

Paper: 1MA1/3H				
Question	Working	Answer	Mark	Notes
17		14.4	P1	for start of process, eg $0.5 \times 11 \times CD \times \sin 105 = 56$
Q1			P1	for complete process to find CD , eg $(CD =) \frac{56}{0.5 \times 11 \times \sin 105}$ oe (= 10.54)
			P1	for process to find AC , eg $(AC^2 =) 11^2 + [CD]^2 - 2 \times 11 \times [CD] \times \cos 105$ ($AC = 17.09$)
			P1	for process to find AB , eg $\frac{AB}{\sin 48} = \frac{[AC]}{\sin 118}$
			A1	answer in range 14.3 to 14.4

Paper: 1MA1/1H				
Question	Working	Answer	Mark	Notes
22		Proof		
Q2	$\cos PBQ = \frac{10^2 + 10^2 - x^2(2 - \sqrt{3})}{200}$ $= \frac{200 - x^2(2 - \sqrt{3})}{200}$		B1	(indep) for stating $\cos 30 = \frac{\sqrt{3}}{2}$
			M1	for $PQ^2 = 10^2 + 10^2 - 2 \times 10 \times 10 \times \cos PBQ$ or $AC^2 = x^2 + x^2 - 2 \times x \times x \times \cos 30 (=x^2(2-\sqrt{3}))$ oe
			M1	for $\cos PBQ = \frac{10^2 + 10^2 - PQ^2}{2 \times 10 \times 10}$ (implies previous M1)
			M1	for $\cos PBQ = \frac{10^2 + 10^2 - (x^2 + x^2 - 2 \times x \times x \times \cos 30)}{2 \times 10 \times 10}$
			A1	conclusion of proof with all working seen

Paper 1MA1: 3H				
Question	Working	Answer	Mark	Notes
15		2.63	P1	for setting up the expression $\frac{1}{2}(x+3)(2x-1)\sin 45$ (may be seen in an equation)
Q3			P1	(dep) for expanding the brackets in the expression or for the equation $\frac{1}{2}(x+3)(2x-1)\sin 45 = 6\sqrt{2}$ oe
			P1	(dep) for the process to set up the equation and rearrange to the form $ax^2 + bx + c = d$ e.g. to $2x^2 + 5x - 27 = 0$ or $24 = 2x^2 + 5x - 3$
			P1	(dep) for substitution into the quadratic formula e.g. $\frac{-5 \pm \sqrt{5^2 - 4 \times 2 \times -27}}{4}$
			A1	for 2.63(10436...)

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
Q4	13.1	P1	for start of process to find the length of BD , eg $\frac{BD}{\sin 34^\circ} = \frac{12.5}{\sin 109^\circ}$	Accept 7.4 for the award of the first two P marks If an answer is given within the range and then incorrectly rounded to 3 sig figs award full marks.
		P1	for complete process to find the length of BD , eg $BD = \frac{12.5}{\sin 109^\circ} \times \sin 34^\circ (= 7.39\dots)$	
		P1	for process to find the length of AD , eg $AD^2 = 11.4^2 + "7.39^2" - 2 \times 11.4 \times "7.39" \times \cos 86^\circ$	
		P1	for process to use correct order of operations, eg $129.96 + 54.6(5\dots) - 11.7(5\dots) (= 172.85\dots)$	
		A1	for answer in the range 13.1 to 13.2	

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Question	Answer	Mark	Mark scheme	Additional guidance
14	36	P1	for process to find an expression for the area of triangle eg $\frac{1}{2} \times 24 \times AE \times \sin 30 (= 6AE)$	Accept any correct expression, eg $\frac{1}{2} \times 24 \times y \times \sin 30$
Q5		P1	(dep P1) for process to link the area of rectangle with the area of the triangle eg $2 \times \frac{1}{2} \times 24 \times AE \times \sin 30 (= 12AE)$ or for $AB = 12$	May be shown on the diagram by labelling AE and AB with, for example, $3x, x$ or $x, \frac{1}{3}x$ or $\frac{3}{4}x, \frac{1}{4}x$ Do not accept 3, 1 or $1, \frac{1}{3}$ or $\frac{3}{4}, \frac{1}{4}$ for this mark.
		P1	(indep) for use of given ratio eg $AE = 3AB$ oe, eg area of rectangle = $AE \times AB = 3x \times x$	
		A1	cao	

