Question Number	Scheme	Marks
2	$w=\dfrac{z+2}{z-\mathrm{i}} \quad z\neq \mathrm{i}$	
	$z=\dfrac{2+\mathrm{i}w}{w-1}$	M1
	$\lvert z\rvert=2 \Rightarrow \left\lvert\dfrac{2+\mathrm{i}w}{w-1}\right\rvert=2 \Rightarrow \lvert 2+\mathrm{i}w\rvert=2\lvert w-1\rvert$	
	$\lvert 2+\mathrm{i}u-v\rvert=2\lvert u+\mathrm{i}v-1\rvert$	M1 A1
	$(2-v)^2+u^2=4\left((u-1)^2+v^2\right)$	M1 A1
	$3u^2+3v^2-8u+4v=0$ oe	
	$\left(u-\dfrac{4}{3}\right)^2+\left(v+\dfrac{2}{3}\right)^2=\dfrac{20}{9}$ or $u^2+v^2-\dfrac{8}{3}u+\dfrac{4}{3}v=0$	dM1
	(i) centre is $\left(\dfrac{4}{3},-\dfrac{2}{3}\right)$	A1
	(ii) radius is $\dfrac{2\sqrt{5}}{3}$ oe	A1 [8]

M1	Rearrange equation to $z=\ldots$
M1	Change w to $u+\mathrm{i}v$ and use $\lvert z\rvert=2$ Allow if a different pair of letters used.
A1	Correct equation
M1	Correct use of Pythagoras on either side. Allow with 2 or 4 (RHS)
A1	Correct unsimplified equation
dM1	Attempt the circle form. Coefficients for u^2 and v^2 must be 1. Depends on all 3 previous M marks
(i)A1	Correct centre given (no decimals) (Use of rounded decimals changes the values)
(ii)A1	Correct radius given, any equivalent form (but no decimals)
	NB: These 2 A marks can only be awarded if the results have been deduced from a correct circle equation.
ALT 1	
M1	Change w to $u+\mathrm{i}v$ Allow a different pair of letters.
M1	Rearrange equation to $z=\ldots$ and use $\lvert z\rvert=2$
A1	Correct equation
	Then as above.

ALT 2	Very rare but may be seen:	
	i maps to $\infty \Rightarrow \pm 2\mathrm{i}$ map to a diameter of C	M1A1
	So $\dfrac{2\mathrm{i}+2}{\mathrm{i}}$ and $\dfrac{-2\mathrm{i}+2}{-3\mathrm{i}}$ are ends of a diameter	M2A1
	Calculate centre and radius	M1A1A1