Methods in Mathematics June 2014 Unit 2 Higher Tier	Mark	Comment
4.(Area of faces are) $2e \times 3e$, $2e \times 4e$, $3e \times 4e$, (cm^2) $(2e \times 3e, 2e \times 4e, 3e \times 4e)$ (cm^2)	M2	M1 for any one of the 3 unique expressions These marks may be implied by correct simplified expressions
(Simplified equation for the total surface area is) $52e^2 = 468$	A2	FT for M2 or M1 as appropriate, provided their simplified sum includes at least two of the expressions $6e^2$, $8e^2$, $12e^2$ and all three terms in the form ae^2 . A1 for $(2 \times) [6e^2 + 8e^2 + 12e^2]$ OR $52e^2$ (cm ²) A1 for $ae^2 = 468$
$e^2 = 468/52 (=9)$ e = 3	B1 B1	FT 'their equation' if in the form $ae^2 = 468$ FT 'their equation' if in the form $ae^2 = 468$
(Volume = $6 \times 9 \times 12$ =) 648 (cm ³)	B1	FT 'their e' within $24 \times e^3$ correctly evaluated
Look for: if units given, are they correct? notation labels and joining text	QWC 2	If no marks, then allow SC2 for $3e \times 4e \times 2e = 468$ leading to an answer of $e = 2.69$ or 2.7, or SC1 for sight of $3e \times 4e \times 2e = 468$ or equivalent QWC2 Presents relevant material in a coherent and logical manner using acceptable mathematical
QWC2: Candidates will be expected to • present work clearly, with words explaining		form, and with few if any errors in spelling, punctuation and grammar.
 make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer 		QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar OR
QWC1: Candidates will be expected to • present work clearly, with words explaining process or steps		using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar.
 make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer 	9	QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar.
5. $26.5 - 26.5 \times 0.12$ OR 26.5×0.88 (=23.3(2)	M1	OR M2 for
23.3(2) – 23.3(2) × 0.08 OR 23.3(2) × 0.92 (= 21.4544 or 21.436)	M1	$26.5 \times 0.88 \times 0.92$ FT 'their 23.32', but not 26.5
25.3 – 21.4544 (= 3.8456) OR 25.3 – 21.436(=3.864)	m1	Depends on both previous M marks FT for their 23(.32) and their 21()
$3.8(^{\circ}C)$ to $3.9(^{\circ}C)$ from correct working	A1 4	Accept 4(°C) from correct working
6. Sight of any quotient using values from the table for a/b or b/a	M1	Or sight of 1 correct response, or answers reversed
$a = 2.5 \times b$ $b = 0.4 \times a$	A1 A1 3	Or equivalent Or equivalent FT from $a = 0.4 \times b$ to give $b = 2.5 \times a$
7.(a) 5.6×10^{-5} (b) 2.3×10^{9}	B1 B1 2	

Methods in Mathematics	Mark	Comment
8 Idea to show or use the perpendicular height in a	<u>S1</u>	Award for statement such as '6(cm) is not the
right angled triangle	51	vertical height'
Height = $\sin 58^\circ \times 6$	M2	M1 for $\sin 58^\circ = \text{Height}/6$
= 5(.088 cm)	A1	
$Area = 5(.088) \times 10$	M1	FT their 5(.088cm) provided prior M1 awarded
		or an attempt has been made to use a trig ratio
$= 50.9 (cm^2) \text{ or } 51 (cm^2)$	A1	Must be rounded. Do not accept 50.8 or 50 (from
		premature approximation). FT from M1
		If S1 only, then use of spurious perpendicular
		height <6, then also award SC1 for their
		perpendicular height $\times 10$ correctly evaluated
		Alternative:
		Use of ½ absinC S1
		$2 \times \frac{1}{2} \times 6 \times 10 \times \sin 58^{\circ}$ M3
		or M2 for $\frac{1}{2} \times 6 \times 10 \times \sin 58^{\circ}$
		$50.9(cm^2) \text{ or } 51(cm^2)$ A2
	6	or A1 for calculating 1/2 required area
9(a) Correct translation	B1	
(b) Correct rotation	B2	B1 near miss of grid lines or for clockwise 90°
		about (-2, -1), or for anticlockwise 90° about
		(-1, -2)
(c) Correct reflection in $y = x$	B2	B1 for a reflection in $v = -x$.
		OR for sight of the line $v = x$
(d) Enlargement scale factor ¹ / ₂	B2	B1 for any 1 line correct, or consistent incorrect
		fractional scale
Correct position	B1	
	8	
10. 26.7 = $\Pi \times d$ or 26.7 = $2 \times \Pi \times r$ or $r = 26.7/\Pi$	M1	
Diagonal = 8.495 to $8.5(0)$ (cm)	A1	Accept rounded or truncated
$diagonal^2 = side^2 + side^2$	M1	FT their diagonal
$side^2 = diagonal^2/2$	Al	
side length = $6(.0096cm)$	AI	Do not FT from inappropriate truncation or
		incorrect rounding (e.g. from $d = 8.4$)
$P_{\text{entropy}} = 24$ (, , , , ,)	D1	The movided both M more a guarded for 4x 'their
Perimeter = 24.(cm)	6	side length'
11 (a)(i) $y = x$ and $y = -x$ indicated	B2	B1 for either indicated in 2 quadrants or both
(2 quadrants for both)	D2	indicated in 1 quadrant each
(- quantante for cour)		B1 for indication of appropriate points at least 3 in
		each of the 4 quadrants
		Ignore any circles drawn
(ii) $y = x$ and $y = -x$ or equivalent	B2	CAO. B1 for either equation
(b) $x^2 + y^2 = 3^2$ or $x^2 + y^2 = 9$	B1 5	CAO
$12. \sin XYZ/23.8 = \sin 123(^{\circ})/38.9$	M1	OR 23.8/sin XYZ = 38.9/sin123(°)
$\sin XYZ = 23.8 \times \sin 123(^{\circ})/38.9$	M1	OR sin ⁻¹ 0.513 This M1 implies previous M1
$XYZ = 30.871(^{\circ})$ rounded or truncated correctly	A1	· · · · · · · · · · · · · · · · · · ·
	3	

Methods in Mathematics	Mark	Comment
June 2014 Unit 2 Higner Tier	2.01	
13. $y = 4 - x$ OR $x = 4 - y$	MI	OR For sight of $x^2 + xy = 4x$
$2x^{2} + x(4-x) - 5 = 0 \qquad 2(4-y)^{2} + (4-y)y - 5 = 0$	M1	OR Subtraction from 1 st equation
$x^2 + 4x - 5 = 0 \qquad \qquad y^2 - 12y + 27 = 0$	A1	$OR x^2 + 4x = 5$
(x - 1)(x+5) = 0 $(y - 3)(y - 9) = 0$	M1	FT provided quadratic from an appropriate
		substitution method or subtraction method
		OP alternative method to solve a g formula with
		or alternative method to solve, e.g. formula with a_{a}
	A 1	correct substitution and b -4ac correctly simplified
x = 1, x = -5 OR $y = 5, y = 9$	AI	
y = 3, y = 9 $x = 1, x = -5$	AI	
		If A0, A0 then SC1 for $x = 1$, $y = 3$ OR $x = -5$, $y = 9$
		provided algebraic method shown with
		appropriate M1, M1, M1 marks
	6	No marks for trial & improvement methods
14(a) 6:2 and 7:QR or equivalent, or scale factor 7/6	B1	OR 6:8 and 7: PR or equivalent
$OR = 2 \times 7 \div 6$ or equivalent	M1	OR PR = $7 \times 8 \div 6$ (= 9.33) or equivalent
OR = 23(33 cm)	A1	
(b) $AE = Ax$	B1	
AE = 55 M	B1	
$A\Gamma = 3.5 \text{ y}$ (Designator =) $E_{\text{W}} + 9.5 \text{ y}$ or $E_{\text{W}} + 17 \text{ y}/2$ IEW	B1	CAO Must be simplified
(Perimeter =) 0x + 8.5y 0r 0x + 1/y/2 15 w	DI	CAO. Must be simplified $A = (1/(12) + 17)$
	6	Accept $\frac{1}{2}(12x + 1/y)$
	0	Answers of $4x + 5.5y + 2x + 3y$ imply B1, B1, B0
15. $b = 45(^{\circ})$	BI	
$c = 180(^{\circ})$	BI	
	2	
16(a) HK = HL + LK (= 5 x + 6 y + 3 x - 6 y)	M1	
$= 8\mathbf{x} (+0\mathbf{y})$	A1	
(b)(i) $LN = 3x - 6y + 18x - 36y (=21x - 42y)$	M1	
k = 7	A1	May be embedded. Award M1, A1 for sight of
		k=7
(ii) Collinear (or lie along the same straight line)	B1	Do not accept parallel as a full description
	5	
17. Area of the square base = $119.8 - 4 \times 23.6$	M1	
$= 25.4 (\text{cm}^2)$	A1	
(Volume pyramid) $76.4 = \frac{1}{3} \times 25.4 \times \text{height}$	m1	FT their area of square base
		Note $\sqrt{25.4} = 5.0398 \times 5.0398$
height = 9.02 cm	A1*	
(Volume cone) $44.4 = \frac{1}{3} \times \pi \times r^2 \times height$	M1*	Depends on all previous method marks, FT their
		height
$r^2 = 44.4/(\frac{1}{3} \times \pi \times \text{height})$	M1	FT equivalent difficulty, isolating r^2
	Al	CAO.
