

Area of Circles & Segments Mark Scheme		
1	<p>The diagram consists of six circles arranged vertically. Each circle has an 'X' marking a specific part. Arrows point from labels on the right to these parts:</p> <ul style="list-style-type: none"> Arc: Points to the curved part of the top circle. Chord: Points to a horizontal line segment across the second circle. Sector: Points to a wedge-shaped region in the third circle. Radius: Points to a line from the center to the circumference in the fourth circle. Diameter: Points to a horizontal line through the center of the fifth circle. Tangent: Points to a line touching the bottom circle at a single point. 	[5] Mark for each correctly matched term
2(a)	$2 \times 3.7 = 7.4 \text{ m}$	[1] Diameter of the circle
2(b)	$C = \pi d$ or $7.4 \times \pi = 23.2478$	[1] Correct circumference
	$C = 23.25 \text{ m}$	[1] Correct rounding required
3(a)	Diameter = $2 \times r = 2 \times 3.6 = 7.2 \text{ cm}$	[1] Multiplication of radius by 2
	Circumference = $\pi \times d = 2 \times \pi \times r = 7.2\pi \text{ cm}$	[1] Correct circumference in terms of π
3(b)	Area = $\pi \times r^2 = \pi \times 3.6^2$	[1] Correct calculation
	$= 12.96 \pi = 40.7 \text{ cm}^2$	[1] Correct area to 1 decimal place
4	Perimeter of semi-circle arc: $\frac{1}{2} \times \pi \times d = \frac{1}{2} \times \pi \times 16 = 8\pi \text{ cm}$	[1] Correct calculation
	Perimeter of diameter = 16 cm	[1] Correct calculation
	Total Perimeter = $16 + 8\pi = 41.1 \text{ cm}$	[1] Correct perimeter to 1 decimal place

Turn over ►

5	$\text{Area} = \pi \times x^2 = 150 \text{ cm}^2$	[1] Forming correct equation
	$x = \sqrt{\frac{150}{\pi}}$	[1] Rearranging to make x the subject
	$x = 6.9 \text{ cm}$	[1] Correct radius to 1 decimal place
6(a)	$\text{Area of A} = \pi \times 16^2 = 256\pi \text{ cm}^2$	[1] Correct area of circle A
6(b)	$\text{Area of B} = \pi \times 7^2 = 49\pi \text{ cm}^2$	[1] Correct area of circle B
	$\text{Shaded area} = 256\pi - 49\pi = 207\pi \text{ cm}^2$	[1] Finding the difference of the two areas
	$= 650.3 \text{ cm}^2$	[1] Correct shaded area to 1 decimal place
7	$\text{Shaded outer area} = 100\pi - 49\pi = 51\pi \text{ m}^2$	[1] Calculation of the area of the outer ring
	$\text{Area of interior circles} = 5 \times (\pi \times 1^2) = 5\pi \text{ m}^2$	[1] Calculation of the interior circles area
	$\text{Total shaded area} = (51\pi + 5\pi) = 56\pi \text{ m}^2$	[1] Summing all shaded areas
	$= \frac{56\pi}{100\pi} = 56\%$	[1] Correct shaded area as a percentage to the total area of the large circle
8	Ratio of areas is $1^2 : 2^2 : 3^2 : 5^2$	[1] Correct calculation
	$1 : 4 : 9 : 25$	[1] Correct answer in its simplest form
9(a)	Diagonal AC = 12 cm	[1] Identify length of diagonal AC or BD
	$x^2 + x^2 = 12^2$ $2x^2 = 144$ $x = \sqrt{72} = 6\sqrt{2}$	[1] By use of Pythagoras or otherwise, find the lengths, x , of each side of the square
	$\text{Area} = 6\sqrt{2} \times 6\sqrt{2} = 72 \text{ cm}^2$	[1] Correct area of square ABCD
9(b)	$\text{Area of circle} = \pi \times 6^2 = 36\pi$	[1] Correct calculation
	$\text{Shaded area} = 36\pi - 72 = 41.1 \text{ cm}^2$	[1] Correct shaded area to 1 decimal place

END