

Complex Numbers Advanced Revision

Q10 Show $1+2i$ is a root of $z^2 - (3+3i)z + 5i = 0$

If k is a root
 $f(k) = 0$

$$(a+b)^2 = a^2 + 2ab + b^2$$

$$\begin{aligned} f(1+2i) &= (1+2i)^2 - (3+3i)(1+2i) + 5i \\ &= (1+4i - 4i^2) - [3+6i+3i-6i^2] + 5i \\ &= -3 + 4i - [-3 + 9i] + 5i \\ &= -3 + 4i + 3 - 9i + 5i \\ &= 0 \quad \Rightarrow \text{it is a root} \end{aligned}$$