorrect denominator. If no marks awarded, SC1 for sight of 92/210 (probability of both the same colour) *Alternative method:* P(YR or RY or RB or BR or BY or YB) M1 = 5/15×9/14 + 9/15×5/14 + 9/15×1/14 + 1/15×9/14 + 1/15×5/14 + 5/15×1/14 or equivalent M2 = 118/210 (= 59/105) A1 If no marks awarded, SC2 for this method and related answer, having omitted one product (out of 6) SC1 for this method, having omitted one product, with no related correct answer SC1 for this method and related answer, having omitted two products *Alternative method:* P(YY' or RR' or BB') M1 = 5/15×10/14 + 9/15×6/14 + 1/15(×14/14) M2 = 118/210 (= 59/105) A1 If no marks awarded, SC1 for this method and related answer, having omitted one product (out of 3) SC2 for method <u>with</u> replacement in part (b), leading to an answer of 118/225 SC1 for method <u>with</u> replacement in part (b), without a related answer
15. (a) Sketch with downwards shift - 4 indicated on *y*-axis or (0, -4) given		B1 B1	Clear intention to draw same curve. Depends on correct shape of first curve.
(b) Reflection in *x* axis - 1 indicated on *y*-axis or (0, -1) given		B1 B1	Clear intention to reflect same curve. Depends on first B1.

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2015 June UNIT 3 (calculatorallowed) Foundation Tier	✓	**Mark**	**Comments**
Ribbon Marked 1(a) marked with 1(b) and 1(c) 1. (a) (£) 18·75 (£) 1·78 (£) 8(·00) (Total =) (£) 28·53	 ✓ ✓ ✓ ✓	 B1 B1 B1 B1 4	 FT 'their three costs'.
1 (b) (number of complete £5 spent=) 5 (5×100=) 500		B1 B1 2	FT 'their total' for both B1s.
1 (c) 40 – (£)28.53 (£) 11·47		M1 A1 2	FT 'their' total for M1 A1
2(a) 32000		B1 1	
2(b) 62.8		B1 1	
3. Evidence of counting squares 24-28 inclusive (cm^2)		M1 A1 2	
4. (32−18)÷2 7(cm)		M1 A1 2	Or equivalent.
5. Use of 1000m = 1km (2000÷400=) 5 (laps)		B1 B1 2	
Ribbon Marked 6(a) 6(b), 6(c), 6(d), 6(e) and 6(f) 6 (a) 6 (students ate no fruit or veg)		 B1 1	
6 (b) 6+4+6+7+9+10+8 =50		M1 A1 2	An attempt to add at least six vertical heights of bars. FT 'their 6' or allow one other slip in reading from scale CAO
6 (c) 18/50 or equivalent		B2 2	Or equivalent. FT 'their 50' B1 for 18 as a numerator (but denominator not 'their 50') or B1 for an attempt to add 10/'their 50' + 8/'their 50'.
6 (d) 120 /360 or equivalent		B1 1	Allow 120°±2. Accept equivalent fraction. ISW.
6 (e) 36 – 1/3 of 36 24		M1 A1 2	FT 'their fraction' in (d) for M1 A1 24/36 M1 A0
6 (f) A correct comment with reference to both sets of data or that makes specific reference to just one.		E1 1	"Two sets of results give different conclusions" "The school results shows the statement wrong but the sports centre results show the statement correct".

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2015 June UNIT 3 (calculatorallowed) Foundation Tier	✓	Mark	Comments
7. $a = 10$ $b = 5$ b×b (area =) 25 (cm^2)	✓ ✓ ✓ ✓	B1 B1 M1 A1 4	 FT 15 – 'their *a'* FT for M1 and A1,'their b×b' provided at least one B1 awarded.
8. Extras used (150 − 120 =) 30 (mins) or (490 − 400 =) 90 (texts) <u>Cost of Bill</u> Ext mins×(£)0·35 + Ext texts×(£)0·12+(£)15(·00) Total cost = £36·30 <u>New contract</u> (240 mins 800 texts cost) £30 He should accept the new contract. Look for • Spelling in at least one statement or sentence • Clarity of text explanations • Consistent use of £ and p • Correct use of mathematical symbols, 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.	 ✓ ✓ ✓ ✓ ✓ ✓ ✓	B1 M1 A1 B1 E1 QWC2 7	For either "extra" amount used FT 'their' extra mins and texts but not from 150 mins or 490 texts. CAO FT 'their £36.30'. The bill would have been cheaper by £6.30 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. Use of 1000g=1kg to convert units 6750 ÷450 or 6.75÷0·45(0) (=15) or equivalent 15 × 20 + 25 (=325) 325 (mins) 5 hours 25 minutes	✓ ✓ ✓ ✓ ✓	B1 M1 m1 A1 B1 5	 FT error in conversion if consistent units FT 'their 15' CAO For correct conversion to hours and minutes. FT 'their 325'provided equivalent difficulty

