GCSE MARKING SCHEME

MATHEMATICS - UNITISED

SUMMER 2014

INTRODUCTION

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

<table>
<tr><th>JUNE 2014 UNIT 1
Foundation Tier</th><th>✓</th><th>Mark</th><th>Comments</th></tr>
<tr><td>Ribbon marking for 1(a) and 1(b).
1. (a) 69025
Five hundred and fifty thousand seven hundred and four

(b) Sight of 481679
482000</td><td></td><td>B1
B1

B1
B1</td><td>
Ignore incorrect spelling.

F.T. 550704 – ‘their number for Anglesey’
F.T. from their calculation. Implies first B1 if no contradicting work.</td></tr>
<tr><td>2. (a) 0, 1, 2, 3 and 4 shown on the horizontal axis.
Uniform scale starting at 0 on the frequency axis.
Five vertical lines at correct height (± 2mm).</td><td>✓
✓
✓
✓</td><td>B1
B1
B2</td><td>Ignore unequal spacing.

F.T. where possible from a previous B0.
Accept intent to draw vertical lines.
B1 for four vertical lines at correct height.
B1 for five bars drawn at correct height.
B1 for sight of five correct plots.</td></tr>
<tr><td>2. (b) $(6 \times 0) + 8 \times 1 + 5 \times 2 + 2 \times 3 + 1 \times 4$

$= 28$</td><td></td><td>M1

A1</td><td>For the intent to multiply values by their frequencies and then add.
C.A.O.</td></tr>
<tr><td>3. View with diagram
<table><tr><td>Berlin</td><td>Paris</td><td>London</td><td>Prague</td></tr><tr><td>25</td><td>26 to 29</td><td>32</td><td>34 to 36</td></tr></table></td><td></td><td>B3

B1</td><td>View with diagram for B3 marks.
B3 for four correct entries. B2 for three correct entries.
B1 for one or two correct entries. Allow on diagram.
For correct order. F.T. their temperatures.</td></tr>
<tr><td>4(a) A correct combination with cost.

A different combination with cost.

Look for
• spelling
• clarity of text explanations,
• the use of notation (watch for the use of ‘=’, £ being appropriate)
• correct units shown

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.</td><td>✓
✓

✓
✓

✓
✓</td><td>B2

B2

QWC 2</td><td>B1 for a correct possible choice with no cost or an incorrect cost.
B1 for an incorrect combination of at least four containers with a correct cost.
B1 for a different correct possible choice with no cost or an incorrect cost.
B1 for a different incorrect combination of at least four containers with a correct cost.

<table><tr><th>Small</th><th>Medium</th><th>Large</th><th>Cost</th></tr><tr><td>0</td><td>4</td><td>1</td><td>(£)44</td></tr><tr><td>1</td><td>5</td><td>0</td><td>(£)46</td></tr><tr><td>4</td><td>0</td><td>2</td><td>(£)48</td></tr><tr><td>5</td><td>1</td><td>1</td><td>(£)50</td></tr><tr><td>6</td><td>2</td><td>0</td><td>(£)52</td></tr></table>
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.</td></tr>
<tr><td>4(b) Use of 15×11
Sight of $165(m^2)$ AND ‘Medium box’</td><td></td><td>M1
A1</td><td>Implied by sight of $165(m^2)$.
Accept ‘$25(m^2)$ box’ or ‘£8 box’ for ‘Medium box’.
‘$25(m^2)$ box’ or ‘£8 box’ or ‘Medium box’ alone is M0A0.</td></tr>
</table>

JUNE 2014 UNIT 1 Foundation Tier	✓	Mark	Comments
5(a) (Charge =) (£)2 × 64 + (£)12 = (£)140		M1 A1	SC1 for an answer of (£)1292 or (£)129.2(0)
5(b) $\frac{205 - 15}{2}$ or equivalent = 95 950(metres)		M1 A1 A1	F.T. 'their 95' × 10 only if M1 gained. *Trial and improvement should show ÷10, ×2, +15 for M1 Then A2 C.A.O.*
Ribbon marking for 6(a)(i), 6(a)(ii) and 6(b). **All parts to be viewed with diagram.**			**Use overlay and measuring tools.**
6(a)(i) Points A and B in correct position.		B2	B1 for each (ignore labelling). *Use overlay for tolerance allowance.*
(ii) 8 (± 0·2) × 25 = 200 (± 5) (m)		M1 A1	F.T. their AB length (±0·2cm) × 25.
(b) 132(±4) (°)		B2	B1 for 48(±4) (°). F.T. from their diagram.
7. (£)103 – 5 × (£)7 = (£)68 (£)68 ÷ 17 = (£)4	✓ ✓ ✓ ✓	M1 A1 M1 A1	F.T. 'their £68'.
8. (Time driving = 2hrs 15min + 1hr 45min) = 4 (hours) or 240(min)	✓ ✓	B2	B1 for sight of either 2(hrs) 15(min) or 135(min) OR 1(hr) 45(min) or 105(min) *Alternative method* *4hours 25min – 25min* *= 4(hours) B2* *B1 for sight of 4(hrs) 25(min) or 265(min).*
(Av. Speed =) $\frac{200}{4}$ = 50 m.p.h.	✓ ✓ ✓	M1 A1 U1	F.T. their time. Do not penalise if they incorrectly note 'their F.T. time' (e.g. use 3·3 for 3hrs 30 min). A0 if they have incorrectly used 'their F.T. time'. Independent of other marks. Allow any unambiguous correct notation. *200 / 240 = 0·83(33..). m.p.min gains M1,A1,U1.* *200 / 240 = 0·83(33..). m.p.h gains M1,A1,U0.* *200 / 240 = 0·83(33...) gains M1,A1,U0.*
9. Use of 'Volume = length × width × height' (Volume =) 5·5 × 3·8 × 0·12 = 2·5(08 m^3)		M1 m1 A1	Allow m1 for 550 × 380 × 12 C.A.O. If 0 marks awarded, SC1 for sight of 0·12
10. **Use overlay** Position at 135° from ship A. Position at 215° from ship B. Position marked OR two intersecting lines.		M1 M1 A1	± 2° (use overlay). Allow the M marks for dots, crosses or any unambiguous indication that the correct bearings have been offered. F.T. if at least M1 and two intersecting lines. (Lines must originate from ship A and ship B respectively)
11. (cost of 600 euros =) $\frac{600}{1·28}$ = (£)468.75 (600 euros bought) $\frac{600}{1·50}$ = (£)400 (Keith lost) (£)68.75	✓ ✓ ✓ ✓ ✓	M1 A1 M1 A1 A1	F.T. their amounts. Dependent on **both** M1.

