Question Number	Scheme	Notes	Marks
6	$(x+1)^2+(y-1)^2=1\Rightarrow\lvert z-(-1+\mathrm{i})\rvert=1$	Correct locus e.g., $\lvert z+1-\mathrm{i}\rvert=1$	**B1**
	$w=\dfrac{z+2}{3z+4}\Rightarrow z=\dfrac{2-4w}{3w-1}$	M1: Attempts to make z the subject A1: Any correct rearrangement	**M1** **A1**
	$\lvert z-(-1+\mathrm{i})\rvert=1\Rightarrow\left\lvert\dfrac{2-4w}{3w-1}+1-\mathrm{i}\right\rvert=1$	Uses a locus of the form $\lvert z\pm1\pm\mathrm{i}\rvert=1$ and their expression for z in terms of w and sets = 1	**dM1**
	$\Rightarrow\left\lvert\dfrac{2-4w+3w-3w\mathrm{i}-1+\mathrm{i}}{3w-1}\right\rvert=1\Rightarrow\lvert 1-w-3w\mathrm{i}+\mathrm{i}\rvert=\lvert 3w-1\rvert$ $\Rightarrow\lvert 1-u-\mathrm{i}v-3u\mathrm{i}+\mathrm{i}+3v\rvert=\lvert 3u+3\mathrm{i}v-1\rvert$ M1: Finds common denominator, multiplies up and introduces $w=u+\mathrm{i}v$		**ddM1**
	$(1-u+3v)^2+(1-v-3u)^2=(3u-1)^2+9v^2$	Applies Pythagoras correctly to obtain an equation in u and v	**dddM1**
	$u^2+v^2-2u+4v+1=0$	Correct equation in this form	**A1**
			(7)
	There may be various alternatives. If using the main scheme above benefits the learners for any different approaches then please use that. Approaches which attempt to map points can access the first mark as above (or by choosing three correct points (or complex numbers) for the circle). The remaining marks would score as follows: M1 for transforming 3 points using the given transformation A1: 3 correct points dM1ddM1dddM1: For a complete valid method to establish the equation of circle D Could find the intersection point of two perpendicular bisectors and then find the radius and produce a circle equation, or use the transformed points in a general circle equation and solve the 3 simultaneous equations involving 3 unknowns and produce a circle equation A1: Correct equation Another possibility is: $u+\mathrm{i}v=\dfrac{x+\mathrm{i}y+2}{3(x+\mathrm{i}y)+4}$ or $x+\mathrm{i}y=\dfrac{2-4(u+\mathrm{i}v)}{3(u+\mathrm{i}v)-1}$ (the latter could get M1A1 already) $\Rightarrow x=\dfrac{-12u^2-12v^2+10u-2}{(3u-1)^2+9v^2}\quad y=\dfrac{-2v}{(3u-1)^2+9v^2}\quad(\mathrm{M1A1})$ Could write this as $x+\mathrm{i}y$ and note that $(3u-1)^2+9v^2=9u^2-6u+1+9v^2$ $\left(\dfrac{-12u^2-12v^2+10u-2}{(3u-1)^2+9v^2}+1\right)^2+\left(\dfrac{-2v}{(3u-1)^2+9v^2}-1\right)^2=1\quad(\mathrm{dM1ddM1dddM1,\ B1\ if\ all\ correct})$ $u^2+v^2-2u+4v+1=0\quad(\mathrm{A1})$		