$r^{2} = (44.4 \times \frac{1}{3} \times 25.4) / (76.4 \times \frac{1}{2} \times \pi)$		OR $r^2 = 4.7$ or an appropriate unrounded r r -
$r^2 = 4.69$ to 4.701		2 1681875 to 2 17
(radius) = 2.17 or 2.2 (cm)	Δ1	CAO
	111	Appropriate degree of accuracy required
		Appropriate degree of accuracy required
		Alternative for A1* M1*
		Fauating heights
		$76 \Lambda / (1/2 \times 25 \Lambda) - \Lambda \Lambda / (1/2 \times -2^{2})$
		$(0.4) (/3 \land 25.4) = 44.4 / (73 \land 1 \land 1)$
		For information :
		Common height = 0.02(cm)
	0	$U_{\text{tight}} = 9.02(\text{cm})$
	ð	пеіgnt of a triangular face = 9.3/(ст)

UNIT 2 (HIGHER TIER)

	1	
Methods in Mathematics Unit 2 Higher Tier June 2014	Mark	Comment
1. Shape completed accurately with correct rotation	B3	With no other 90° rotations shown
seen		B2 for at least two lines correct in attempting to
		complete the shape with correct rotation of their
		shape with no other 90° rotations shown. OR
		B1 for the shape completed correctly, or a correct
		rotation of the part of the shape given ignore other
	3	90° rotations shown
2.		Accept embedded answers in parts (a), (b) & (c)
(a) $(x =) 10 \times 8/5$	M1	
x = 16	A1	
(b) $(x =) 4$	B1	Mark final answer. Do not accept 28/7
(c) $18x - 102 = 42$ OR $3x - 17 = 42/6$	B1	FT until 2 nd error
18x = 144 $3x = 24$ or $x = 24/3$	B1	
x=8	B1	
(d) $9x < 77 - 5$	M1	No marks for use of "=" unless finally replaced to
x<8	A1	give $x < 8$ then award M1 A1
		SC1 for $x < 82/9$ ISW
(e) $x < 85/5$ or $x < 17$	M1	Or sight of $5 \times 16 = 80$ with $5 \times 17 = 85$
16		Accept unsupported 16 or a unique answer of 16
	711	from a trial and improvement method. Do not
		accept x<16.
		SCI for sight of $5x = 85$, $x = 17$ followed by
	10	selecting $x = 16$
$3(a) 100 \times 34 / 6800$ or $100 \times 34 \div 6800$	M1	
0.5(%) or $1/6(%)$		
(b) 1.0225×34000 or $34000 + 34000 \times 2.25/100$	M1	Accept 0.25 written as $\frac{1}{4}$
or 102 25 × 34000/100	1411	Accept 0.25 whiteh as 74
34765	A 1	
57705	711	
(c) 0.26×1345 or $\frac{3}{8} \times 600$ or 0.045×3600 or equivalent	M1	Any one correct calculation shown
349.7 (m)	Al	Accept 349 or 350
225 (m)	A1	Accept 230
162 (m)	Al	Accept 160
160 230 350	B1	Must all be 2 significant figures
		FT provided at least 2 of the A marks awarded
		1
(d) $450 \times 4 \div 9$	M1	Complete method
= 200	A1	CAO
$450 imes 4 \div 5$	M1	Complete method
= 360	A1	CAO
Difference 160	A1	Depend on both M marks
	14	

Methods in Mathematics Unit 2 Higher Tier June 2014	Mark	Comment
4.(Area of faces are) $2e \times 3e$, $2e \times 4e$, $3e \times 4e$, (cm^2) $(2e \times 3e, 2e \times 4e, 3e \times 4e)$ (cm^2)	M2	M1 for any one of the 3 unique expressions These marks may be implied by correct simplified expressions
(Simplified equation for the total surface area is) $52e^2 = 468$	A2	FT for M2 or M1 as appropriate, provided their simplified sum includes at least two of the expressions $6e^2$, $8e^2$, $12e^2$ and all three terms in the form ae^2 . A1 for $(2 \times) [6e^2 + 8e^2 + 12e^2]$ OR $52e^2$ (cm ²) A1 for $ae^2 = 468$
$e^2 = 468/52 (=9)$ e = 3	B1 B1	FT 'their equation' if in the form $ae^2 = 468$ FT 'their equation' if in the form $ae^2 = 468$
(Volume = $6 \times 9 \times 12$ =) 648 (cm ³)	B1	FT 'their e ' within $24 \times e^3$ correctly evaluated
Look for: if units given, are they correct? notation labels and joining text	QWC 2	If no marks, then allow SC2 for $3e \times 4e \times 2e = 468$ leading to an answer of $e = 2.69$ or 2.7, or SC1 for sight of $3e \times 4e \times 2e = 468$ or equivalent OWC2 Presents relevant material in a coherent and
QWC2: Candidates will be expected to present work clearly, with words ovalaining process or store		logical manner, using acceptable mathematical form, and with few if any errors in spelling, punctuation and grammar.
 AND make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer 		QWC1 Presents relevant material in a coherent and logical manner but with some errors in use of mathematical form, spelling, punctuation or grammar OR
QWC1: Candidates will be expected to • present work clearly, with words explaining process or steps		evident weaknesses in organisation of material but using acceptable mathematical form, with few if any errors in spelling, punctuation and grammar.
 make few if any mistakes in mathematical form, spelling, punctuation and grammar and include units in their final answer 	9	QWC0 Evident weaknesses in organisation of material, and errors in use of mathematical form, spelling, punctuation or grammar.
5. $26.5 - 26.5 \times 0.12$ OR 26.5×0.88 (=23.3(2)	M1	OR M2 for
23.3(2) – 23.3(2) × 0.08 OR 23.3(2) × 0.92 (= 21.4544 or 21.436)	M1	$26.5 \times 0.88 \times 0.92$ FT 'their 23.32', but not 26.5
25.3 - 21.4544 (= 3.8456) OR 25.3 - 21.436(=3.864)	m1	Depends on both previous M marks FT for their 23(.32) and their 21()
$3.8(^{\circ}C)$ to $3.9(^{\circ}C)$ from correct working	A1 4	Accept 4(°C) from correct working
6. Sight of any quotient using values from the table for a/b or b/a	M1	Or sight of 1 correct response, or answers reversed
$\begin{array}{l} a=2.5\times b\\ b=0.4\times a \end{array}$	A1 A1 3	Or equivalent Or equivalent FT from $a = 0.4 \times b$ to give $b = 2.5 \times a$
7.(a) 5.6×10^{-5} (b) 2.3×10^{9}	B1 B1 2	

8. Idea to show a basine and the perpendicular height in a right angled mixed in a strain basine of the statement such as '6(cm) is not the writcal height' M1 for sinf88 = Height'6 Area = 5(.088m) = 50.9(cm ²) or 51(cm ²) = 6 or Al for calculating the required area = 74 for or calculating the required area = 6 or Al for calculating the required area = 6 or Al for calculating the required area = 6 or Al for calculating the required area = 11 for a trifference or 10 cm ² strain	Methods in Mathematics Unit 2 Higher Tier June 2014	Mark	Comment
right angled triangle Hight = sin58 × 6 = 5(0.88,) × 10 = 50.9(cm ²) or 51(cm ²) = 50.9(cm ²) or 51(cm ²) or 51(cm ²) or 71 or anticlockwise 90° = 50.9(cm ²) or 51(cm ²) or 71 or anticlockwise 90° = 50.9(cm ²) or 71 or an	8. Idea to show or use the perpendicular height in a	S1	Award for statement such as '6(cm) is not the