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2015 June UNIT 3 (calculatorallowed) Foundation Tier	✓	Mark	Comments
10.(a) $2x = 16$ $x = 8$		B1 B1 2	FT one error Accept embedded answer
10.(b) $42 = 4\times3 + 6C$ $6C = 30$ $C = 5$		B1 B1 B1 3	Correct substitution FT until second error. Accept embedded answer
11. 1 /4+1/8 = 3/8 1− (1/4 + 1/8) = 5/8 5/8 is (£)100 so 1/8 is (£) 20 (Total amount=)(£)160	✓ ✓ ✓ ✓	B1 B1 M1 A1 4	Accept decimal equivalent. B2 for 5/8. FT 'their 3/8' but not 2/12. Alternative 100÷5×8 Look for trial and improvement methods. Award M1 for at least two trials that demonstrate some improvement.
12 (a) 360 – (45 + 90 + 62) 163(°)		M1 A1 2	
12 (b) 360(°)		B1 1	Accept reference to the sum equals 360(°)
13 (a) 30 (minutes)		B1 1	Accept ½ hour or half an hour.
13 (b) 50 (miles)		B1 1	
Ribbon marked 13 (c) and 13 (d) 13 (c)horizontal line from (11:30, 80) to (13:00 ,80) Line with negative gradient to (15:00 , 0)		B1 B1 2	
13 (d) 80 ÷ 2 40(mph)		M1 A1 2	FT 'their line' from part c if line with negative gradient.
14. ½×8×8 = 32 cm^2		M1 A1 U1 3	
15. (Ratio =) 4:2:1 or equivalent (1 part =) 385 ÷ (4+2+1) Flour 220(g) Sugar 110(g) Raisins 55(g)	✓ ✓ ✓ ✓	B1 M1 A2 4	A1 for two correct amounts OR for all three correct but incorrectly designated. *Alternative method using trial and improvement:* *B4 for correct amounts (B3 for 2 correct).* *B2 for two trials using correct proportions working towards the correct amounts.* *B1 for one trial using correct proportions.* *SC1 for Flour 154, Sugar 154, Raisins 77 from use of the ratio (2:2:1)*
16**. Use overlay.** Correct size and position of ABCD. Arc drawn of radius AX centre A. Arc ending on 'their new CD'		B1 M1 A1 3	Allow ± 2mm on the length of the sides and ± 2° on the 90° angles.

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2015 June UNIT 3 (calculatorallowed) Foundation Tier	✓	Mark	Comments
17(a) **Use overlay** Correct grouped frequency diagram.		B2 2	B1 for any 3 correct heights of bars. B0 if a frequency polygon has been drawn, with or without a frequency diagram. Penalise -1 for any other ambiguous lines.
17.(b) **to be viewed with table** Sight of the mid-points 2·5, 7·5, 12·5, 17·5, 22·5 $2·5\times19 + 7·5\times17 + 12·5\times10 + 17·5\times5 + 22·5\times2$ (47·5 +127·5 + 125 + 87·5 + 45 = 432·5) $432·5 \div 53$ = 8·1(60…) or 8· 2 (minutes) or 8 min 9.6 sec	✓ ✓ ✓ ✓	B1 M1 m1 A1 4	 FT their mid-points from within or at the bounds of the groups. FT 'their 432.5' Accept 8 (minutes) from correct working
17.(c) $0 < t \leq 5$ (minutes)		B1 1	Allow any unambiguous reference to the group eg $0 - 5$.
18.(a) Valid explanation eg.'x is the hypotenuse so it should be longer than 16.5' or 'x should be the longest side'		E1 1	'x is the hypotenuse' is not sufficient.
18.(b) $(x^2 =) 8·6^2 + 16·5^2$ $x^2 = 346·21$ OR $(x =) \sqrt{346·21}$ $(x =) 18·6(067…\text{cm})$		M1 A1 A1 3	 Accept 19 from correct working
TOTAL MARKS		80	