JUNE 2014 UNIT 1 Foundation Tier	✓	Mark	Comments
12. Three different valid comments. e.g. 'Not representative of population' 'Not relevant to the hypothesis being tested' 'Personal' 'Gender not asked' 'Does not specify over what period of time', 'Can tick one of two boxes if answer is 3' 'People might forget to bring them' 'Might be different people at the next meeting'	✓ ✓ ✓	B3	*Ignore irrelevant statements.* B1 for each different valid comment. Accept equivalent statements e.g. 'biased' (by gender or 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)) (criticisms of question (ii)) (criticisms of the method of collection)
13. 35·5		B2	B1 for 35·4(924.....)
Ribbon marking for 14(a) and 14(b). 14. (a) $500 + 500 \times {}^{2}/_{5}$ or equivalent $= 700$ Two further correct steps. (Number of workers =) 1372 (b) (1372 – 500 =) 872 872 / 500 × 100 = 174(·4%)	✓ ✓ ✓ ✓	M1 A1 M1 A1 B1 M1 A1	Allow M1A0 for '200'. Allow M1A1 for '200 extra'. M1A1 implied by sight of 1100 (or 1300). Ignore continuing to an additional year. C.A.O. Mark final answer. *Alternative method.* $500 \times (1{\cdot}4)^3$ *M2* *= 1372* *A2* *Allow* $500 \times (1{\cdot}4)^4$ *M2* *= 1920·8 (or 1921)* *A1* F.T. 'their 1372'. FT 'their 1372 – 500' If no marks gained then allow SC1 for an answer of 274(·4%) or equivalent on F.T.

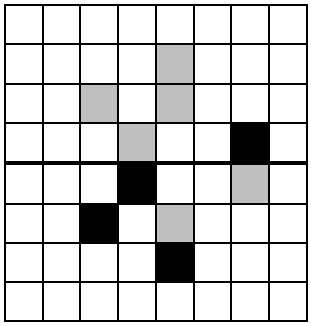
UNIT 1 - HIGHER TIER

June 2014 UNIT 1 Higher Tier	✓	Mark	Comments
1. Three different valid comments. e.g. 'Not representative of population' 'Not relevant to the hypothesis being tested' 'Personal' 'Gender not asked' 'Does not specify over what period of time', 'Can tick one of two boxes if answer is 3' 'People might forget to bring them' 'Might be different people at the next meeting'	✓ ✓ ✓	B3	*Ignore irrelevant statements.* B1 for each different valid comment. Accept equivalent statements e.g. 'biased' (by gender or 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)) (criticisms of question (ii)) (criticisms of the method of collection)
2. **Use overlay** Position at 135° from ship A. Position at 215° from ship B. Position marked OR two intersecting lines.		M1 M1 A1	± 2° (use overlay). Allow the M marks for dots, crosses or any unambiguous indication that the correct bearings have been offered. F.T. if at least M1 and two intersecting lines. (Lines must originate from ship A and ship B respectively)
3. (Salary received) (£)30000 × 0·7 = (£)21000 (Cost of petrol) $\frac{8000}{40}$ × (£)6·25 = (£)1250 (New salary received) = (£)14000 (Loss) (£)21000 – (£)1250 – (£)14000 = (£)5750 Look for • spelling • clarity of text explanations, • the use of notation (watch for the appropriate use of '=' and operators) • '£' shown where 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	✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓ ✓	M1 A1 M1 A1 B1 M1 A1 QWC 2	Or F.T. 2/3 × 'their 21000'. F.T. their three stated values. (Look for '19750 – 14000' or '21000 – 15250') 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

June 2014 UNIT 1 Higher Tier	✓	Mark	Comments
4. (cost of 600 euros =) $\frac{600}{1{\cdot}28}$	✓	M1	
= (£)468.75	✓	A1	
(600 euros bought) $\frac{600}{1{\cdot}50}$	✓	M1	
= (£)400	✓	A1	
(Keith lost) (£)68.75	✓	A1	F.T. their amounts. Dependent on **both** M1.
5. 35·5		B2	B1 for 35·4(924.....)
Ribbon marking for 6(a) and 6(b).			
6. (a) $500 + 500 \times {}^{2}/_{5}$ or equivalent	✓	M1	Allow M1A0 for '200'. Allow M1A1 for '200 extra'.
= 700	✓	A1	M1A1 implied by sight of 1100 (or 1300).
Two further correct steps.		M1	Ignore continuing to an additional year.
(Number of workers =) 1372	✓ ✓	A1	C.A.O. Mark final answer.
			Alternative method. *$500 \times (1{\cdot}4)^3$ M2* *= 1372 A2* *Allow* *$500 \times (1{\cdot}4)^4$ M2* *= 1920·8 (or 1921) A1*
(b) (1372 – 500 =) 872		B1	F.T. 'their 1372'.
872 / 500 × 100		M1	FT 'their 1372 – 500'
= 174(·4%)		A1	If no marks gained then allow SC1 for an answer of 274(·4%) or equivalent on F.T.
7. (a) Appropriate uniform scale on vertical axis.		B1	Must allow for all plots up to (£6000, £1100). Need not start at 0. Allow 'steps of £1000'.
Line starts at (0, 500).		B1	Accept plot at (0,500) if no line drawn.
Straight line with correct gradient (£100 per £1000).		B1	
7.(b) A comment that states that it may appear that reported crime has decreased because the axes are not perpendicular.		B2	Accept any wording that suggests this. B1 if only refers to the misunderstanding. B1 if only refers to the reason.
8. Sight of 8·5 (litres) or equivalent	✓	B1	
Sight of $\frac{7 \times 24}{5}$	✓	M1	Allow for (7×24) / an attempt at time difference.
× 8·5	✓	m1	F.T. 'their 8·5' (including use of 8).
= 285·6 (litres)	✓	A1	C.A.O. Allow 286 (litres) or 285 (litres) from correct working.
Ribbon marking for 9(a) and 9(b).			
9. (a) (Volume of sphere) $4/3 \times \pi \times 5^3$		M1	
= 523·6 (cm^3) or $\frac{500\pi}{3}$		A1	Accept 523 to 524 inclusive.
(b) (Volume of cylinder) $\pi \times 5{\cdot}5^2 \times 63$	✓	M1	
= 5987·1(cm^3)	✓	A1	Accept 5984 to 5989·5 inclusive.
(Empty space for cyl.) $2 \times 5987{\cdot}1 - 12 \times 523{\cdot}6$	✓ ✓	M1	F.T. their derived volumes only if more than one cylinder required.
= 5691(cm^3)	✓	A1	
(Empty space for box) $42 \times 32 \times 11 - 12 \times 523{\cdot}6$	✓	M1	F.T their volume for a sphere.
= 8500(·8..)(cm^3)		A1	
10. Use of R = 6 AND N = 3		B1	
$\left[\left(1+\frac{6}{100\times 3}\right)^3 - 1\right] \times 100$		M1	Allow FT for N = 4 only.
(AER =) 6·12 (%)		A1	N = 4 leads to an answer of 6.14 (%)

