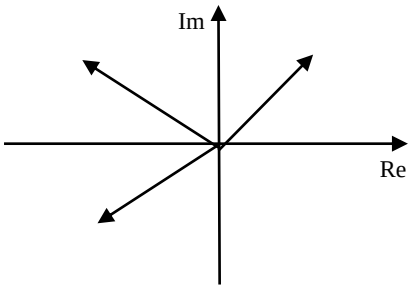
| Question Number | Scheme | Notes | Marks |
|---|---|---|---|
| **1(a)** | $z_1 = 3+3\text{i} \qquad z_2 = p+q\text{i} \qquad p,q \in \mathbb{R}$ | | |
| | $\lvert z_1\rvert = \sqrt{3^2+3^2}$<br>$\lvert z_1 z_2\rvert = \lvert z_1\rvert\lvert z_2\rvert \Rightarrow \lvert z_2\rvert\sqrt{18} = 15\sqrt{2} \Rightarrow \lvert z_2\rvert = \ldots$ | Attempts $\lvert z_1\rvert$ using Pythagoras and uses $\lvert z_1 z_2\rvert = \lvert z_1\rvert\lvert z_2\rvert$ to find $\lvert z_2\rvert$ | M1 |
| | $\lvert z_2\rvert = 5$ | Cao | A1 |
| | | | **(2)** |
| **ALT** | $\lvert z_1 z_2\rvert = 15\sqrt{2}$<br>$\lvert(3p-3q)+\text{i}(3p+3q)\rvert = 15\sqrt{2}$<br>$\sqrt{18p^2+18q^2} = 15\sqrt{2}$<br>$p^2+q^2 = 25$<br>$\lvert z_2\rvert = \sqrt{p^2+q^2} = 5$ | Uses $\lvert z_1 z_2\rvert = \lvert z_1\rvert\lvert z_2\rvert$ to reach $p^2+q^2 = \ldots$ | M1<br><br>A1 **(2)** |
| **(b)** | $\lvert z_2\rvert = 5 \Rightarrow p^2+q^2 = 25$<br>$\Rightarrow (-4)^2+q^2 = 25 \Rightarrow q = \ldots$ | Uses $p^2+q^2 = "5"^2$ with $p = \pm 4$ leading to a value for $q$. | M1 |
| | $q = \pm 3$ | Both values. Must be clear $p = 4$ has not been used | A1 |
| | | | **(2)** |
| **(c)** | <br>Points to be in the correct quadrants and either with correct numbers on the axes or labelled correctly | 3 + 3i plotted correctly and labelled<br><br>Vectors/ lines not needed; point(s) alone are sufficient | B1 |
| | | A conjugate pair plotted correctly following through their $q$. | B1ft |
| | | | **(2)** |
| | | | **Total 6** |