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UNIT 3 - HIGHER TIER

Unitised Unit 3 – June 2015 Higher Tier	✓		Comments
1.(a) 5(2x – 3)		B1	
1.(b) −31		B2	B1 for −6 + … OR … −25 OR B1 for 1½×−4 – 5^2.
1.(c) 8x – 2x = −5 + 77 6x = 72 x = 12		B1 B1 B1	FT until 2nd error.
2. ½×8×8 = 32 cm^2		M1 A1 U1	
3. (a) 'His speed increases' or 'He accelerates'. (b) **To be viewed with graph. Use Overlay.** 1st section: 6 miles travelled in 1 hour. Straight line drawn to (11:45, 14). Horizontal line of 1 square drawn from end of 1st line. 2nd section: Straight line - 6 miles travelled in 1 hour.		E1 B1 B1 B1	E0 for a description of the journey e.g. he travels 3 miles in 30 min, then 5 miles in the next 30 min. If no marks awarded, allow SC1 for journey finishing at (1:00, 20) provided an attempt made at all 3 parts of the journey. Ignore any additional lines.
3.(c) 20 ÷ 3 OR 20 ÷ 180 = 6⅔ (mph) or equivalent = 0·1(111…) (miles/min)		M1 A1	 Accept 6·66, 6·67 and 6·7 but not 6·6. Allow M1 for 20 ÷ 2·75 leading to A1 for 7·2727… Allow M1 for 20 ÷ 165 leading to A1 for 0·1212…
4. 3·40		B2	B1 for 3·3(9636…) or 3·4
5. Sight of $\frac{8}{15}$ or equivalent (fraction remaining =) $1 - (\frac{1}{3} + \frac{1}{5})$ or equivalent) (fraction remaining =) $\frac{7}{15}$ or equivalent		B1 M1 A1	 CAO. *Alternative method:* *B1 for the correct calculation of the addition of 2 fractional amounts.* *M1 for the subtraction of this total from the amount.* *A1 for a correct fraction.*
6. Use Overlay. Correct size and position of ABCD. Arc drawn of radius AX, centre A. Arc ending on 'their new CD'		 B1 M1 A1	 Allow ±2mm on the length of the sides and ±2º on the 90º angles.
7. (Ratio =) 4:2:1 or equivalent (1 part =) 385 ÷ (4+2+1) Flour 220(g) Sugar 110(g) Raisins 55(g)	✓ ✓ ✓ ✓	B1 M1 A2	 A1 for two correct amounts OR all 3 correct but incorrectly designated. *Alternative method using trial and improvement:* *B4 for correct amounts (B3 for 2 correct).* *B2 for two trials using correct proportions working towards the correct amounts.* *B1 for one trial using correct proportions.* *SC1 for Flour 154, Sugar 154, Raisins 77 from use of the ratio (2:2:1)*

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Unitised Unit 3 – June 2015 Higher Tier	✓		Comments
8. (Sale price of standard box =) 2.50 – (0·18×2.50) OR 0·82×2.50	✓	M1	
(= £) 2.05	✓	A1	
Perform calculations that allow comparison.			
e.g. Standard box Large box			
205÷750 280÷1000	✓	M1	FT 'their £2.05'including £2.50 used.
= 0.273…(p per gram) = 0.28 (p per gram)	✓	A1	*(Or 365.85g/£ and 357.14g/£)*
			Alternative method: Price of 1kg worth of 750g box or vice versa
			M1 for 2.05 × 4/3 OR 2.80 × ¾
			A1 for (£)2.73… OR (£)2.10
Statement implying that the standard box is better value.	✓	A1	FT *their* values provided M1 awarded.
QWC: Look for			
• correct units used i.e. kg, g, £, p			QWC2 Presents material in a coherent and logical manner, using
• spelling in at least 1 statement/sentence			acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar.
• clarity of text explanations			QWC1 Presents material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar
QWC2: Candidates will be expected to			OR
• present work clearly, with words or quantities shown for clarity of process or steps			evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar.
AND			QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar.
• make few if any mistakes in mathematical form, spelling, punctuation and grammar in their answer	✓ ✓	QWC 2	
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			
9. (a) **Use Overlay.**			
Correct grouped frequency diagram.		B2	B1 for any 3 correct heights of bars. B0 if a frequency polygon has been drawn, with or without a frequency diagram. Penalise −1 for any other ambiguous lines.
9. (b) **To be viewed with table.**			
Sight of the mid-points 2·5, 7·5, 12·5, 17·5, 22·5	✓	B1	
2·5×19 + 7·5×17 + 12·5×10 + 17·5×5 + 22·5×2	✓	M1	FT their mid-points from within or at the bounds of the groups.
(47·5 + 127·5 + 125 + 87·5 + 45 = 432·5)			
432·5 ÷ 53	✓	m1	
= 8·1(60…) or 8· 2 (minutes) or 8 min 9·6 sec	✓	A1	FT 'their 432·5' Accept 8 (minutes) from correct working.
9. (c) $0 < t \leq 5$ (minutes)		B1	Allow e.g. 0 – 5.
10. (a) Valid explanation e.g. 'x is the hypotenuse so it should be longer than 16·5' or 'x should be the longest side'.		E1	'x is the hypotenuse' is not sufficient.
10. (b) $(x^2 =) 8{\cdot}6^2 + 16{\cdot}5^2$		M1	
$x^2 = 346{\cdot}21$ OR $(x =) \sqrt{346{\cdot}21}$		A1	
$(x =) 18{\cdot}6(067\ldots$ cm)		A1	Accept 19 from correct working.
11. (x + 8)(x + 3)		B2	B1 for (x…8)(x…3)
x= −8 AND x = −3		B1	Strict FT their brackets provided previous B1 awarded. Final B0 for solutions obtained using the formula.
12. $3{\cdot}05 \times 10^6$		B3	B2 for $3{\cdot}045 \times 10^6$ OR $3{\cdot}04 \times 10^6$ OR 3 050 000 or equivalent. B1 for 3 045 000 or equivalent. If no marks awarded, SC1 for $1{\cdot}73 \times 10^3$.
13. (length of block =) 40 500/(15×15)	✓	M1	
= 180(cm)	✓	A1	
(Volume of hole =) 25 × 180	✓	M1	FT 'their 180'.
= 4500(cm^3)	✓	A1	
(Mass of block remaining =) 2·7×(40500−4500)	✓	M1	FT 'their 4500' provided it is a volume.
= 97 200 (g) or equivalent	✓	A1	Mark final answer. Accept rounded answers provided previous M1 awarded
			Alternative method:
			B1 for (Mass of whole block =) 40 500×2·7 (109 350(g))
			M1 for (length of block =) 40 500/(15×15)
			A1 for 180 (cm)
			M1 for (Mass of hole =) 25 × 180 × 2·7 FT 'their 180'
			A1 for 12 150 (g)
			A1 for 97 200 (g) FT 'their 109 350'.