June 2014 UNIT 1 Higher Tier	✓	Mark	Comments
11. (Distance) $30 \times ⅓ + 45 \times ⅓ + 60 \times ⅓$	✓	M1	
$= 45$ (miles)	✓	A1	*Note: 45 minutes is M0A0.*
(Time) $15/30 + 15/45 + 15/60$	✓	M1	May be implied. F.T. 'one third of their distance'.
$= 1^{1}/_{12}$ (hr) or 65(min) or equivalent. ISW	✓	A1	
Ribbon marking for 12(a) and 12(b).			
12(a) Sight of (arc length =) 10·8(m)	✓	B1	
Use of $A\hat{O}B /360 \times 2 \times \pi \times 8{\cdot}6 = 10{\cdot}8$	✓	M1	F.T. 'their arc length' (including use of 28).
$A\hat{O}B = \frac{10{\cdot}8 \times 360}{2 \times \pi \times 8{\cdot}6}$	✓	m1	
$= 71{\cdot}9(..)$ or $72^{(°)}$	✓	A1	
(b) (Area =) $72/360 \times \pi \times 8{\cdot}6^2$		M1	F.T. 'their 72°'.
$= 46{\cdot}4(..)$ (m^2)		A1	Accept 46·4 to 46·5 inclusive.
13. (Total volume =) $h^3 + ⅓ \times \pi \times r^2 \times 4h$	✓	B1	Radius 'r' may be shown as 'h'.
$h^3 + ⅓ \times \pi \times r^2 \times 4h = 648{\cdot}6$	✓	M1	F.T. h^3 + 'their cone volume'.
$h^3 + ⅓ \times \pi \times h^2 \times 4h = 648{\cdot}6$	✓	m1	
$h^3 = 125$	✓	A1	C.A.O.
$h = 5$(cm)	✓	A1	F.T. 'their h^3' if M1 gained
$H = 25$ (cm)	✓	B1	F.T. 5 × 'their derived h'.

UNIT 2 - FOUNDATION TIER

June 2014 UNIT 2 (non calculator) Foundation Tier	✓	Mark	Comments
1. (a) (i) 328		B1	
1. (a) (ii) 388		B1	
1. (b) (i) 33, 54		B1	
1.(b) (ii) 18		B1	
1. (b) (iii) 42		B1	
1. (b) (iv) 36		B1	
1. (c) 23689		B1	
1. (d) 5000		B1	
1.(e) 4 thousand(s), 4000		B1	Accept thousand(s). B0 for 1000.
2. chord radius tangent		B1 B1 B1	
3. (a) unlikely		B1	
3. (b) an even chance		B1	
4. **Use overlay** 		B2	**Use overlay** B1 for all 4 squares and one extra OR B1 for 2 or 3 correct squares and no incorrect squares
5. (a) 11h		B1	Accept $11 \times h$
5. (b) (i) (5, 7) plotted correctly (ii) line $y = 4$ drawn correctly		B1 B1	At least 3 squares long

June 2014 Unit 2 (non calculator) Foundation Tier	✓	Mark	Comments
6. (a)An attempt to find values that can be directly compared. Finding (Zac) 60/100(oe) (Josh) 62/100 (oe) (Lowri) 58/100 (oe) OR (Zac) 60% (Josh) 62% (Lowri) 58% OR (Zac) 0·6 (Josh) 0·62 (Lowri) 0·58 OR (Zac) 3/5 = 60% = 0.6 Most: Josh AND least: Lowri		M1 A1 A1	All %, OR all fractions with common denominator, OR all decimals, OR a valid combination e.g. Zac 3/5 = 60% = 0.6 All fractions must have the same denominator If only one error made, then FT. SC1 if most: Josh, AND least: Lowri with no supporting work.
6. (b) (48 ÷ 6 =) 8 (8 + 9 =) 17		B1 B1	*Alternative:* FT their 8 *6n – 54 = 48* *6n = 102 B1* *n = 17 B1 FT 'their 102'*
6. (c) (i) 45		B1	Accept embedded answer
6. (c) (ii) 13		B1	Accept embedded answer
6. (d) 4 – 6		B1 B1	FT 'their 4' – 10 provided 'their 4' < 10