Height = sin S8" × 6 = 5(.088m) provided prior M1 awarded or an attempt has beem rade to use a trig ratio or an attempt has beem rade to use a trig ratio or an attempt has beem rade to use a trig ratio must be rounded. Do not accept 50.8 of 00 from premature approximation, JT from M1 HT their 5(.088m) provided prior M1 awarded or an attempt has beem rade to use a trig ratio Must be rounded. Do not accept 50.8 of 00 from premature approximation, JT from M1 HT s1 may, then use of spurines perpendicular height <.0 then also averad 221 for their perpendicular height ×10 correctly evaluated Ahermative: Use of f viobinC $2 \times 4 \times 0 \times 10 \times \sin 50^{\circ}$ $0 \times 21 \times 5 \times 10 \times \sin 50^{\circ}$ $0 \times 10 \times 10^{\circ}$ $10 \times 10^{\circ} - 11 \times 10^{\circ} - 11 \times 10^{\circ} - 11 \times 10^{\circ} - 11 \times 10^{\circ} - 10^{\circ} - 11 \times 10^{\circ} - 10^{\circ} - 10^{\circ} - 10^{\circ} - 10^{\circ} $	right angled triangle		vertical height'
$ \begin{array}{c} = 5(0.88m) \\ Area = 5(0.88m) \\ Area = 5(0.88m) \\ = 50.9(cm2) or 51(cm2) \\ \end{array} \\ \begin{array}{c} FT their 5(0.88cm) provided prior M1 awarded or an attempt has been made to use at transition for the set of surface products of the set of the$	Height = $\sin 58^\circ \times 6$	M2	M1 for $\sin 58^\circ = \text{Height}/6$
Area = 3(0.88) × 10YIPT inder 3(0.88) provided prior VII standard or an attempt has been made to use a trig ratio or an attempt has been made to use a trig ratio man tempt has been made to use a trig ratio Must be rounded. Do not accept 50.8 or 50 (form prenature approximation). PT from MI If SI only, then use of spurious perpendicular height < 50 hen acts avard 250 (form in perpendicular height × 10 correctly evaluated Alternative: Use of Y absint C0AltAlt0Normet TotalionBl0Correct translationBl0Correct rotationBl0Correct reflection in y = xBl near miss of grid lines, or for clockwise 90° about (< 2, -1), or for anticlockwise 90° about (< 1, -2)	= 5(.088cm)	Al M1	ET their 5(000 cm) and ideal arise M1 counded
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	Area = $5(.088) \times 10$ = $50.9(cm^2)$ or $51(cm^2)$		F1 their 5(.088cm) provided prior M1 awarded or an attempt has been made to use a trig ratio Must be rounded. Do not accent 50.8 or 50 (from
If S1 only, then use of spatnings performance of spatnings performance of the spatning SC for their perpendicular height ×10 correctly evaluatedAlternative: Use of Y achin CSI 2 × ½ × 6 × 10 × sin 58° S0 (cm? or 51(cm²))9(a) Correct translationB1(b) Correct rotationB1(c) Correct reflection in $y = x$ (d) Enlargement scale factor ½ Correct positionB2 B1 B110. 26.7 = 11×d or 26.7 = 2 × 11× r or $r = 26.711$ (d) Enlargement scale factor ½ Correct positionB2 B1 B1 For anticlockwise 90° about (-1, -2)10. 26.7 = 11×d or 26.7 = 2 × 11× r or $r = 26.711$ (d) Enlargement scale factor ½ B2M1 Accept rounded or truncated FT their diagonal side '= side' = side' side '= side' = side' Side '= diagonal²2 Side '= side' = side' = side '= side' Side '= diagonal²2 Side '= side' = side '= side' Side '= diagonal²2 Side '= diagonal²2 Side '= side' = side' Side '= diagonal²2 Side '= side' = side' Side '= diagonal²2 Side '= side' = side' Side '= side' = side' = side '= side' Side '= diagonal?11. (a)(i) $y = x$ and $y = -x$ indicated (2 quadrants for both) Si $y = x and y = -x indicated(2 quadrants for both)12. in XYZ = 23.8 sin 123(°)(38.9 Minon' 0.8 11 for either indicated in 2 quadrants, or bothindicated in 1 quadrant eachB1 for indication 6 appropriate points at least 3 ineach of the 4 quadrants(R is in' 0.513 This M1 implies previous M1XYZ = 30.871(?) rounded or truncated correctlyX^2 + 4x - 5 = 0X^2 - 12y + 27 = 013. y = 4$	= 50.7(cm) or 51(cm)	AI	premature approximation). FT from M1
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $			If S1 only, then use of spurious perpendicular
Alternative: Use of Y absin C was of Y absin C W 2 for Y > 6 + 10 × sin 58" M3 or M2 for Y > 6 + 10 × sin 58" M3 or M2 for Y > 6 + 10 × sin 58" M3 or A1 for calculating Y required area9(a) Correct translationB1(b) Correct rotationB29(a) Correct reflection in y = x (d) Enlargement scale factor Y2 Diagonal = 8.495 to 8.50) (cm)B110. 26.7 = 11 × d or 26.7 = 2 × 11× r or r = 26.711 Jagonal = 8.495 to 8.50) (cm)M1 A R10. 26.7 = 11× d or 26.7 = 2 × 11× r or r = 26.711 Jagonal = 8.495 to 8.50) (cm)M1 A A A A tide' = diagonal?2 A1 B111. (a)(i) y = x and y = - x (ii) y = x and y = - x (iii) y = x and y = - xB1 A Correct positionB1In carrel was and y = - x (iii) y = x and y = - x(iii) y = x and y = - x (iii) y = x and y = - xB1 A COR(iii) y = x and y = - x (iii) y = x and y = - xB1 A COR(iii) y = x and y = - x (iii) y = x and y = - xCarrel was and y = - x (iiii) y = x and y = - x(iii) y = x and y = - x (iiii) y = x and y = - xCarrel was an y = - x (iiii) y = x and y = - x(iiii) y = x and y = - xCarrel was an y = - x (x = 0 (x - 1)(x + 2) = 0)(iiii) y = x and y = - xCarrel was an y = - x (x = 0 (x - 1)(x + 2) = 0)(iiii) y = x and y = - xCarrel was an y intered area (X = 0 (x - 1)(x + 2) = 0)(iiii) y = x and y = - xCarrel was an y intered area (X = 0 (x - 1)(x + 2) = 0)(iiii) y = x and y = - xCarrel was an y intered area (iiii) y = x and y = - x(iiii) y = x and y = - xCarre			perpendicular height ×10 correctly evaluated
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $			Alternative:
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $			Use of ½ absinC S1
or M2 for $l_2^{s} < 5 < l0 > sin 58^{s}$ 9(a) Correct translationB1(b) Correct rotationB1(c) Correct reflection in $y = x$ (d) Enlargement scale factor l_2 (e) Correct position(f) $2 = 1 \times d$ or $26.7 = 2 \times \Pi \times r$ or $r = 26.7/\Pi$ (f) $2 = 1 \times d$ or $26.7 = 2 \times \Pi \times r$ or $r = 26.7/\Pi$ (h) $2 = 1 \times d$ or $26.7 = 2 \times \Pi \times r$ or $r = 26.7/\Pi$ (h) $2 = 1 \times d = s ade^2 + s ade^2$ (h) $2 = 1 \times d = s ade^2 + s ade^2$ (h) $2 = 1 \times d = s ade^2 + s ade^2$ (h) $2 = 1 \times d = s ade^2 + s ade^2$ (h) $2 = 1 \times d = s ade^2 + s ade^2$ (h) $2 = 1 \times d = s ade^2 + s ade^2$ (h) $2 = 1 \times d = s ade^2 + s ade^2$ (h) $2 = 1 \times d = s ade^2 + s ade^2$ (h) $2 = 1 \times d = s ade^2 + s ade^2$ (h) $2 = 1 \times d = s ade^2 + s ade^2$ (h) $2 = 1 \times d = s ade^2 + s ade^2$ (h) $2 = 1 \times d = s ade^2 + s ade^2$ (h) $2 = 1 \times d = s ade^2 + s ade^2$ (h) $2 = 1 \times d = s ade^2 + s ade^2$ (h) $2 = 1 \times d = s ade^2 + s ade^2$ (h) $2 = 1 \times d = s ade^2 + s ade^2$ (h) $2 = 1 \times d = s ade^2 + s a$			$2 \times \frac{1}{2} \times 6 \times 10 \times \sin 58^{\circ} \qquad M3$
