Jan 2017
4PMO Further Pure Mathematics Paper 1
Mark Scheme

Question number	Scheme	Marks
1	Mark both parts of this question together $18\pi = \theta r$ $126\pi = \frac{1}{2}\theta r^2 \quad \left(\Rightarrow 252\pi = \theta r^2\right)$ $\frac{252\pi}{18\pi} = \frac{\theta r^2}{\theta r} \Rightarrow 14 = r$ $18\pi = \theta \times 14 \Rightarrow \theta = \frac{9\pi}{7}$ oe **ALT** $A = \frac{1}{2}rl \Rightarrow 126\pi = \frac{1}{2} \times r \times 18\pi \Rightarrow r = 14$ $18\pi = 14\theta \Rightarrow \theta = \frac{9}{7}\pi$	B1 B1 M1A1 A1 **(5)** M1A1A1 B1B1 **(5)**

Notes	
B1	For the equation (or any equivalent) $18\pi = \theta r$
B1	For the equation (or any equivalent) $126\pi = \frac{1}{2}\theta r^2$
M1	For dividing their two equations, eliminating θ **and** finding a value for r
A1	For $r = 14$ (cm)
A1	For $\theta = \frac{9\pi}{7}$ oe
ALT	
M1	Attempts to use the (correct) $A = \frac{1}{2}rl$ formula to give $126\pi = \frac{1}{2} \times r \times 18\pi$
A1	Substitution of correct values of $A = 126\pi$ and $l = 18\pi$
A1	For $r = 14$ (cm)
B1	For the equation (or any equivalent) $18\pi = \theta \times$ their r
B1	For $\theta = \frac{9\pi}{7}$ oe
ALT using degrees	
B1	For the equation $\frac{\theta}{360} \times 2\pi r = 18\pi \Rightarrow \frac{\theta}{360} r = 9$
B1	For the equation $\frac{\theta}{360} \times \pi r^2 = 126\pi \Rightarrow \frac{\theta}{360} r^2 = 126$
M1	Divides their equations to eliminate θ to give $9r = 126$
A1	For $r = 14$
A1	For $\theta = \frac{9\pi}{7}$ oe