June 2014 Unit 2 (non calculator) Foundation Tier	✓	Mark	Comments
7. (2 × adult one-day tickets 2 × £21.50 = £) 43 AND (2 × child one-day tickets 2× £17.50 = £) 35	✓	B1	Accept a sight of 78
(2 × 6 adult individual rides 2 ×6 × £2.50 = £) 30 (2 × 8 child individual rides 2 × 8 × £2.50 = £) 40	✓ ✓	B1 B1	Accept sight of 70 for 2nd and 3rd B1s.
(Tickets are)2 child one-day tickets and 12 (adult) individual ride tickets (Cost = £30 + 35 = £) 65	✓ ✓	B1 B1	May be implied by answer of 65. FT their prices for the cheapest option. SC1 B0 if sight of (£)78 and (£)70 AND conclusion to buy individual ride tickets *Alternative:* *(adult individual rides* *6*× (£)2.50=*) 15 (or ×2=) 30 B1* *(child individual rides* *8* × (£)2.50=) *20 (or×2=) 40 B1* *Adult: indication that 15<21.50 or **30**<43 AND used B1* *Child: indication that 17.50<20 or **35**<40 AND used B1* *(Cost = £)65 B1*
Look for • relevance of work shown • generally correct spelling • clarity of text explanation • use of notation (appropriate use of '=', '×', '+', £) 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: 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.	✓ ✓	QWC2	QWC2 Presents relevant material in a coherent and logical manner, using acceptable mathematical form, and with few if any e 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. <u>A final unsupported statement is QWC0</u>

June 2014 Unit 2 (non calculator) Foundation Tier	✓	Mark	Comments
8. 7/10 + 2/10 or equivalent 9/10 or equivalent 1/10		M1 A1 B1	Fractions must have a common denominator FT 'their derived 9/10' *Alternative – using a length:* *Finding 7/10 and 1/5 of a length AND adding them M1* *Correct answer to addition A1* *Final answer of 1/10 B1*
9. **Use overlay** 2 rectangles 6cm by 3cm 1 rectangle 6cm by 4cm 2 rectangles 4cm by 3cm Makes a correct net		 B1 B1 B1 B1	**Use overlay** (± 2mm) To gain each B1, each pair of rectangles must not be disjointed Penalise – 1 only, if height of 1 cm used.
10. **Ribbon marking for 10(a) and (b)** (a) 13 **23** **33** **17** **31** 45 **21** **39** **57** (b) 4/9		 B2 B2	B1 for 4 correct entries FT their table. B1 for a numerator of 4 in a fraction less than 1. B1 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 '4 out of 9', '4 in 9'. or '4:9'. When both fraction and wrong notation seen, DO NOT penalise wrong notation.
11. **Use overlay** Correct enlargement in correct position		 B2	**Use overlay** B1 for any 2 correct vertices OR for correct enlarged shape in incorrect position OR for wrong scale factor consistently used.
12. **Ribbon marking for 12(a) and (b)** (a) 0·15 × (£)480 or equivalent OR an attempt to calculate 24 × (£)22 (Total cost =) 0·15 × (£)480 + 24 × (£)22 or equivalent (£72 + £528 =) (£)600 (b) (Difference in price =) (£)600 – (£)480 OR (£)120 (Percentage increase =) 120/480 × 100% or equivalent 25%		 M1 M1 A1 B1 M1 A1	Valid method for finding either 15% of (£)480 OR 24 × (£)22 (implied by sight of (£)72 or (£) 528 respectively) A complete correct method CAO Attempt to find difference in price. FT 'their (a)' A complete correct method *OR 600/480 × 100(%) (= 125%) B1* *600/480 × 100(%) – 100(%) M1* *25(%) A1*

June 2014 Unit 2 (non calculator) Foundation Tier	✓	Mark	Comments
13. $3x + 20 = 6x - 25$ OR (BCD=)$180 - (3x + 20) = 180 - (6x - 25)$ $3x = 45$ (or $-3x = -45$) (x =) 15 65 (°) seen or implied (Angle BCD =) 115(°)	✓ ✓ ✓ ✓ ✓	M1 A1 A1 B1 B1	Strategy of equating opposite angles or other equivalent equations CAO FT their $kx = a$, where $k \neq 1$ Alternative: A trial and improvement method with an attempted first trial (for both relevant angles) M1 Two appropriate trials completed (both angles) A1 (x =) 15 CAO A1 FT 'their 15' i.e. correct substitution in either expression FT 180 – 'their 65', but not 180 – 'their 15'
14. $-x < 7 - 3$ OR $3 - 7 < x$ OR equivalent $x > -4$ OR $-4 < x$		M1 A1	Accept $-3 + x > -7$ as a valid first step. Mark final answer. Solving an equation gets M0A0 unless the 'equals' sign is correctly replaced by an inequality sign.
15. **To be viewed with diagram** $(1/10 \times 360(°)) = 36(°)$ seen or implied $360(°) - 1/10 \times 360(°)$ (=324(°)) $2/3 \times 324(°)$ OR at least two appropriate trials to split 324 into 2 parts, one being twice the other 216(°)	 ✓ ✓ ✓ ✓	 B1 B1 M1 A1	*OR 2/3 × 9/10 M1* *6/10 or equivalent A1* *6/10 × 360(°) M1* FT 'their derived 324(°) *216(°) A1* *FT 'their 6/10'* CAO Award B1B1SC1 or M1A1SC1 for a final answer of 108(°) if 'red' and 'yellow' have clearly been reversed

UNIT 2 - HIGHER TIER

June 2014 UNIT 2 Higher Tier	✓	Mark	Comments
1. **<u>To be viewed with diagram</u>** Reflection (in the line with equation) $x = 1$		B1 B1	 Check diagram for line <u>with</u> its equation $x = 1$
2. **<u>Ribbon-marking for parts (a) and (b)</u>** (a) 0•15 × (£)480 or equivalent OR an attempt to calculate 24 × (£)22 (Total cost =) 0•15 × (£)480 + 24 × (£)22 or equivalent (£72 + £528 =) (£)600 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) QWC: Candidates would be expected to • clearly show how they arrived at their solution • have few errors in mathematical form, spelling, punctuation and grammar Count incorrect use of '=' in situations such as '24 × (£)22 = 528 + 72' 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 (b) (Difference in price =) (£)600 − (£)480 OR (£)120 (Percentage increase =) 120/480 × 100(%) or equivalent 25(%)	✓ ✓ ✓ ✓ ✓	M1 M1 A1 Q W C 2 B1 M1 A1	Valid method for finding either 15% of (£)480 OR 24 × (£)22 (implied by sight of (£)72 or (£) 528 respectively) A complete correct method CAO 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 Attempt to find difference in price. FT 'their (a)' A complete correct method *OR 600/480 × 100(%) (= 125%) B1* *600/480 × 100(%) – 100(%) M1* *25(%) A1*
3. **<u>Overlay required</u>** Correct enlargement in correct position		B2	B1 for any 2 correct vertices OR for correct enlarged shape in incorrect position OR wrong scale factor consistently used
4. **<u>To be viewed with diagram</u>** $3x + 20 = 6x – 25$ OR (BCD =) 180 – (3x +20) = 180 – (6x – 25) $3x = 45$ (or $–3x = –45$) (x =) 15 65(°) seen or implied (Angle BCD =) 115(°)	✓ ✓ ✓ ✓ ✓	M1 A1 A1 B1 B1	Strategy of equating opposite angles or other equivalent equations *OR a trial and improvement method with an attempted first trial (for both relevant angles)* *OR two appropriate trials completed (both angles)* CAO FT their $kx = a$, where k ≠ 1 FT 'their 15'. i.e. correct substitution in either expression. FT 180 - 'their 65°', but not 180 – 'their 15'