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Question	Answer	Mark	Mark scheme	Additional guidance
Q6	098.6	P1	for using bearings to determine ABC as 67°	Accept 67 written on the diagram. Accept correct substitution into RHS of equation Accept AC in the range 9.41 to 9.42 Accept any equivalent form with values substituted If the correct answer is given without supportive evidence award 0 marks. Condone missing "0" at the front. If an answer within the range is seen in working and rounded incorrectly award full marks.
		P1	for using the cosine rule to find AC eg $(AC^2 =) 9^2 + 8^2 - 2 \times 9 \times 8 \times \cos[67]$ oe or $AC = 9.4199\dots$	
		P1	(dep P1) for using the sine rule to find angle BAC eg $\frac{9}{\sin BAC} = \frac{"9.42"}{\sin[67]}$ oe OR for using the cosine rule to find angle BAC eg $9^2 = "9.42^2" + 8^2 - 2 \times "9.42" \times 8 \times \cos BAC$ oe	
		P1	for rearranging eg $\sin BAC = 9 \times \frac{\sin[67]}{"9.42"}$ oe OR eg $\cos BAC = ("9.42^2" + 8^2 - 9^2) \div (2 \times "9.42" \times 8)$ oe OR for angle $BAC = 61.57\dots$	
		A1	for angle in the range 98.5 to 98.6	

Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
13	15.4	M1	for $\frac{AB}{\sin 34} = \frac{23.8}{\sin 120}$ or $\frac{\sin 34}{AB} = \frac{\sin 120}{23.8}$	“120” comes from 180 – 26 – 34
Q7		M1	for $(AB =) \frac{23.8}{\sin 120} \times \sin 34$	If an answer in the range 15.36 to 15.4 is given in the working space then incorrectly rounded, award full marks
		A1	for answer in range 15.36 to 15.4	

Paper: 1MA1/2H					
Question	Answer	Mark	Mark scheme	Additional guidance	
15 Q8	(a)	11.4	M1	for start to method to find the length of BC eg. $8^2 + 11^2 - 2 \times 8 \times 11 \times \cos 72$	If an answer within the given range is seen in working and rounded incorrectly award full marks. Any alternative method must be complete If an answer within the given range is seen in working and rounded incorrectly award full marks.
			M1	(dep on M1) for method to use correct order of operations, eg. $64 + 121 - 54.38\dots (= 130.61\dots)$	
			A1	for answer in the range 11.4 to 11.5	
	(b)	41.8	M1	for $0.5 \times 8 \times 11 \times \sin 72 (= 41.8\dots)$	
			A1	for answer in the range 41.5 to 41.9	

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Question	Answer	Mark	Mark scheme	Additional guidance
23	Proof (supported)	M1	for using the sine rule on triangle ABD or on triangle ADC , to involve sides AB, BD, AC , or DC eg $\frac{AB}{\sin ADB} = \frac{BD}{\sin x}$ oe or $\frac{AC}{\sin ADC} = \frac{DC}{\sin x}$ oe OR for an expression for the area of triangle ABD or for the area of triangle ADC eg $\frac{1}{2} AB AD \sin x$ or $\frac{1}{2} AD AC \sin x$ or $\frac{1}{2} h BD$ or $\frac{1}{2} h DC$	Accept extra letters eg y shown on diagram for any angle used
Q9		M1	for using the sine rule on both triangle ABD and on triangle ADC , to involve sides AB, BD, AC , or DC eg $\frac{AB}{\sin ADB} = \frac{BD}{\sin x}$ oe and $\frac{AC}{\sin ADC} = \frac{DC}{\sin x}$ oe OR for two expressions for the area of either triangle ABD or for triangle ADC eg $\frac{1}{2} AB AD \sin x$ and $\frac{1}{2} h BD$ or $\frac{1}{2} AD AC \sin x$ and $\frac{1}{2} h DC$	
		M1	for stating or showing $\sin ADB = \sin ADC$, eg $\sin y = \sin (180 - y)$ OR for using two expressions to form an equation eg $\frac{\frac{1}{2} AB AD \sin x}{\frac{1}{2} AD AC \sin x} = \frac{\frac{1}{2} h BD}{\frac{1}{2} h DC}$ oe	
		C1	for a full method to arrive at the given answer	

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Question	Answer	Mark	Mark scheme	Additional guidance
Q10	39.9	P1	for finding the length of the minor or major arc eg $\frac{220}{360}\pi \times 12$ (= 23(.03834..))	Allow appropriate rounding if calculation seen in parts
		P1	for substituting into the sine or cosine rule to find OD eg $14 \div \sin 140 = OD \div \sin 24$ or ($OD^2 = 6^2 + 14^2 - 2 \times 6 \times 14 \times \cos 24$ (=78.5....))	Must involve OD in the relationship but may be implied
		P1	for a complete process to find the length OD eg $14 \div \sin 140 \times \sin 24$ (=8.8(58778..))	
		P1	for a complete process to find the perimeter eg “23(.03834..)” + 14+ “8.8(58778..)” – 6	May be seen in multiple calculations
		A1	for an answer in the range 39.8 to 40	If an answer in the range is seen in working and then incorrectly rounded award full marks.

