Paper: 1MA1/1H				
Question	**Working**	**Answer**	**Mark**	**Notes**
4 **Q1**		Daisy is wrong (supported)	P1 P1 A1 C1	for process to find area of any relevant circle ie $\pi\times4^2$ (=16π), $\pi\times7^2$ (=49π), $\pi\times10^2$ (=100π) **or** 7^2 and 4^2 for completed method to find shaded area eg "$\pi\times7^2$" – "$\pi\times4^2$" (=33π) **or** use of radii eg $7^2 - 4^2$ (=33) for 2 comparable figures, eg 33π and 100π **or** 33 and 100 **or** 103 to 103.7 and 314 to 314.2 **or** 103 to 103.7 and 104.6 to 104.8 statement eg No because it should be $\frac{33}{100}$ and their accurate figures Allow use of π = 3 or better

Paper: 1MA1/2H				
Question	Working	Answer	Mark	Notes
20 **Q2**		68.5	B1	for angle $OAB = 90°$ or angle $OCB = 90°$, may be seen on diagram
			P1	for a process to find the length of AB or the length of CB (= $10\sqrt{3}$ oe) eg $10 \times \tan 60°$ (= 17.3...) or the length of OB (= 20), eg $10 \div \cos 60°$
			P1	for a process (dep previous P1) to find the area of the triangle OAB (= $50\sqrt{3}$ oe) or area of triangle OCB (= $50\sqrt{3}$ oe) or area of kite $OABC$ (= $100\sqrt{3}$ oe)
			P1	for a process to find the area of the sector OAC e.g. $\frac{1}{3} \times \pi \times 10^2$ (= 104.7...), accept rounded or truncated to 3 significant figures or more
			A1	for $68.4 - 68.6$

Paper: 1MA1/2H				
Question	Working	Answer	Mark	Notes
17 **Q3**		66.5	B1	for recognising an angle of 60 at *AOB*
			P1	for a process to find the area of the sector, e.g. $\frac{"60"}{360} \times \pi \times 11^2$ $(= 63.3..$ or $\frac{121\pi}{6})$
			P1	for a process to find the area of the triangle, e.g. $\frac{1}{2} \times 7^2 \times \sin "60"$ $(=21.2..$ or $\frac{49\sqrt{3}}{4})$
			P1	for a process to find the required percentage, eg. $\frac{"63.3.."-"21.2.."}{"63.3.."} \times 100$
			A1	for answer in the range 66.5 to 66.6

Paper: 1MA1/2H				
Question	**Working**	**Answer**	**Mark**	**Notes**
21 **Q4**		8600	P1	for process to find the length of the rectangle, e.g. 24×4 (= 96)
			P1	for process to find the perpendicular height of an equilateral triangle of side (24×2) cm, e.g. 48sin60 (= 41.5(69..)) or $\sqrt{48^2 - 24^2}$ (= $24\sqrt{3}$ oe)
			P1	for complete process to find the width of rectangle, e.g. "41.5(69..)" + 24 + 24 (= 89.5(69..))
			A1	for answer in the range 8592 to 8602

Paper: 1MA1/2H

Question	Answer	Mark	Mark scheme	Additional guidance
12 **Q5**	25.4	P2	for finding the size of the angle eg $\dfrac{40 \times 360}{\pi \times 7^2}$ (=93.5(4..)) **or** for working with proportion, eg $\dfrac{40}{49\pi}$ (=0.259(8…) or 0.26) **or** $\dfrac{49\pi}{40}$ (=3.84(8…) or 3.85)	
		(P1	for finding the area of the circle eg $\pi \times 7^2$ (=153(.938..) or 154))	May be embedded
		P1	(dep on P2) for a process to find the arc length, eg $\dfrac{"93.5(4...)"}{360} \times \pi \times 2 \times 7$ (=11.4(28…)) **or** $\dfrac{40}{49\pi} \times \pi \times 2 \times 7$ (=11.4(28…)) **or** $\pi \times 2 \times 7 \div \dfrac{49\pi}{40}$ (=11.4(28…))	
		A1	for answer in the range 25 to 25.44	If an answer is shown in the range in working and then incorrectly rounded award full marks. Accept $\dfrac{178}{7}$

Paper: 1MA1/1H

Question	Answer	Mark	Mark scheme	Additional guidance
22 **Q6**	0.5	P1	derive an algebraic expression for the area of A eg $\frac{1}{8}\pi\,[\,(5x-1)^2-(3x-1)^2\,]$	
		P1	expand and simplify for either area A or area B eg $\frac{1}{8}\pi\,(16x^2-4x)$ **or** $\pi(x^2-2x+1)$	
		P1	(dep P2) equate and rearrange into a quadratic eqn of the form $ax^2+bx+c=0$ eg $2x^2+3x-2=0$	
		P1	(dep P3) factorise eg $(2x-1)(x+2)=0$ **or** use of formula eg $\dfrac{-3\pm\sqrt{3^2-4\times2\times-2}}{2\times2}$	
		A1	oe	Accept only the single value of 0.5 oe but award 0 marks for a correct answer with no supportive working

Paper: 1MA1/3H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
7 **Q7**	18.3	P1	for finding the area of the triangle eg $0.5 \times 8 \times 8$ (= 32)	Accept rounded or truncated figures
		P1	for finding the area of the circle $\pi \times 8 \times 8$ (= 201.06..)	
		P1	for finding the area of the sector eg $\frac{1}{4} \times \pi \times 8^2$ **or** "201.06.." ÷ 4 (= 50.26...)	
		A1	for an answer in the range 18.2 to 18.3	If the answer is given within the range but then rounded incorrectly award full marks.