June 2014 UNIT 2 Higher Tier	✓	Mark	Comments
5. Method that produces at least 2 correct prime factors Sight of correct factors (2, 3, 3, 7) in any order $2 \times 3^2 \times 7$		M1 A1 B1	FT until 2nd error Ignore 1s seen FT their factors (with at least 1 index >1 used). Do not ignore 1s within the product. B0 for a sum or list.
6. $-x < 7 - 3$ OR $3 - 7 < x$ or equivalent $x > -4$ OR $-4 < x$		M1 A1	Accept $-3 + x > -7$ as a valid first step Mark final answer. Solving an equation gets M0A0 unless the 'equals' sign is correctly replaced by an inequality sign.
7. **To be viewed with diagram** $(1/10 \times 360(°) =)$ 36(°) seen or implied $360(°) - 1/10 \times 360(°)$ (= 324(°)) $2/3 \times 324(°)$ OR at least two appropriate trials to split 324 into 2 parts, one being twice the other 216(°)		 B1 B1 M1 A1	 *OR 2/3 × 9/10 M1* *6/10 or equivalent A1* FT 2/3 of 'their derived 324' *6/10 × 360(°) M1* *216(°) A1* CAO *FT 'their 6/10'* Award B1B1SC1 or M1A1SC1 for a final answer of 108(°) if 'red' and 'yellow' have clearly been reversed.
8. **Ribbon-marking for parts (a) and (b)** (a) $4n + 4$ OR $(n + 2)^2 - n^2$ or equivalent		B3	B2 for $4n + ...$ OR $n + 2^2 - n^2$ (brackets missing) B1 for sight of 8, 12, 16, 20 (check diagrams) $n + 4$ OR $n^2 + 4 - n^2$ gets B0 If B3 awarded, penalise – 1 for subsequent incorrect working
(b) $4n + 4 = 164$ OR appropriate inverse operations $n = 40$ (number of white tiles =) 1600		B1 B1 B1	Setting up appropriate equation. FT their expression. FT their equation (for equivalent difficulty). FT their integer n.
9. 2a + 3c = 31.60, a + 2c = 18.60 (or equivalent in pence) Method to find the first variable Correct first variable Correct second variable		S1 M1 A1 A1	Strategy of forming a pair of equations. (Do not penalise for not defining variables.) Allow one slip (but not in equated variable). FT 'their equations' (provided equivalent difficulty) FT their first variable a = (£) 7.4(0), c = (£) 5.6(0) (or equivalent in pence) Award 0 marks for an unsupported answer
10. $(6 \times 10^6) \times 4$ (× .....) 'their $(6 \times 10^6) \times 4$' × 1000 $2{\cdot}4 \times 10^{10}$ OR $2{\cdot}388 \times 10^{10}$ OR $2{\cdot}412 \times 10^{10}$		M1 M1 A1	At least one number must be rounded. Must be within a product. Metric conversion. Allow unrounded numbers.
11. **Overlay required** Sight of line for either $x = -2$ or $y = 1$ Correct line drawn for $x + 2y = 4$ Correct region clearly identified		 B1 B2 B1	 Accept an unlabelled correct line provided unambiguous. Accept dotted lines throughout question. B1 for correct gradient (= –½) OR correct y-intercept plotted (0, 2) OR correct x-intercept plotted (4, 0) OR any two other points calculated or plotted correctly (with no incorrect points) FT for their lines (for equivalent difficulty)
12. (a) $2c^2 - 5c + 6c - 15$ $2c^2 + c - 15$		B1 B1	FT until 2nd error (and equivalent difficulty) Mark final answer.
(b) Sight of $w^2 + x^2 = 4$ $w^2 = 4 - x^2$ $w = (\pm)\sqrt{(4 - x^2)}$ or $(\pm)\, 2\sqrt{(1 - x^2/4)}$		B1 B1 B1	FT until 2nd error (for equivalent difficulty) Accept a correct alternative approach e.g. $w^2/4 = 1 - x^2/4$ Isolating w^2 Square root must clearly be over complete expression (or correct use of brackets is required). Do not ISW e.g. $(\pm)\sqrt{(4 - x^2)} = 2 - x$ gets B0