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
Q11	1.95	P1	for correct substitution into the cosine rule, eg $3.4^2 = 6.1^2 + 6.2^2 - 2 \times 6.1 \times 6.2 \times \cos BCA$	Can be any angle within triangle ABC P2 can be awarded for $BCA = 32(.08046913\dots)$ Must not come from incorrect processing
		P1	for a full process to find BCA eg $(\cos BCA =) \frac{6.1^2 + 6.2^2 - 3.4^2}{2 \times 6.1 \times 6.2}$ or $(BCA =) 32(.08046913\dots)$	
		P1	correct substitution into the sine rule, eg $\frac{DC}{\sin("32.08\dots" \times \frac{2}{5})} = \frac{6.2}{\sin(180 - "32.08\dots" - ("32.08\dots" \times \frac{2}{5}))}$	
		P1	for complete process to find DC eg $(DC =) \frac{6.2 \times \sin "12.832"}{\sin "135.088"}$	
		A1	Answer in the range 1.94 to 1.951	

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
22 Q12	$\frac{65}{214}$	B1	for $\sin 30 = 0.5$	
		P1	for use of the sine rule with values substituted, eg $\frac{6.5}{\sin ABC} = \frac{10.7}{\sin 30}$ oe	
		P1	for $(\sin ABC =) \frac{6.5 \times \sin 30}{10.7}$ oe or for a complete process to find $\sin ABC$, eg $(\sin ABC =) \frac{6.5 \times [0.5]}{10.7}$ oe	Answer of $\frac{3.25}{10.7}$ or $\frac{6.5}{21.4}$ gets 3 marks Where [0.5] is their value of $\sin 30$
		A1	for $\frac{65}{214}$ oe eg $\frac{325}{1070}$	Answer must be in the form $\frac{m}{n}$ where m and n are integers

Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
18	21.3	P1	for $\frac{1}{2} \times 11.2 \times 4.3 \times \sin(118)$	
Q13		A1	answer in the range 21.26 to 21.3	If a correct answer within the range is shown in working but incorrectly rounded award full marks

Paper: 1MA1/3H				
Question	Answer	Mark	Mark scheme	Additional guidance
Q14	15.8	P1	starts process by finding an angle, eg exterior angle = $360 \div 7 (= 51.42\dots)$ or interior angle = $\frac{900}{7}$ or $180 - (360 \div 7) (= 128.57\dots)$ oe	Accept values to 3 figures rounded or truncated Any symbols used in formulae must be consistent with any labels on the diagram. For this mark, [128.5...] does not have to come from a correct process but is the value that the student believes is the interior angle.
		P1	start of process to find length of side by using area, eg $\frac{1}{2} \times AB \times AG \times \sin GAB = 30$ oe or $\frac{1}{2} \times a \times b \times \sin [128.5 \dots] = 30$ oe or $\frac{1}{2} \times x \times x \times \sin [128.5 \dots] = 30$ oe or $\frac{1}{2} \times AG \times \frac{1}{2}GB \times \sin AGB = 15$ oe or for a relationship linking GB and h , $\frac{1}{2} \times GB \times h = 30$ oe	
		P1	for process to find the length of a side of the polygon eg $\sqrt{\frac{2 \times 30}{\sin "128.5\dots"}}$ oe (= 8.76...) or for process to get a second relationship linking AG and $\frac{1}{2}GB$, eg $AG \times \cos "25.7\dots" = \frac{1}{2}GB$ oe or for process to get a second relationship linking GB and h , eg $\tan "25.7\dots" = \frac{h}{\frac{1}{2}GB}$ oe	

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Q15	7.63	M1	for process to use the cosine rule to find QR , eg $(QR^2 =) 11^2 + 9.4^2 - 2 \times 11 \times 9.4 \cos(27)$	<p>$[QR]$ could be written as “5.009...” or could be a different figure, as long as this is clearly associated with the side QR</p> <p>If an answer is given in the range in working and then rounded incorrectly award full marks. Award 0 marks for a correct answer with no (or incorrect) supportive working</p>
		M1	for correct order of operations, eg $QR = \sqrt{209.36 - 206.8 \times \cos 27}$ (= 5(.009...)) or $QR = \sqrt{25(.09...)} \text{ or } \sqrt{25.1}$	
		M1	(dep on M1) for process to use the sine rule, eg $\frac{QS}{\sin 88} = \frac{[QR]}{\sin 41}$ oe or $QS = \frac{[QR] \times \sin 88}{\sin 41}$ (= 7.631...) oe	
		A1	for answer in range 7.61 to 7.632	