SolutionSolutionA29(a) Correct translationB1(b) Correct rotationB2(c) Correct reflection in $y = x$ B2(d) Enlargement scale factor V_2 B1(d) Enlargement scale factor V_2 B1(d) Enlargement scale factor V_2 B1Correct positionB110. 26.7 = $\Pi \times d$ or $26.7 = 2 \times \Pi \times r$ or $r = 26.7/\Pi$ M1Accept rounded or truncateddiagonal ² = 3495 to 850) (cm)side ² = diagonal ² /2side length = 6.0096 cm)Perimeter = $24cm$)B111.(a)(i) $y = x$ and $y = -x$ indicated(2 quadrants for both)(ii) $y = x$ and $y = -x$ or equivalent(b) $x^2 + y^2 = 3^2$ or $x^2 + y^2 = 9$ B1CAO12. $xin XYZ/23.8 = sin123(°)/38.9$ (ii) $y = x$ and $y = -x$ or equivalent(b) $x^2 + y^2 = 3^2$ or $x^2 + y^2 = 9$ B1CAO13. $y = 4 - x$ OR $x = 4 - y$ $x^2 + 4x - 5 = 0$ $y^2 - 12y + 27 = 0$ (x - 1)(x+5) = 0(y - 3)(y - 9) = 0x^2 + 4x = 5(x - 1)(x+5) = 0(y - 3)(y - 9) = 0x - 1, x = -5(x - 1)(x+5) = 0(y - 3)(y - 9) = 0x - 1, x = -5(x - 1)(x+5) = 0(y - 3)(y - 9) = 0x - 1, x = -5(x - 1)(x+5) = 0(y - 3)(y - 9) = 0x - 1, x = -5(x - 1)(x+5) =			or M2 for $\frac{1}{2} \times 6 \times 10 \times \sin 58^{\circ}$
9(a) Correct translation007 At for Cultulating 2/ required area(b) Correct rotationB1(c) Correct rotationB2(d) Enlargement scale factor $\frac{1}{2}$ B1(d) Enlargement scale factor $\frac{1}{2}$ B2(d) Enlargement scale factor $\frac{1}{2}$ B1(d) Enlargement scale factor $\frac{1}{2}$ B1(e) Correct positionB1(f) 2, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,		6	$50.9(cm^2)$ or $51(cm^2)$ A2
(b) Correct rotationB2B1 near miss of grid lines, or for clockwise 90° about (-2, -1), or for anticlockwise 90° about (-1, -2)(c) Correct reflection in $y = x$ B2B1 for a reflection in $y = -x$, OR for sight of the line $y = x$ (d) Enlargement scale factor ½B2(d) Enlargement scale factor ½B2(e) Correct positionB110. $26.7 = 10 \times dor 26.7 = 2 \times X \times or r = 26.7/ M1Diagonal = 8.495 to 8.5(0) (cm)A1side length = 6(.096cm)A1side length = 6(.096cm)A1Perimeter = 24.(cm)B111.(a)(i) y = x and y = -x indicated(i) y = x and y = -x indicated(ii) y = x and y = -x or equivalent(iii) y = x and y = -x or equivalent(b) x^2 + y^2 = 3^2 or x^2 + y^2 = 911. xyZ2 = 23.8 \times sin123(°)/38.9(iii) xy = x = 0(iii) xy = x = 0x^2 + x(4x) - 5 = 0y^2 - 12y + 27 = 0(x - 1)(x+5) = 0$ $(x - 1)(x+5) = 0$	9(a) Correct translation	B1	or A1 for calculating 72 required area
(b) Correct rotationB2B1 near miss of grid lines, or for clockwise 90° about (-1, -2) B1 for a netlection in $y = x$, (0) Enlargement scale factor ½B2B1 for a netlection in $y = -x$, OR for sight of the line $y = x$ B1 for any 1 line correct, or consistent incorrect fractional scale(d) Enlargement scale factor ½B2B1 for any 1 line correct, or consistent incorrect fractional scale(d) Enlargement scale factor ½B1(d) $26.7 = 11 \times d$ or $26.7 = 2 \times 111 \times r$ or $r = 26.7/11$ side 2 + side 2M1NiAccept rounded or truncated fractional scale(d) Enlargement scale factor ½A1Side 2 + side 2 + side 2A1Side 1 = constant 1 = (0, 096,cm)A1Perimeter = 24.(cm)B1F1 their diagonalB2B1 for either indicated in 2 quadrants, or both indicated in 1 quadrant scale(i) $y = x$ and $y = -x$ or equivalentB2(ii) $y = x$ and $y = -x$ or equivalent(iii) $y = x$ and $y = -x$ or equivalent(b) $x^2 + y^2 = 3^2$ or $x^2 + y^2 = 9$ SiCA0SiSiSi $xYZ = 238.8 \times in123(°)/38.9$ M1OR Subtraction from 1 * quation(x - 1)(x+5) = 0(y - 3)(y - 9) = 0x^2 + 4x - 5 = 0y^2 - 12y + 27 = 0(x - 1)(x+5) = 0(y - 3)(y - 9) = 0M1OR Subtraction from 1 * quation $x = 1, x = -5$ OR $y = 3, y = 9$ $x = 1, x = -5$ <tr< td=""><td></td><td></td><td></td></tr<>			
about (-2, -1), or for anticleckwise 90° about (a) 201 (-2, -1), or for anticleckwise 90° about (-1, -2)(c) Correct reflection in $y = x$ B2(d) Enlargement scale factor V_2 B1Correct positionB110. 26.7 = 11x d or 26.7 = 2 x I1x r or r = 26.7/IIM1Diagonal 2 = side ² + side ² M1aide ² = diagonal ² /2A1side length = 6(.0096cm)A1perimeter = 24.(cm)B1for any t ine correct, or and y = -x indicatedB2(ii) y = x and y = -x indicatedB2(iii) y = x and y = -x or equivalentB2(iii) y = x and y = -x or equivalentB2(b) $x^2 + y^2 = 3^2$ or $x^2 + y^2 = 9$ B112. sin XYZ/23.8 = sin123(°)/38.9M1sin YZZ = 30.871(°) rounded or truncated correctlyM1(x - 1)(x+5) = 0(y - 3)(y - 9) = 0(x - 1)(x+5) = 0(y - 3)(y - 9) = 0(x - 1)(x+5) = 0(y - 3)(y - 9) = 0(x - 1)(x+5) = 0(y - 3)(y - 9) = 0(x - 1)(x+5) = 0(y - 3)(y - 9) = 0(x - 1)(x+5) = 0(y - 3)(y - 9) = 0(x - 1)(x+5) = 0(y - 3)(y - 9) = 0(x - 1)(x+5) = 0(y - 3)(y - 9) = 0(x - 1)(x+5) = 0(y - 3)(y - 9) = 0(x - 1)(x+5) = 0(y - 3)(y - 9) = 0(x - 1)(x+5) = 0(y - 3)(y - 9) = 0(x - 1)(x+5) = 0(y - 3)(y - 9) = 0(x - 1)(x+5) = 0(y - 3)(y - 9) = 0(x - 1)(x+5) = 0(y - 3)(y - 9) = 0(x - 1)(x+5) = 0(y - 3)(y - 9) = 0(x - 1)(x+5) = 0((b) Correct rotation	B2	B1 near miss of grid lines, or for clockwise 90°
(c) Correct reflection in $y = x$ (d) Enlargement scale factor V_2 Correct positionB2 B1 If for any line correct, or consistent incorrect fractional scale(d) Enlargement scale factor V_2 Correct positionB1 If or any line correct, or consistent incorrect fractional scale(d) Enlargement scale factor V_2 Correct positionB1 If or any line correct, or consistent incorrect fractional scale(d) Enlargement scale factor V_2 Correct positionB1 If or any line correct, or consistent incorrect fractional scale(d) Enlargement scale factor V_2 Diagonal = 8.495 ($side length = 6(.0096cm)$ M1 A1 A1 A1 Side length = $6(.0096cm)$ Perimeter = $24.(cm)$ B1 If or either indicated in 2 quadrants, or both indicated in 1 quadrant scalePerimeter = $24.(cm)$ B1 If or either indicated in 2 quadrants, or both indicated in 1 quadrant scale(ii) $y = x$ and $y = -x$ or equivalentB2 If or either indicated in 2 quadrants, or both indicated in 1 quadrant scale(iii) $y = x$ and $y = -x$ or equivalentB2 If or either equation(b) $x^2 + y^2 = 3^2$ or $x^2 + y^2 = 9$ sin XYZ = $23.8 \times sin123(^\circ)/38.9$ sin XYZ = $23.8 \times sin123(^\circ)/38.9$ Sin XYZ = $23.8 \times sin123(^\circ)/38.9$ XYZ = $30.871(^\circ)$ rounded or truncated correctly $x^2 + 4x - 5 = 0$ $x^2 + 12y + 27 = 0$ M1 M1 M113. $y = 4 - x$ $2x^2 + x(4-x) - 5 = 0$ $x^2 - 12y + 27 = 0$ M1 M1 M1OR For sight of $x^2 + xy = 4x$ OR subtraction from 1 st equation OR subtraction method OR subtraction method OR alternative method to solve, e_2 , formula with correct substitution and b^2-4ac corecetly simplified 			about $(-2, -1)$, or for anticlockwise 90° about $(-1, -2)$