June 2014 UNIT 2 Higher Tier	✓	Mark	Comments
13. **Ribbon-marking required for parts (a) to (d)** **To be viewed with diagram** (a) 38(°) (b) 71(°) (c) 109(°) (d) 76(°)		 B1 B1 B1 B1	 FT (180 – 'their a')/2' FT 180 – 'their b' FT 2 × 'their a'
14. (a) $x = 0{\cdot}36666.....$ $10x = 3{\cdot}6666.....$ with an attempt to subtract 33/90 (=11/30) or 363/990 or equivalent		M1 A1	Or $10x$ and $100x$, or equivalent. Or an alternative method. CAO (3·3/9 gets M1 A0)
(b) 2/3		B2	B1 for $(3/2)^{-1}$ or 1/(3/2) or 1/1·5 or $(8/27)^{1/3}$ or $(\sqrt[3]{8}/\sqrt[3]{27})$ or $\sqrt[3]{(8/27)}$ B0 for $8/27^{1/3}$ or $8^{1/3}/27$
(c) $5\sqrt{3} + 3 - 5\sqrt{3} + 2\times3$ = 9		B1 B1	 FT from one incorrect term
15. (a) 3/8 × 2/7 6/56 (= 3/28)		M1 A1	 Do not ignore incorrect cancelling *OR two-way table drawn, with 8 × 8 – 8 spaces M1* *6/56 (= 3/28) A1* If M0A0, award SC1 for method 'with replacement' (3/8 × 3/8 =) 9/64
(b) 1 – P(7 and 8) 1/8 × 1/7 + 1/8 × 1/7 OR 2 × 1/8 × 1/7 (1 – 2/56 =) 54/56 (= 27/28)		S1 M1 A1	Award even if 7,8 and 8,7 are not both considered Must have considered both 7,8 and 8,7 Do not ignore incorrect cancelling *OR two-way table drawn, with 8 × 8 – 8 spaces M1* *1 – P(7 and 8) S1* *(1 – 2/56 =) 54/56 (= 27/28) A1* If M0A0, award SC1 for method 'with replacement' (1 – 2 × 1/8 × 1/8 – 1/8 × 1/8 =) 61/64
16. Translation horizontally to the right (8, 0) indicated correctly on the *x*-axis **with** the correct translation.		B1 B1	 Accept labelling of 8 on the *x*-axis. SC1 for left shift with (-2, 0) or -2 indicated on the *x*-axis.

UNIT 3 - FOUNDATION TIER

June 2014 UNIT 3 (calculator allowed) Foundation Tier	✓	Mark	Comments
1. **Ribbon marking for 1(a) and 1(b)** (a) (£)96 (£)34.2(0) (£)14.8(0) Total = 96 + 34.2(0) + 14.8(0)=(£)145 (b) 0.05×(£)145 or equivalent (£) 7.25	 ✓ ✓ ✓ ✓ 	 B1 B1 B1 B1 M1 A1 6	 FT candidate's values. FT 'their total'. (£) 152.25 gets M1 A1
2. (a) 457.8		B1 1	
2. (b) 458		B1 1	
2. (c) 500		B1 1	
3. 14		B2 2	B1 for sight of 32 or (–) 18
4. (a) E (is congruent to A)		B1	
4. (b) B and F (similar but not congruent)		B1	
4. (c) C (has half the area of shape E)		B1	
Ribbon marking for 4(d)(i) and 4(d)(ii) 4. (d) (i) 12 (cm) (ii)D (has the same perimeter as shape F)		 B1 B1 5	
5. **Ribbon marking for 5(a) and 5(b)** (a)Yellow = 4 Blue = 6 and Green = 6 (b) Both axes labelled, eg Frequency or number along vertical axis, Red, Yellow, Blue, Green along horizontal axis **and** uniform scale for frequency axis starting at 0. Four bars at correct heights and equal widths.	 ✓ ✓ ✓ ✓	 B1 B1 B2 B2 6	 FT their yellow provided whole number Or suitable code e.g. R, Y, B, G. F.T. their table values. B1 for any 2 or 3 correct bars on F.T.

June 2014 UNIT 3 (calculator allowed) Foundation Tier	✓	Mark	Comments
6. (number of packets=)(£)15 ÷ 0.89 (=16.853932..)	✓	M1	1500 ÷ 89 or appropriate method.
16 (packets can be purchased)	✓	A1	
(Change=)(£)15 - 16 × (£) 0.89 or 1500(p)−16×89(p)	✓	M1	FT number of packets of biscuits
(£)0.76 or 76(p)	✓	A1	A0 for £76 or 0·76p
Look for • Spelling • Clarity of text explanations, • Consistent use of £ or p signs.	✓ ✓	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.
QWC2: Candidates will be expected to • Present work clearly, with words explaining process and steps AND • Make few, if any, mistakes in mathematical form, spelling, punctuation and grammar in their final answer.			QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar. OR Evident weakness 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 in their final answer.			QWC0 Evident weakness in organisation of material, and errors in use of mathematical form, spelling, punctuation and grammar.
		6	
7. Circle with AB as diameter		B1 1	Intention of circle accepted.
8. (a) (i) identify warmest and coldest (42°C and −39°C) and intention to subtract.		M1	M0 A0 for 42−39=3 M1A0 for −39−42=-81
81 (°C)		A1	M1A0 for 42− −39=3
8. (a) (ii) order data (−39, −5, 0, 1, 11, 11, 42) (median) 1 (°C)		M1 A1 4	Allow M1 for data ordered with one omitted. CAO
8. **8b(i) and 8b(ii) ribbon marked** **8b(i) to be viewed with table below**	✓	M1	For an attempt to add the numbers
(b) (i) Sum of numbers (126) Sum/12	✓	m1	For a division by 12. FT one slip. (1+4+2+7+11+16+17+21+19+10+7+11)/12 gets M1 m1
	✓	A1	CAO
(mean=) 10·5 (°C)	✓	B1	
(range = 21 – 1=) 20		B2	B1 for a numerical comparison of mean and range with correct interpretation of one of mean or range.
(ii) A correct statement, in context, involving meanand range with interpretation.		6	

