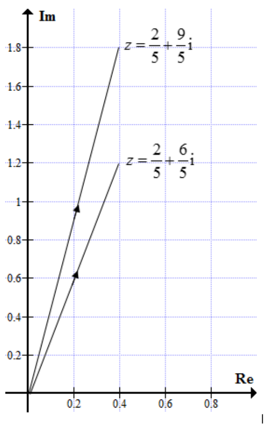
Q	Scheme	Marks	AOs	Pearson Progression Step and Progress descriptor
1a	Multiplies by the complex conjugate: $\frac{8+p\mathrm{i}}{p-4\mathrm{i}}\times\frac{p+4\mathrm{i}}{p+4\mathrm{i}}$	**M1**	2.2a	TBC
	Simplifies to find: $\frac{4p}{p^2+16}+\frac{p^2+32}{p^2+16}\mathrm{i}$ Award mark for only $\frac{4p}{p^2+16}$ seen.	**M1**	1.1b	
	Recognises $\frac{4p}{p^2+16}=\frac{2}{5}$	**M1**	2.2a	
	Solves to find $p = 2$ or $p = 8$	**A1**	1.1b	
		(4)		
1b	$p=2\Rightarrow z=\frac{2}{5}+\frac{9}{5}\mathrm{i},\ p=8\Rightarrow z=\frac{2}{5}+\frac{6}{5}\mathrm{i}$	**A1**	1.1b	TBC
		(1)		
1c	**Figure 1**  Argand diagram drawn with points clearly labelled.	**B1**	1.1b	TBC
		(1)		
				(6 marks)

Notes

Q	Scheme	Marks	AOs	Pearson Progression Step and Progress descriptor
2a	Multiplies by the complex conjugate: $\frac{4}{1+\text{i}} \times \frac{1-\text{i}}{1-\text{i}}$	**M1**	2.2a	TBC
	Finds $z = 2 - 2\text{i}$ or states $a = 2$ and $b = -2$	**A1**	1.1b	
		(2)		
2b	States or implies that the complex conjugate, $z = 2 + 2\text{i}$ is also a root of the quadratic equation.	**M1**	2.2a	TBC
	Writes $\left(z-(2-2\text{i})\right)\left(z-(2+2\text{i})\right)=0$ Or Writes $\frac{-q}{p}=(2-2\text{i})+(2+2\text{i})$ and $\frac{r}{p}=(2-2\text{i})(2+2\text{i})$	**M1**	2.2a	
	Makes an attempt to multiply out the brackets. For example, $z^2-2z-2z\text{i}-2z+2z\text{i}+4+4\text{i}-4\text{i}+4=0$ is seen. Or Calculates $\frac{-q}{p}=4$ and $\frac{r}{p}=8$	**M1**	1.1b	
	Simplifies to $z^2-4z+8=0$ or states $p = 1$, $q = -4$, $r = 8$ Accept any multiple of this solution, providing each constant is an integer.	**A1**	1.1b	
		(4)		
				(6 marks)

Notes