(d) Enlargement scale factor $\frac{1}{2}$ B2OR for sight of the line $y = x$ B1 for any 1 line correct, or consistent incorrect fractional scale(d) Enlargement scale factor $\frac{1}{2}$ B1If any 1 line correct, or consistent incorrect fractional scale10. 26.7 = 11×d or 26.7 = 2 × II×r or r = 26.7/II biagonal = 8.495 to 8.5(0) (cm)M1 A1 Accept rounded or truncated11. diagonal = 3.402*, side + side = 3A1 Accept rounding (e.g. from d = 8.4) Answer here for A1 should round to 6.01 FT provided both M marks awarded for 4× "their side length"Perimeter = 24.(cm)B1 FT provided both M marks awarded for 4× "their side length"11. (a)(i) y = x and y = -x indicated (2 quadrants for both)B2 B1 for either indicated in 2 quadrants, or both indicated in 2 quadrants Ignore any circles drawn (ii) y = x and y = -x or equivalent(b) $x^2 + y^2 = 3^2$ or $x^2 + y^2 = 9$ B1 S1 (cAO, B1 for either equation(i) $x^2 + y^2 = 3^2$ or $x^2 + y^2 = 9$ M1 S1 (or rounded or truncated correctly A1 (a)13. $y = 4 - x$ $x^2 + x(+x) - 5 = 0$ $x^2 + 12y + 27 = 0$ M1 M1 (OR Subtraction from 1" equation OR $x^2 + 4x = 5$ (x - 1)(x+5) = 0 $(y-3)(y-9) = 0$ M1 $x = 1, x = -5$ OR $y = 3, y = 9$ A1 A1(x - 1)(x+5) = 0 $y = 3, y = 9$ $y = 3, y = 9$ M1 $x = 1, x = -5$ OR $x = 1, y = 3$ OR $x = -5, y = 9$ provided algebraic method shown with appropriate method shown with appropriate method shown with appropriate method shown with approprinte M1, M1, M1 marks(x - 1)(x+5) = 0 $y = 3, y = 9$ (A1 $x = 1, x = -5$ (A1 A1 A1((c) Correct reflection in $y = x$	B2	B1 for a reflection in $y = -x$,
(d) Enlargement scale factor $\frac{1}{2}$ B2B1B1Correct positionB110. $26.7 = \Pi \times d$ or $26.7 = 2 \times \Pi \times r$ or $r = 26.7/\Pi$ M1Diagonal = 8.495 to $8.5(0)$ (cm)M1Diagonal = 8.495 to $8.5(0)$ (cm)A1Side = diagonal?A1side length = $6(.0096cm)$ A1Perimeter = 24.(cm)B1T1.(a)(i) y = x and y = -x indicatedB1(2 quadrants for both)B1B1B1 for either indicated in 2 quadrants, or both(ii) y = x and y = -x or equivalentB2(b) $x^2 + y^2 = 3^2$ or $x^2 + y^2 = 9$ 12. sin XYZ/23.8 = sin123(°)/38.9sin XYZ/23.8 = sin123(°)/38.9sin XYZ/23.8 = sin123(°)/38.9sin XYZ/23.8 = sin123(°)/38.9(i) y = 4 - x $x^2 + 4x - 5 = 0$ $(x - 1)(x+5) = 0$ $(x - 1)(x+$			OR for sight of the line $y = x$
Correct positionB1 8Iractional scale10. $26.7 = 11 \times d$ or $26.7 = 2 \times 11 \times r$ or $r = 26.7/11$ Diagonal $= 8.495$ to $8.5(0) (cm)$ M1 A1 M1 A1 B1Accept rounded or truncated FT their diagonalside $2 = diagonal^2/2$ side length $= 6(.0096cm)$ A1 A1 A1 Do not FT from inappropriate truncation or incorrect rounding (e.g. from $d = 8.4$) Answer here for A1 should round to 6.01 FT provided both M marks awarded for $4 \times '$ their side length'Perimeter $= 24.(cm)$ B1 for either indicated in 2 quadrants, or both indicated in 1 quadrant each B1 for either indicated are ach B1 for either equation(ii) $y = x$ and $y = -x$ or equivalentB2(ii) $y = x$ and $y = -x$ or equivalentB2(b) $x^2 + y^2 = 3^2$ or $x^2 + y^2 = 9$ B1 S1(i) $x^2 + y^2 = 3^2$ or $x^2 + y^2 = 9$ B1 S1(ii) $y = x$ and $y = -x$ or equivalentB2(b) $x^2 + y^2 = 3^2$ or $x^2 + y^2 = 9$ B1 S1(ii) $y = x$ and $y = -x$ or equivalentB2(b) $x^2 + y^2 = 3^2$ or $x^2 + y^2 = 9$ B1 S1(iii) $y = x$ and $y = -x$ or equivalentB2(iii) $y = x$ and $y = -x$ or equivalentB2(b) $x^2 + y^2 = 3^2$ or $x^2 + y^2 = 9$ M1 S1(iii) $y = x$ and $y = -x$ or equivalentB2(iii) $y = x$ and $y = -x$ or equivalentB2(iii) $y = x$ and $y = -x$ or equivalentB2(iii) $y = x$ and $y = -x$ or equivalentB2(iii) $y = x$ and $y = -x$ or equivalentB2(iii) $y = x$ and $y = -x$ or equivalentB2(iii) $x^2 + 4x = 3^2$	(d) Enlargement scale factor $\frac{1}{2}$	B2	B1 for any 1 line correct, or consistent incorrect
Outcet pointedBit10. $26.7 = 11 \times d \text{ or } 26.7 = 2 \times 11 \times r \text{ or } r = 26.7/11$ M1Diagonal = 8.495 to $8.5(0)$ (cm)A1side = diagonal ² /2M1side = diagonal ² /2A1side length = $6(.0096cm)$ A1Perimeter = $24.(cm)$ B111.(a)(i) y = x and y = - x indicatedB2(2 quadrants for both)B1(ii) y = x and y = - x or equivalentB2(iii) y = x and y = - x or equivalentB2(a) x 2 + y ² = 3 ² or x ² + y ² = 9B1(b) x ² + y ² = 3 ² or x ² + y ² = 9B1(c) x 2 + y ² = 3 ² or x ² + y ² = 9CAO(i) x y = x and y = - x or equivalentB2(b) x ² + y ² = 3 ² or x ² + y ² = 9M1(c) x 2 + y ² = 3 ² or x ² + y ² = 9M1(a) x 12 (°)/38.9M1(b) x ² + y ² = 3 ² or x ² + y ² = 9M1(c) x 2 + x(4-x) - 5 = 02(4-y) ² + (4-y)y - 5 = 0(x - 1)(x+5) = 0(y - 3)(y - 9) = 0(x - 1)(x+5) = 0(y - 3)(y - 9) = 0(x - 1)(x+5) = 0(y - 3)(y - 9) = 0(x - 1)(x+5) = 0(y - 3)(y - 9) = 0(x - 1)(x+5) = 0(y - 3)(y - 9) = 0(x - 1)(x+5) = 0(y - 3)(y - 9) = 0(x - 1)(x+5) = 0(y - 3)(y - 9) = 0(x - 1)(x+5) = 0(y - 3)(y - 9) = 0(x - 1)(x+5) = 0(y - 3)(y - 9) = 0(x - 1)(x+5) = 0(y - 3)(y - 9) = 0(x - 1)(x+5) = 0(y - 3)(y - 9) = 0(x - 1)(x+5) = 0(y - 3)(y - 9) = 0(x - 1)(x+5) = 0	Correct position	B1	fractional scale
10. $26.7 = 11 \times d \text{ or } 26.7 = 2 \times 11 \times r \text{ or } r = 26.7/\Pi$ MI A1 M1 M1 miagonal = $side^2 + side^2$ side length = $6(.0096\text{cm})$ MI A1 A1 M2 M1 M1 M2 Perimeter = $24.(\text{cm})$ MI M1 M1 M1 M1 M1 M1 M1 M1 M1 M1 M1 M1 M2 M2 Perimeter = $24.(\text{cm})$ MI M1 M1 M1 M1 M1 M1 M1 M1 M1 M1 M1 M1 (i) $y = x$ and $y = -x$ indicated (2 quadrants for both)MI M1 M1 M1 M1 M1 M1 M1 M2 M2 M2 M2 M2 M2 M2 M2 M2 M1 M2 M3 M3 M4 M2 M4 <b< td=""><td></td><td>8</td><td></td></b<>		8	