June 2014 UNIT 3 (calculator allowed) Foundation Tier	✓	Mark	Comments
9. **Use overlay** (a) Angle $YX\hat{Z} = 98^{\circ}$ Angle $XY\hat{Z} = 40^{\circ}$ Completed triangle		B1 B1 B1 3	Allow ± 2° Allow ± 2° Only if at least one angle correct. **Complete reflection of the triangle gets B2**
9. **Use overlay** (b) Appropriate arcs above and below the given line with perpendicular bisector correctly constructed.		B2 2	B1 for at least two correct arcs.
10. Finding *A*: $A = 9$ Finding *B*: $2B=14$ $B=7$ Finding C: $C+8= 9+7+3$ or equivalent $C=11$	✓ ✓ ✓ ✓	B1 B1 B1 B1 B1 5	Seen or implied. Correct answer need not be on written on answer line. Seen or implied. F.T their *A* and *B*
11. $25\times24\times20$ (cm^3) OR $25\times24\times20\div1000$ (litres) $\div1500$ (cm^3) $\div1{\cdot}5$(litres) 8 (jugs)		M1 m1 A1 3	Or correct volume in units. Consistent units CAO
12. (a) $3x= 21$ $x = 7$		B1 B1 2	FT $ax=b$ if $a\neq1$.B0 for $\frac{21}{3}$ or if b is a multiple of a and fraction not simplified on FT.
12. (b) $75 = ½ \times 50 + 5 \times R$ $75 - 25 = 5 \times R$ $R = 10$		B1 B1 B1 3	Correct substitution. Isolating *R* term FT $aR=b$ if $a\neq1$ Accept embedded answer.
13. (Annual cost of units) 15000×4.028(p) 60420(p) or (£)604.2(0) (Fixed charge per year £6.98 × 12 =) (£)83.76 (cost of units + fixed charge per year – 48) ÷12 (£639.96÷12 or 63996÷12) (Monthly payment=) (£)53.33 or 5333(p)	✓ ✓ ✓ ✓ ✓	M1 A1 B1 M1 A1 5	Alternative mark scheme- Monthly cost (Monthly cost of units=)$15000\div12\times4.028$(p) (£)50.35 or 5035(p) (Monthly discount=)(48÷12=)(£)4 (£)604.2(0) ÷12 + 6·98 – 4 . (=£50·35+6·98 – 4) (Monthly payment=)(£)53.33 or 5333(p)
14. Ribbon marked. To be viewed with graph. (a) (£) 5400 (b) Appropriate straight line of best fit, with some points above and below the line at each end of the line, or touching at least one point at each end of the line. (c) Answer should be approximately (£) 7800		B1 B1 B1 3	FT from their line. B0 if no line drawn.

June 2014 UNIT 3 (calculator allowed) Foundation Tier	✓	Mark	Comments
15. 1·62		B2 2	B1 for 1.6(23697…). All digits given must be correct.
16. 5 parts = 30 OR 30 ÷ 5 OR 7x – 2x = 30 OR equivalent (1 part) = 6 (Amount shared =) 6 × 9 = (£) 54	✓ ✓ ✓	M1 A1 m1 A1 4	Accept 5/9=30 FT their 1 part, provided M1 awarded. Award M1A1m1 A0 for answers of £12 and £42.
17. **To be viewed with diagram.** 360 ÷ 45 = 8 sides		 M1 A1 2	 Or appropriate working using the internal angle.
18. 3x – 6 = x + 2 3x – x = 2 + 6 x = 4		B1 B1 B1 3	For expanding the bracket. FT until 2nd error. Accept embedded answers
19. **To be viewed with diagram.** $8{\cdot}5^2 + 7^2$ $\sqrt{121{\cdot}25}$ = 11(·011…km) (Race distance =) 26·5(113…km)	 ✓ ✓ ✓ ✓	 M1 A1 A1 B1 4	 FT "their 11·011"+15.5 provided Pythagoras' attempted.

UNIT 3 - HIGHER TIER

June 2014 UNIT 3 Higher Tier	✓	Mark	Comments
1. (a) 1.62		B2	B1 for 1.6(23697…). All digits given must be correct.
1. (b) $9(2 - y)$		B1	
1. (c) 0.4 or equivalent.		B2	B1 for sight of 4 OR -3.6.
1. (d) 0.3 OR 3/10		B1	Accept embedded answers.
1. (e) $3x - 6 = x + 2$ $3x - x = 2 + 6$ $x = 4$		B1 B1 B1	For expanding the bracket. FT until 2^{nd} error. Accept embedded answers.
2. Ribbon marked. To be viewed with graph. (a) (£) 5400 (b) Appropriate straight line of best fit, with some points above and below the line at each end of the line, or touching at least one point at each end of the line. (c) Answer should be approximately (£) 7800		 B1 B1 B1	 Mark intention. FT from their line. B0 if no line drawn.
3. (Annual cost of units) 15000×4.028(p) 60420(p) or (£)604.2(0) (Fixed charge per year £6.98 × 12 =) (£)83.76 (cost of units + fixed charge per year – 48) ÷12 (£639.96÷12 or 63996÷12) (Monthly payment=)(£)53.33 or 5333(p) QWC: Look for • units - p, £ • 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	 ✓ ✓ ✓ ✓ ✓ ✓ ✓	 M1 A1 B1 M1 A1 QWC 2	Alternative mark scheme- Monthly cost (Monthly cost of units =)15000÷12×4.028(p) (£)50.35 or 5035(p) (Monthly discount =)(48÷12=)(£)4 (£)604.2(0) ÷12 + 6.98 – 4 . (=£50.35+6.98 – 4) (Monthly payment=)(£)53.33 or 5333(p) 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.
4. (a) Suitable uniform scales starting at zero, with axes labelled. Correct grouped frequency diagram. [Heights of 80,60,52,32,16]		B1 B2	 B1 for 1 error in heights of bars. If no marks awarded, SC1 for a frequency polygon with all correct heights.
4. (b) Sight of the mid-points 0.5, 1.5, 2.5, 3.5 & 4.5 Sum of mid-points × freq = 444 ÷ 240 = 1.8(5) (hours) or equivalent.	✓ ✓ ✓ ✓	B1 M1 m1 A1	 FT their mid-points provided they are within the limits of each group, including the limits themselves. ISW. Accept 1.9. Allow 2 if 1.85 has been seen.
4. (c) $1 < t \le 2$ (hours)		B1	Allow 1 to 2 hours.
5. 5 parts = (£)30 OR 30 ÷ 5 OR $7x - 2x = 30$ OR equivalent (1 part) = (£)6 (Amount shared =) 6 × 9 = (£) 54	✓ ✓ ✓ ✓	M1 A1 m1 A1	Accept 5/9 = 30 FT their 1 part, provided M1 awarded. Award M1A1m1A0 for answers of £12 and £42.
6. To be viewed with diagram. 360 ÷ 45 = 8 sides		 M1 A1	 Or appropriate working using the internal angle.