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Unitised Unit 3 – June 2015 Higher Tier	✓		Comments
14.(a) (£)17·5(0)		B1	
14.(b) (19·5 to 19·75) – (15·25 to 15·5) = (£)4 to (£)4·50 inclusive		M1 A1	
15. Ribbon marked. To be viewed with graph. Use Overlay. (a) Correct calculation of at least 6 coordinates. Plotting at least 4 points correctly. Correct curve through all 7 correct points. (b) (x =) –1 and 1·5 (c) Rearranging equation to $2x^2 - x - 3 = -x + 4$ Line $y = -x + 4$ drawn Solutions of approximately −1·9 and 1·9		B2 P1 C1 B1 M1 A1 A1	B1 for correct calculation of at least 4 coordinates. FT their curve provided there are at least 2 solutions. Implied by sight of (y =) $-x + 4$. FT their curve. Solutions alone gain no marks.
16. (AB^2 =) $10{\cdot}8^2 + 7{\cdot}4^2 - 2\times10{\cdot}8\times7{\cdot}4\times\cos96°$ AB^2 = 188.107… OR (AB =) √188.107… (AB =) 13·7(152…m)		M1 A1 A1	
17. (x =) $\frac{27 \pm \sqrt{(-27)^2 - 4\times12\times-2}}{2\times12}$ (x =) $\frac{27 \pm \sqrt{825}}{24}$ x = −0·07 AND x = 2·32		M1 A1 A1	Allow one slip in substitution. CAO. CAO.
18. To be viewed with graph. Idea that each large block is equivalent to frequency of 20 OR each block on the y-axis is a frequency density of 4 OR 4/12 of 240 80 (trees)		M2 A1	M1 for 12 × (x × 5) = 240
19. (Area of sector of circle =) $\frac{1}{12} \times \pi \times 15^2$ = 58·875 to 58·9125 (cm^2) (Length of circular arc =) $\frac{1}{12} \times 2 \times \pi \times 15$ = 7·85 to 7·855 (cm) (Area of curved surface =) 47·1 to 47·13 (cm^2) (Total surface area =) 2×58·875 + 47·1 + 2×(15×6) = 344·85 to 345 (cm^2)	✓ ✓ ✓ ✓ ✓ ✓	M1 A1 M1 A1 M1 A1	30/360 could be seen instead of 1/12. (Or 75π/4). Sight of 117·75 to 117·825 implies. (Or 5π/2) (Or 15π). FT 6 × 'their 7·85'. FT provided both M1s awarded. (Or 180 + 105π/2).
20. (a), (b) To be viewed with graph. (a) Tangent drawn. Idea of increase in y/increase in x. Gradient from a reasonable tangent. (b) Split into 4 areas and attempt to sum (Area =) ½×1(26 + 2×35 + 2×33 + 2×20 + 0) = 101 ($units^2$)		S1 M1 A1 M1 M1 A1	Ignore signs for M1 only. About −7. Or equivalent. Award for up to 1 error in reading scale. CAO

x	−3	−2	−1	0	1	2	3
$y = 2x^2 - x - 3$	18	7	0	−3	−2	3	12

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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

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