Diagonal = 8,495 to 8,5(0) (cm) diagonal = 8,495 to 8,5(0) (cm)A1 diagonal = 8,495 to 8,5(0) (cm)A1 MI FT their diagonalside = diagonal - 2 side = diagonal - 2A1 A1FT their diagonalside = lagonal - 2 side = diagonal - 2A1 A1side = lagonal - 2 side = 1, 2, 2, 3, y = 9A1 A1Perimeter = 24.(cm)B1 FT provided both M marks awarded for 4x 'their side length'11.(a)(i) y = x and y = - x indicated (2 quadrants for both)B2B1 B1 for indication of appropriate points at least 3 in each of the 4 quadrants <i>Ignore any circles drawn</i> CAO. B1 for either equation(ii) y = x and y = - x or equivalentB2(b) x ² + y ² = 3 ² or x ² + y ² = 9B1 S12. sin XYZ/23.8 = sin123(°)/38.9 sin XYZ = 23.8 × sin123(°)/38.9 x ² + x(4-x) - 5 = 0M1 y ² - 12y + 27 = 0(x - 1)(x+5) = 0(y - 3)(y - 9) = 0M1 X = 1, x = -5(x - 1)(x+5) = 0(y - 3)(y - 9) = 0M1 X = 1, x = -5(x - 1)(x+5) = 0(y - 3)(y - 9) = 0M1 X = 1, x = -5(x - 1)(x+5) = 0(y - 3)(y - 9) = 0M1 X = 1, x = -5(x - 1)(x+5) = 0(y - 3)(y - 9) = 0M1 X = 1, x = -5(x - 1)(x+5) = 0(y - 3)(y - 9) = 0M1 X = 1, x = -5(x - 1)(x+5) = 0(y - 3)(y - 9) = 0M1 X = 1, x = -5(x - 1)(x+5) = 0(y - 3)(y - 9) = 0M1 X = 1, x = -5(x - 1)(x+5) = 0(y - 3)(y - 9) = 0M1 X = 1, x = -5(x - 1)(x+5) = 0(y - 3)(y - 9) = 0M1 X = 1, x = -5(x	10. 26.7 = $\Pi \times d$ or 26.7 = $2 \times \Pi \times r$ or $r = 26.7/\Pi$	M1	
InterformIf the induginalidid2 = diagonal/2idid2 = diagonal/2side1 = diagonal/2A1side1 = diagonal/2A1side1 = diagonal/2A1perimeter = 24.(cm)B111.(a)(i) y = x and y = - x indicatedB1(i) y = x and y = - x indicatedB1(ii) y = x and y = - x or equivalentB2(iii) y = x and y = - x or equivalentB2(iii) y = x and y = - x or equivalentB2(iii) y = x and y = - x or equivalentB2(iii) y = x and y = - x or equivalentB2(iii) y = x and y = - x or equivalentB2(iii) y = x and y = - x or equivalentB2(iii) y = x and y = - x or equivalentB2(iii) y = x and y = - x or equivalentB2(iii) y = x and y = - x or equivalentB2(iv) x ² + y ² = 3 ² or x ² + y ² = 9B1(iv) x ² + y ² = 3 ² or x ² + y ² = 9B1(iv) x ² + y ² = 3.8 × sin123(°)/38.9M1(iv) x ² + x ² = 30.8 x sin123(°)/38.9M1(iv) x ² + x ² = 30.8 x sin123(°)/38.9M1(iv) x ² + x ² = 30(iv) x ² + 4x + 3(iv) x ² + 4x - 5 = 0(iv) x ² + 4x + 5 = 0(iv) x ² + 4x - 5 = 0(iv) x ² + 4x + 5(iv) x ² + 4x - 5 = 0(iv) x ² + 4x + 5(iv) x ² + 3, y = 9(iv) x ² + 3, y = 9(iv) x ² + 4x + 5(iv) x ² + 3, y = 9(iv) x ² + 4x + 5(iv) x ² + 3, y = 9(iv) x ² + 4x + 5(iv) x ² + 4x + 5(iv) x ² + 4x + 5(iv) x ² + 4x + 5 <tr< td=""><td>Diagonal = 8.495 to $8.5(0)$ (cm)</td><td>Al M1</td><td>Accept rounded or truncated</td></tr<>	Diagonal = 8.495 to $8.5(0)$ (cm)	Al M1	Accept rounded or truncated
Side - utagonal 2 side length = 6(.0096cm)A1Do not FT from inappropriate truncation or incorrect rounding (e.g. from $d = 8.4$) Answer here for A1 should round to 6.01Perimeter = 24.(cm)B1FT provided both M marks awarded for 4× 'their 	diagonal ² = side ² + side ² side ² = diagonal ² /2		F1 their diagonal
IntermeterIntermeterIntermeterPerimeter = 24.(cm)B1 (2 quadrants for both)Incorrect rounding (e.g. from d = 8.4) Answer here for A1 should round to 6.01 FT provided both M marks awarded for 4x 'their 	side = diagonal /2 side length = $6(.0096 \text{ cm})$	A1 A1	Do not FT from inappropriate truncation or
Perimeter = 24.(,cm)Answer here for A1 should round to 6.01 FT provided both M marks awarded for 4x 'their side length'11.(a)(i) y = x and y = - x indicated (2 quadrants for both)B2B1 for either indicated in 2 quadrants, or both indicated in 1 quadrant each B1 for indicated in 1 quadrant each B1 for either indicated in 2 quadrants, or both 			incorrect rounding (e.g. from $d = 8.4$)
Perimeter = 24.(cm)B1 6FT provided both M marks awarded for 4x 'their side length'11.(a)(i) y = x and y = - x indicated (2 quadrants for both)B2B1 for either indicated in 2 quadrants, or both indicated in 1 quadrant each B1 for indicated in 1 quadrant each B1 for either equation(ii) y = x and y = - x or equivalentB2B1 CAO. B1 for either equation(b) $x^2 + y^2 = 3^2$ or $x^2 + y^2 = 9$ B1 SCAO12. sin XYZ/23.8 = sin123(°)/38.9 sin XYZ = 23.8 × sin123(°)/38.9 $xYZ = 30.871(°)$ rounded or truncated correctlyM1 A1 A1OR 23.8/sin XYZ = 38.9/sin123(°) OR sin^1 0.513 This M1 implies previous M113. $y = 4 - x$ $2x^2 + x(4 - x) - 5 = 0$ $x^2 + 4x - 5 = 0$ $y^2 - 12y + 27 = 0$ M1 A1 A1OR For sight of $x^2 + xy = 4x$ OR subtraction from 1st equation OR $x^2 + 4x = 5$ (x - 1)(x+5) = 0 $y = 3, y = 9$ M1 $x = 1, x = -5$ $y = 3, y = 9$ M1 $x = 1, x = -5$ FT provided quadratic from an appropriate substitution method or solve, e.g. formula with correct substitution and b²-4ac correctly simplified $x = 1, x = -5$ $y = 3, y = 9$ A1 $x = 1, x = -5$ A1 $A1$ $A1$ $f A0, A0$ then SC1 for $x = 1, y = 3$ OR $x = -5, y = 9$ provided algebraic method shown with appropriate M1, M1, M1 marks			Answer here for A1 should round to 6.01
11.(a)(i) $y = x$ and $y = -x$ indicatedB1If or either indicated in 2 quadrants, or both indicated in 1 quadrant each B1 for either indicated in 1 quadrant each B1 for indication of appropriate points at least 3 in each of the 4 quadrants Ignore any circles drawn CAO. B1 for either equation(ii) $y = x$ and $y = -x$ or equivalentB2B1CAO(b) $x^2 + y^2 = 3^2$ or $x^2 + y^2 = 9$ B1 Sin XYZ = 3.8 × sin123(°)/38.9 sin XYZ = 30.871(°) rounded or truncated correctlyM1 A1 3OR 23.8/sin XYZ = 38.9/sin123(°) OR sin ⁻¹ 0.513 This M1 implies previous M113. $y = 4 - x$ $2x^2 + x(4-x) - 5 = 0$ $x^2 + 4x - 5 = 0$ OR $x = 4 - y$ $2(4-y)^2 + (4-y)y - 5 = 0$ $x^2 + 4x - 5 = 0$ M1 $y = -12y + 27 = 0$ OR For sight of $x^2 + xy = 4x$ OR Subtraction from 1 st equation OR $x^2 + 4x = 5$ (x - 1)(x+5) = 0 $y = 3, y = 9$ (y - 3)(y - 9) = 0M1 A1FT provided quadratic from an appropriate substitution method to solve , e.g. formula with correct substitution and b ² -4ac correctly simplified $x = 1, x = -5$ $y = 3, y = 9$ OR $x = 1, x = -5$ A1 A1FT provided quadratic from an appropriate substitution and b ² -4ac correctly simplified $x = 1, x = -5$ $y = 3, y = 9$ OR $x = 1, x = -5$ A1 A1FT provided algebraic method to solve , e.g. formula with correct substitution and b ² -4ac correctly simplified $x = 1, x = -5$ $y = 9$ OR $x = 1, x = -5$ A1 A1 $f A0, A0$ then SC1 for $x = 1, y = 3$ OR $x = -5, y = 9$ provided algebraic method shown with appropriate M1, M1, M1 marks	Perimeter = 24.(cm)	BI 6	FT provided both M marks awarded for $4 \times$ 'their side length'