June 2014 UNIT 3 Higher Tier	✓	Mark	Comments
7. To be viewed with diagram.			
$(SB^2 =)\ 8.5^2 + 7^2$	✓	M1	
$(SB^2 =)\ 121.25$ or $SB = \sqrt{121.25}$	✓	A1	
(SB =) 11(.011…km)	✓	A1	
(Race distance =) 26.5(113…km)	✓	B1	FT 'their 11.011' + 15.5 provided Pythagoras attempted.
8. **Use Overlay.**			
Correct line drawn.		B1	Mark intention ±2mm.
Correct arc drawn from B.		B1	±2mm.
Correct region identified within the triangle.		B1	FT for a region bounded by a straight line crossing AB and BC and an arc centre B but outside tolerances.
9. 920000 – 30000 (= 890000)		M1	OR $9.2\times10^5 - 0.3\times10^5$ OR $92\times10^4 - 3\times10^4$ OR 89×10^4 OR 890×10^3
$= 8.9 \times 10^5$		A1	
10. (Volume of block =) $10 \times 8 \times 5$ (=400) (cm^3)	✓	B1	
(Density of metal =) $1100 \div 400$ OR $1.1 \div 400$ OR $1.1 \div 0.0004$	✓	M1	FT 1100 or 1.1 ÷ 'their volume' provided it is a product. Volume may be given in another metric unit.
= 2.75 OR 0.00275 OR 2750	✓	A1	
Appropriate unit g/cm^3 kg/cm^3 kg/m^3	✓	U1	
11. Ribbon marked			
(a) 18, 40, 100, 184, 200		B1	
(b) Use Overlay. To be viewed with table from (a).			
Idea, unique vertical plotting of the upper class boundary consistently with the corresponding cumulative frequency.		M1	FT, for all marks, their cumulative frequencies, provided an attempt made to be cumulative.
2 points plotted correctly.		A1	
All points correct and joined by straight lines or a curve, including to 0.		A1	SC1 if points plotted at mid-points and joined by straight lines or a curve, including to0.
(c) To be viewed with graph from (b).			
200 – their reading at 250 evaluated correctly.		B2	Accept 130. B1 for sight of their reading at 250 OR 84+16+½ of 60.
12. Method of working with all 3 terms to clear the 2 fractions.	✓	M2	M1 for appropriate working for 2 of the 3 terms.
	✓		Clearing implies denominator of 1.
Correctly expanding brackets and collecting like terms i.e.			
$(24x - 2 - 5x = -40$ leading to) $19x - 2 = -40$	✓	A1	FT provided at least M1 awarded. FT until 2nd error.
$x = -2$	✓	A1	Mark their final answer. *If no marks awarded SC1 for sight of (19x − 2)/10.*
13. To be viewed with diagram.			
15º marked on diagram or used correctly.	✓	B1	
$h = \tan 15º \times 700$ OR $h = 700/\tan 75°$	✓✓	M2	FT their angle of depression. M1 for $\tan 15º = h/700$ OR M1 for $\tan 75° = 700/h$
h = 187(.564…) or 188	✓	A1	An answer of 2612(.435…) may earn B0M2A1 or B1M0A0. Watch out for compensating errors.
14. Ribbon marked.			
(a) Use overlay.			
Calculation of at least 3 of the coordinates.		B1	(-2,8) (-1,3) (0,0) (1,-1) (2,0) (3,3) (4,8)
Plotting at least 4 correct points.		P1	
Correct curve.		C1	CAO.
(b) To be viewed with graph from (a).			
0 and 2		B1	FT from their non-linear graph.
(c) To be viewed with graph from (a).			
Rearranging equation to $x^2 - 2x = x + 1$		M1	
Line $y = x + 1$ drawn		A1	
Solution of approximately -0.3 AND 3.3		A1	FT their curve. A solution obtained using the formula gets M0A0A0.
15. To be viewed with diagram.			
$(35/360)\times2\pi\times25$		M1	
= 15.2(...) up to 15.3		A1	Accept an answer of 15 from correct working.
16. $p = k/r^2$ or $p \propto 1/r^2$		B1	
$6 = k/3^2$		M1	FT for non-linear start only.
$p = 54/r^2$		A1	

June 2014 UNIT 3 Higher Tier	✓	Mark	Comments
17. To be viewed with diagram. (Area =) $(6x+4)(x+2)/2$ $3x^2 + 8x + 4 = 10$ OR $6x^2 + 16x + 8 = 20$ $3x^2 + 8x - 6 = 0$ OR $6x^2 + 16x - 12 = 0$ $\frac{-8 \pm \sqrt{(8^2 - 4\times3\times-6)}}{2\times3}$ OR $\frac{-16 \pm \sqrt{(16^2 - 4\times6\times-12)}}{2\times6}$ $(-8 \pm \sqrt{136})/6$ OR $(-16 \pm \sqrt{544})/12$ x = 0.6(10... or -3.276…) x = 0.6(10...)	✓ ✓ ✓ ✓ ✓ ✓ ✓	M1 m1 A1 M1 A1 A1 A1	 Allow 1 slip. CAO. FT their equation provided it's a quadratic of comparable difficulty. Allow one slip in substitution. CAO from 'their quadratic.' CAO from 'their quadratic.' Realisation that x = -3.2 is not a valid solution. FT provided 2nd M1 awarded AND 1 possible and 1 impossible solution.
18. To be viewed with diagram. Strategy to find AD using sine rule, equating it to BC, then using cosine rule to find angle BFC. $AD = 10/\sin68 \times \sin60$ AD = 9(.340…) $\cos BFC = \frac{14^2 + 18^2 - AD^2}{2\times14\times18}$ (0.8586452...) *BFC* = 30.8(351…º)	✓ ✓ ✓ ✓	S1 M2 A1 M2 A1	 M1 for AD/sin60 = 10/sin68 FT their derived AD. M1 for $AD^2 = 14^2 + 18^2 - 2\times14\times18\times\cos BFC$
19. (a) Correct sketch, with inflection points at (0,0), (180,0) and (360,0) AND vertical asymptotes at x = 90 and x = 270.		B2	B1 for a sketch with inflection points at (0,0), (180,0) and (360,0) OR vertical asymptotes at x = 90 and x = 270.
19. (b) 116(.565…º) or 117 (°) 296(.565…º) or 297(°)		B1 B1	 FT 180 + their first angle. MR-1 if additional angles given within the range 0 to 360.

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