Question Number	Scheme	Marks
5	$w=\dfrac{z-3\mathrm{i}}{z+2\mathrm{i}}$	
	$w(z+2\mathrm{i})=z-3\mathrm{i} \quad z=\dfrac{\mathrm{i}(2w+3)}{1-w}$	M1
	$\lvert z\rvert=1 \quad \left\lvert\dfrac{\mathrm{i}(2w+3)}{1-w}\right\rvert=1$	dM1
	$\lvert \mathrm{i}(2w+3)\rvert=\lvert 1-w\rvert$	
	$w=u+\mathrm{i}v \quad (2u+3)^2+4v^2=(1-u)^2+v^2$	ddM1
	$4u^2+12u+9+4v^2=1-2u+u^2+v^2$	
	$3u^2+3v^2+14u+8=0$	dddM1
	$u^2+v^2+\dfrac{14}{3}u+\dfrac{8}{3}=0$	A1
	$\left(u+\dfrac{7}{3}\right)^2+v^2=-\dfrac{8}{3}+\dfrac{49}{9}=\dfrac{25}{9}$	
(i)	Centre $\left(-\dfrac{7}{3},0\right)$	A1
(ii)	Radius $\dfrac{5}{3}$	A1 (7)
		[7]

(a) M1	re-arrange to z = ...
dM1	dep (on first M1) using $\lvert z\rvert=1$ with their previous result
ddM1	dep (on both previous M marks) use $w=u+\mathrm{i}v$ (or any other pair of letters inc (x, y)) and find the moduli (or square of it)
dddM1	dep (on all previous M marks) re-arrange to the form of the equation of a circle (same coeffs for the squared terms)
A1	for a correct equation in u and v with coeffs of u^2 and v^2 both 1
A1	Correct centre, must be in coordinate brackets. Completion of square need not be shown.
A1	Correct radius
	Centre and radius must come from a correct circle equation for the A marks