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B1 for indication of appropriate points at least 3 in each of the 4 quadrants Ignore any circles drawn CAO. B1 for either equation(ii) $y = x$ and $y = -x$ or equivalentB2(b) $x^2 + y^2 = 3^2$ or $x^2 + y^2 = 9$ B1 S12. sin XYZ/23.8 = sin123(°)/38.9 sin XYZ = 30.871 (°) rounded or truncated correctlyM1 A1 313. $y = 4 - x$ $2x^2 + x(4-x) - 5 = 0$ $x^2 + 4x - 5 = 0$ OR $2(4-y)^2 + (4-y)y - 5 = 0$ $y^2 - 12y + 27 = 0$ M1 M1 M1 M1 OR13. $y = 4, x$ $2x^2 + x(4-x) - 5 = 0$ $x^2 + 4x - 5 = 0$ OR $y = 3, y = 9$ N1 $x = 1, x = -5$ (x - 1)(x+5) = 0 $y = 3, y = 9$ M1 $x = 1, x = -5$ OR A1 A114FT provided quadratic from an appropriate substitution method to solve, e.g. formula with correct substitution and b²-4ac correctly simplified15. $y = 9$ $x = 1, x = -5$ 16N0 marks for trial & improvement methods	(2 quadrants for both)		indicated in 1 quadrant each
(ii) $y = x$ and $y = -x$ or equivalentB2each of the 4 quadrants Ignore any circles drawn CAO. B1 for either equation(b) $x^2 + y^2 = 3^2$ or $x^2 + y^2 = 9$ B1 SCAO12. sin XYZ/23.8 = sin123(°)/38.9 sin XYZ = 30.871 (°) rounded or truncated correctlyM1 A1 3OR 23.8/sin XYZ = 38.9/sin123(°) OR sin^{-1} 0.513 This M1 implies previous M113. $y = 4 - x$ $2x^2 + x(4-x) - 5 = 0$ $x^2 + 4x - 5 = 0$ OR $x = 4 - y$ $2(4-y)^2 + (4-y)y - 5 = 0$ $y^2 - 12y + 27 = 0$ M1 M1 M1 A1OR For sight of $x^2 + xy = 4x$ OR Subtraction from 1^{st} equation OR $x^2 + 4x = 5$ (x - 1)(x+5) = 0 $y = 3, y = 9$ (y -3)(y - 9) = 0M1 A1FT provided quadratic from an appropriate substitution method or subtraction method OR alternative method to solve , e.g. formula with correct substitution and b ² -4ac correctly simplified $x = 1, x = -5$ $y = 9$ A1 $x = 1, x = -5$ If A0, A0 then SCI for $x = 1, y = 3$ OR $x = -5, y = 9$ provided algebraic method shown with appropriate M1, M1, M1 marks6No marks for trial & improvement methods			B1 for indication of appropriate points at least 3 in
(ii) $y = x$ and $y = -x$ or equivalentB2CAO. B1 for either equation(b) $x^2 + y^2 = 3^2$ or $x^2 + y^2 = 9$ B1 Sin XYZ = 23.8 × sin123(°)/38.9 sin XYZ = 23.8 × sin123(°)/38.9 XYZ = 30.871(°) rounded or truncated correctlyM1 A1 3OR 23.8/sin XYZ = 38.9/sin123(°) OR sin^{-1} 0.513 This M1 implies previous M113. $y = 4 - x$ $2x^2 + x(4-x) - 5 = 0$ $x^2 + 4x - 5 = 0$ OR $x = 4 - y$ $2(4-y)^2 + (4-y)y - 5 = 0$ $y^2 - 12y + 27 = 0$ M1 M1 A1 OROR For sight of $x^2 + xy = 4x$ OR subtraction from 1st equation OR $x^2 + 4x = 5$ (x - 1)(x+5) = 0 $y = 3, y = 9$ (y - 3)(y - 9) = 0M1 A1FT provided quadratic from an appropriate substitution method or subtraction method OR alternative method to solve , e.g. formula with correct substitution and b ² -4ac correctly simplified $x = 1, x = -5$ $y = 3, y = 9$ A1 $x = 1, x = -5$ A1 A1 $f A0, A0$ then SC1 for $x = 1, y = 3$ OR $x = -5, y = 9$ provided algebraic method shown with appropriate M1, M1 marks6No marks for trial & improvement methods			each of the 4 quadrants
(b) $x^2 + y^2 = 3^2$ or $x^2 + y^2 = 9$ B1 5CAO12. sin XYZ/23.8 = sin123(°)/38.9 sin XYZ = 23.8 × sin123(°)/38.9 XYZ = 30.871(°) rounded or truncated correctlyM1 A1 3OR 23.8/sin XYZ = 38.9/sin123(°) OR sin ⁻¹ 0.513 This M1 implies previous M113. $y = 4 - x$ $2x^2 + x(4-x) - 5 = 0$ $x^2 + 4x - 5 = 0$ OR $x = 4 - y$ $2(4-y)^2 + (4-y)y - 5 = 0$ $y^2 - 12y + 27 = 0$ M1 M1 M1 A1 OROR For sight of $x^2 + xy = 4x$ OR Subtraction from 1st equation OR $x^2 + 4x = 5$ (x - 1)(x+5) = 0 $y = 3, y = 9$ (y - 3)(y - 9) = 0M1 A1FT provided quadratic from an appropriate substitution method to solve , e.g. formula with correct substitution and b²-4ac correctly simplified $x = 1, x = -5$ $y = 3, y = 9$ OR $x = 1, x = -5$ A1 A1 A1 $f A0, A0$ then SC1 for $x = 1, y = 3$ OR $x = -5, y = 9$ provided algebraic method shown with appropriate M1, M1, M1 marks6No marks for trial & improvement methods	(ii) $y = x$ and $y = -x$ or equivalent	B2	CAO. B1 for either equation
(b) $x^2 + y^2 = 3^2$ or $x^2 + y^2 = 9$ B1 5CAO12. sin XYZ/23.8 = sin123(°)/38.9 sin XYZ = 23.8 × sin123(°)/38.9 XYZ = 30.871(°) rounded or truncated correctlyM1 A1 3OR 23.8/sin XYZ = 38.9/sin123(°) OR sin^-1 0.513 This M1 implies previous M113. $y = 4 - x$ $2x^2 + x(4-x) - 5 = 0$ $x^2 + 4x - 5 = 0$ OR $x = 4 - y$ $2(4-y)^2 + (4-y)y - 5 = 0$ $y^2 - 12y + 27 = 0$ M1 M1 M1 A1 OROR For sight of $x^2 + xy = 4x$ OR Subtraction from 1st equation OR $x^2 + 4x = 5$ (x - 1)(x+5) = 0(y - 3)(y - 9) = 0M1 X = 1, $x = -5$ FT provided quadratic from an appropriate substitution method or subtraction method OR alternative method to solve, e.g. formula with correct substitution and b²-4ac correctly simplified $x = 1, x = -5$ $y = 3, y = 9$ OR $x = 1, x = -5$ A1 A1 A1 $A1$ $A1$ $A1$ A1 A1 $A1$ $A2$ $A3$ $A2$ $A3$ $A4$ $A1$ $A1$ $A3$ $A4$ $A1$ $A1$ $A3$ $A1$ $A2$ $A3$ $A4$ $A1$ $A4$ A			1
12. $\sin XYZ/23.8 = \sin 123(^{\circ})/38.9$ M1 $\sin XYZ = 23.8 \times \sin 123(^{\circ})/38.9$ M1 M1 A1 3OR $23.8/\sin XYZ = 38.9/\sin 123(^{\circ})$ OR $\sin^{-1} 0.513 This M1 implies previous M113. y = 4 - x2x^2 + x(4-x) - 5 = 0x^2 + 4x - 5 = 0OR x = 4 - y2(4-y)^2 + (4-y)y - 5 = 0y^2 - 12y + 27 = 0M1M1A1A1A1OR For sight of x^2 + xy = 4xOR Subtraction from 1^{st} equationOR x^2 + 4x = 5(x - 1)(x+5) = 0y = 3, y = 9(y - 3)(y - 9) = 0M1A1A1FT provided quadratic from an appropriatesubstitution method or subtraction methodOR alternative method to solve , e.g. formula withcorrect substitution and b^2-4ac correctly simplifiedx = 1, x = -5y = 3, y = 9ORx = 1, x = -5A1A1A1A1A1A1A1A1A1A1A1A1A1A1A1x = 1, x = -5A1$	(b) $x^2 + y^2 = 3^2$ or $x^2 + y^2 = 9$	B1 5	CAO
sin XYZ = $23.8 \times sin123(^{\circ})/38.9$ M1 A1 3OR sin^-1 0.513 This M1 implies previous M1XYZ = $30.871(^{\circ})$ rounded or truncated correctlyA1 3OR13. $y = 4 - x$ $2x^2 + x(4-x) - 5 = 0$ OR $x = 4 - y$ $2(4-y)^2 + (4-y)y - 5 = 0$ $y^2 - 12y + 27 = 0$ M1 	12. $\sin XYZ/23.8 = \sin 123(^{\circ})/38.9$	M1	OR 23.8/sin XYZ = 38.9/sin123(°)
XYZ = $30.8/1(^{\circ})$ rounded or truncated correctlyA1 313. $y = 4 - x$ $2x^2 + x(4-x) - 5 = 0$ $x^2 + 4x - 5 = 0$ OR $2(4-y)^2 + (4-y)y - 5 = 0$ $y^2 - 12y + 27 = 0$ M1 A1OR OR Subtraction from 1st equation OR $x^2 + 4x = 5$ (x - 1)(x+5) = 0(y - 3)(y - 9) = 0M1 A1FT provided quadratic from an appropriate substitution method or subtraction method OR alternative method to solve , e.g. formula with correct substitution and b²-4ac correctly simplifiedx = 1, x = -5 y = 3, y = 9OR x = 1, x = -5A1 A1If A0, A0 then SC1 for x = 1, y = 3 OR x = -5, y = 9 provided algebraic method shown with appropriate M1, M1, M1 marks6No marks for trial & improvement methods	$\sin XYZ = 23.8 \times \sin 123(^{\circ})/38.9$	M1	OR sin ⁻¹ 0.513 This M1 implies previous M1
