Question Number	Scheme	Notes	Marks
2 Way 1	$w=\dfrac{1}{z+1}\Rightarrow z=\dfrac{1-w}{w}$	Makes z the subject and obtains $z=\dfrac{\pm1\pm w}{w}$	M1
	$z=\dfrac{1-(u+\mathrm{i}v)}{u+\mathrm{i}v}\times\dfrac{u-\mathrm{i}v}{u-\mathrm{i}v}$	Replaces w with $u + \mathrm{i}v$ and multiplies top and bottom by complex conjugate of their denominator. This statement is sufficient.	M1
	$x=0\Rightarrow\dfrac{u-(u^2+v^2)}{u^2+v^2}=0$	Equates real part to zero	M1
	$\Rightarrow u^2+v^2-u=0$	Correct equation connecting u and v	A1 **M1 on ePEN**
	Centre $\left(\dfrac{1}{2},0\right)$ **or** radius $\dfrac{1}{2}$	One correct **but must follow the use of a correct circle equation**	A1cso
	Centre $\left(\dfrac{1}{2},0\right)$ **and** radius $\dfrac{1}{2}$	Both correct **but must follow the use of a correct circle equation**	A1cso
			(6)
Way 2	$z=\mathrm{i}y\Rightarrow w=\dfrac{1}{\mathrm{i}y+1}$	Replaces z with $\mathrm{i}y$	M1
	$u+iv=\dfrac{1}{\mathrm{i}y+1}\times\dfrac{1-\mathrm{i}y}{1-\mathrm{i}y}$	Multiplies top and bottom by complex conjugate of denominator. This statement is sufficient.	M1
	$u=\dfrac{1}{1+y^2}$ **or** $v=\dfrac{-y}{1+y^2}$	$w=u+\mathrm{i}v$ and equates real or imaginary parts to obtain either u or v in terms of y	M1
	$\Rightarrow v^2+u^2=u$	Correct equation connecting u and v	A1 **M1 on ePEN**
	Centre $\left(\dfrac{1}{2},0\right)$ **or** radius $\dfrac{1}{2}$	One correct **but must follow the use of a <u>correct circle equation</u>**	A1cso
	Centre $\left(\dfrac{1}{2},0\right)$ **and** radius $\dfrac{1}{2}$	One correct **but must follow the use of a <u>correct circle equation</u>**	A1cso
			(6)
			Total 6