Paper: 1MA1/1H				
Question	Answer	Mark	Mark scheme	Additional guidance
7 **Q8**	shown	C1	for method to find area of semicircle, eg $\pi \times 10^2 \div 2 \ (= 50\pi)$	Can award first 3 marks if a value for π is used
		C1	for method to find area of quarter circle, for $\pi \times 20^2 \div 4 \ (= 100\pi)$	
		C1	for a complete method to find area shaded **and** area of square, eg $\pi \times 20^2 \div 4 - \pi \times 10^2 \div 2$ **and** 20×20	Working out to find the area of the shaded region **must** be shown
		C1	fully correct working leading to $\dfrac{\pi}{8}$	

Paper: 1MA1/2H				
Question	Answer	Mark	Mark scheme	Additional guidance
13 **Q9**	84.9	P1	shows a process to find the radius or diameter eg $44 = 2 \times \pi \times r$ **or** $r = \dfrac{22}{\pi}$ **or** $d = \dfrac{44}{\pi}$ **or** $r = 7.0028$ **or** $d = 14.0056..$	Allow r in the range 7 to 7.1 and d in the range 14 to 14.1 Could be shown on the diagram.
		P1	(dep on P1) complete method to find the area eg $\frac{1}{2} \times$ "d"$^2 \times \text{Sin}60$ oe, $\frac{1}{2} \times 14 \times \text{Tan}60$ oe, $\frac{1}{2} \times 14 \times \sqrt{14^2 - 7^2}$ oe	
		A1	for answer in the range 84.8 to 85	If the correct answer in the range is given in working and then rounded incorrectly award full marks.

Paper: 1MA1/1H				
Question	**Answer**	**Mark**	**Mark scheme**	**Additional guidance**
15 **Q10**	40	P1	for a start to the process, eg $\dfrac{x}{360}\times 2\times\pi\times 18\,(=4\pi)$ oe or $\dfrac{4\pi}{2\times\pi\times 18}\,(=\dfrac{x}{360})$ oe	Any arrangement equivalent to this equation acceptable
		P1	for a complete process to find x, eg $\dfrac{4\pi}{36\pi}\times 360$ oe	
		A1	cao	

Paper: 1MA1/1H

Question	Answer	Mark	Mark scheme	Additional guidance
21 **Q11**	$16\sqrt{3} - \dfrac{16\pi}{3}$	P1	for identifying an angle of 60 or 120	
		P1	for process to find the area of a sector of angle 60 or 120 eg $\pi 4^2 \times \dfrac{60}{360}$ $(= \dfrac{8\pi}{3})$ or $\pi 4^2 \times \dfrac{120}{360}$ $(= \dfrac{16\pi}{3})$	
		P1	for process to find the area of an equilateral triangle eg $\dfrac{1}{2} \times 4 \times 4 \times \sin 60$ $(= 4\sqrt{3})$ **or** $\dfrac{4 \times \sqrt{4^2 - 2^2}}{2}$ $(= 2\sqrt{12}$ or $4\sqrt{3})$ **or** the area of an isosceles triangle **or** area of a right-angled triangle eg $\dfrac{1}{2} \times 4 \times 4 \times \sin 120$ $(= 4\sqrt{3})$ **or** $\dfrac{2 \times \sqrt{4^2 - 2^2}}{2}$ $(= \sqrt{12}$ or $2\sqrt{3})$	
		P1	for using area of sector – area of triangle to find area of a segment eg $\pi 4^2 \times \dfrac{60}{360} - \dfrac{1}{2} \times 4 \times 4 \times \sin 60$ $(= \dfrac{8\pi}{3} - 4\sqrt{3})$ **or** $\pi 4^2 \times \dfrac{120}{360} - \dfrac{1}{2} \times 4 \times 4 \times \sin 120$ $(= \dfrac{16\pi}{3} - 4\sqrt{3})$	
		A1	for $16\pi - 4(\dfrac{16\pi}{6} - 4\sqrt{3} + \dfrac{16\pi}{6})$ or $16\sqrt{3} - \dfrac{16\pi}{3}$ oe	Does not need to be in simplest form

Paper: 1MA1/2H				
Question	**Working**	**Answer**	**Mark**	**Notes**
3 (a) **Q12**		31.4	P1	for working with circumference formula, eg $\pi \times 80$ (=251. …) oe
			A1	for answer in the range 31.4 to 31.5 accept 10π!
(b)		No (supported)	C1	Mean distance stays the same with reason, eg total distance remains unchanged or same number of points