13. $y = 4 - x$ $2x^2 + x(4-x) - 5 = 0$ $x^2 + 4x - 5 = 0$ OR $2(4-y)^2 + (4-y)y - 5 = 0$ $y^2 - 12y + 27 = 0$ M1 M1 A1OR OR Subtraction from 1st equation OR $x^2 + 4x = 5$ $(x - 1)(x+5) = 0$ $(x - 1)(x+5) = 0$ $(y - 3)(y - 9) = 0$ M1FT provided quadratic from an appropriate substitution method or subtraction method OR alternative method to solve , e.g. formula with correct substitution and b²-4ac correctly simplified $x = 1, x = -5$ $y = 3, y = 9$ OR $x = 1, x = -5$ $y = 3, y = 9$ A1 $y = 3, y = 9$ A1 $x = 1, x = -5$ A1 A1If A0, A0 then SC1 for $x = 1, y = 3$ OR $x = -5, y = 9$ provided algebraic method shown with appropriate M1, M1, M1 marks6No marks for trial & improvement methods	XYZ = 30.871(°) rounded or truncated correctly	3	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	13. $y = 4 - x$ OR $x = 4 - y$	M1	OR For sight of $x^2 + xy = 4x$
$x^{-} + 4x - 5 = 0$ $y^{-} - 12y + 27 = 0$ AlOR $x^{2} + 4x = 5$ $(x - 1)(x + 5) = 0$ $(y - 3)(y - 9) = 0$ M1FT provided quadratic from an appropriate substitution method or subtraction method OR alternative method to solve, e.g. formula with correct substitution and b ² -4ac correctly simplified $x = 1, x = -5$ OR $y = 3, y = 9$ A1 $y = 3, y = 9$ $x = 1, x = -5$ A1 $y = 3, y = 9$ $x = 1, x = -5$ A1 $A1$ $A2$ $A2$ $A3$ $A1$ $A3$ $A3$ $A4$ $A3$ $A4$	$2x^{2} + x(4-x) - 5 = 0 \qquad 2(4-y)^{2} + (4-y)y - 5 = 0$	M1	OR Subtraction from 1^{st} equation
(x - 1)(x+5) = 0 $(y - 3)(y - 9) = 0$ M1FT provided quadratic from an appropriate substitution method or subtraction method OR alternative method to solve, e.g. formula with correct substitution and b ² -4ac correctly simplified $x = 1, x = -5$ OR $y = 3, y = 9$ A1 $y = 3, y = 9$ $x = 1, x = -5$ A1A1If A0, A0 then SC1 for $x = 1, y = 3$ OR $x = -5, y = 9$ provided algebraic method shown with appropriate M1, M1, M1 marks6No marks for trial & improvement methods	$x^2 + 4x - 5 = 0 \qquad \qquad y^2 - 12y + 27 = 0$	A1	$OR x^2 + 4x = 5$
x = 1, x = -5OR $y = 3, y = 9$ A1 $y = 3, y = 9$ $x = 1, x = -5$ A1 $A1$ A1 $A2$ $A2$ $A2$ $A3$ $A3$ $A3$ $A4$ $A4$ $A1$ $A4$ $A2$ $A4$ $A3$ $A4$ <t< td=""><td>(x - 1)(x+5) = 0 $(y - 3)(y - 9) = 0$</td><td>M1</td><td>FT provided quadratic from an appropriate</td></t<>	(x - 1)(x+5) = 0 $(y - 3)(y - 9) = 0$	M1	FT provided quadratic from an appropriate
$x = 1, x = -5$ $y = 3, y = 9$ OR $x = 1, x = -5$ $y = 3, y = 9$ OR $x = 1, x = -5$ OR A1 A1OR alternative method to solve , e.g. formula with correct substitution and b^2 -4ac correctly simplified $A1$ $A1$ A1A1 $If A0, A0$ then SC1 for $x = 1, y = 3$ OR $x = -5, y = 9$ provided algebraic method shown with appropriate M1, M1, M1 marks 6 No marks for trial & improvement methods			substitution method or subtraction method
x = 1, x = -5 $y = 3, y = 9$ OR $x = 1, x = -5$ $y = 3, y = 9$ Correct substitution and b²-4ac correctly simplified $A1$ $A1$ $A1$ $A1$ $A1$ $A1$ $A1$ $A1$ $If A0, A0$ then SC1 for $x = 1, y = 3$ OR $x = -5, y = 9$ provided algebraic method shown with appropriate M1, M1, M1 marks 6 No marks for trial & improvement methods			OR alternative method to solve , e.g. formula with
$ \begin{array}{c} x = 1, x = -3 \\ y = 3, y = 9 \end{array} \begin{array}{c} OK \\ x = 1, x = -5 \end{array} \end{array} \begin{array}{c} A1 \\ A1 \\ If A0, A0 \ then \ SC1 \ for \ x = 1, \ y = 3 \ OR \ x = -5, \ y = 9 \\ provided \ algebraic \ method \ shown \ with \\ appropriate \ M1, \ M1 \ marks \end{array} $	x = 1, x = 5 OD $x = 2, 0$	A 1	correct substitution and b ² -4ac correctly simplified
<i>If A0, A0 then SC1 for x= 1, y=3 OR x= -5, y=9</i> <i>provided algebraic method shown with</i> <i>appropriate M1, M1, M1 marks</i> <i>6 No marks for trial & improvement methods</i>	$ \begin{array}{c} x = 1, x = -3 \\ y = 3, y = 9 \end{array} $ OK $y = 3, y = 9 \\ x - 1, x5 \end{array} $	AI A1	
provided algebraic method shown with appropriate M1, M1, M1 marks 6 No marks for trial & improvement methods	$ \begin{array}{c} y = 0, \ y = 0 \end{array} $	111	If A0, A0 then SC1 for $x = 1$, $y = 3$ OR $x = -5$, $y = 9$
appropriate M1, M1 marks 6 No marks for trial & improvement methods			provided algebraic method shown with
6 No marks for trial & improvement methods			appropriate M1, M1, M1 marks
		6	No marks for trial & improvement methods

Methods in Mathematics Unit 2 Higher Tier June 2014	Mark	Comment
14(a) 6:2 and 7:QR or equivalent, or scale factor 7/6	B1	OR 6:8 and 7: PR or equivalent
$QR = 2 \times 7 \div 6$ or equivalent	M1	OR $\mathbf{PR} = 7 \times 8 \div 6 (= 9.33)$ or equivalent
QR = 2.3(33cm)	A1	
(b) $AE = 4x$ AE = 5.5 v	B1 B1	
(Perimeter -) 6x + 85y or 6x + 17y/2 ISW	B1	CAO Must be simplified
(1 crimeter =) 0x + 0.5y or 0x + 1/y/2 is w	DI	Accept $\frac{1}{2}(12x + 17y)$
	6	Answers of $4x + 5.5y + 2x + 3y$ imply B1, B1, B0
15. $b = 45(^{\circ})$	B1	
$c = 180(^{\circ})$	B1	
	2	
16(a) HK = HL + LK (= $5x + 6y + 3x - 6y$)	M1	
$= 8\mathbf{x} (+0\mathbf{y})$	A1	
(b)(i) $LN = 3x - 6y + 18x - 36y (=21x - 42y)$	M1	
k = 7	A1	May be embedded. Award M1, A1 for sight of k=7
(ii) Collinear (or lie along the same straight line)	B1	Do not accept parallel as a full description
	5	
17. Area of the square base = $119.8 - 4 \times 23.6$	M1	
$= 25.4(\text{cm}^2)$	A1	
(Volume pyramid) $76.4 = \frac{1}{3} \times 25.4 \times \text{height}$	m1	FT their area of square base Note $\sqrt{25.4} = 5.0398 \times 5.0398$
height = 9.02 cm	A1*	
(Volume cone) $44.4 = \frac{1}{3} \times \pi \times r^2 \times \text{height}$	M1*	Depends on all previous method marks, FT their height
$r^2 = 44.4/(\frac{1}{3} \times \pi \times height)$	M1	FT equivalent difficulty, isolating r^2
	A1	CAO.
$r^2 = (44.4 \times \frac{1}{3} \times 25.4) / (76.4 \times \frac{1}{3} \times \pi)$		OR $r^2 = 4.7$, or an appropriate unrounded r, r =
$r^2 = 4.69$ to 4.701		2.1681875 to 2.17
(radius) 2.17 or 2.2 (cm)	A1	CAO.
		Appropriate degree of accuracy required
		Alternative for A1*, M1*
		Equating heights, $76.4 \pm 0.04 \times 25.4$ = 44.4 $\pm 0.04 \times 10^{-2}$
		$(0.4 / (7_3 \times 25.4) = 44.4 / (7_3 \times \pi \times r))$
		For information:
		$Common \ height = 9.02(cm)$
	8	<i>Height of a triangular face = $9.37(cm)$</i>

GCSE Methods in Mathematics MS Summer 2014