Getting Ready For A Level Further Maths
Task 0.3 – Complex Numbers Challenge – Exam Questions
Answers are provided but make sure you show a full method

Q1.

(a) Solve the equation $w^2 + 6w + 34 = 0$, giving your answers in the form $p + q\text{i}$, where p and q are integers.

(3)

(b) It is given that $z = \text{i}(1 + \text{i})(2 + \text{i})$.

(i) Express z in the form $a + b\text{i}$, where a and b are integers.

(3)

(ii) Find integers m and n such that $z + mz^* = n\text{i}$.

(3)
(Total 9 marks)

Q2.

(a) Solve the following equations, giving each root in the form $a + b\text{i}$:

(i) $x^2 + 9 = 0$;

(1)

(ii) $(x + 2)^2 + 9 = 0$.

(1)

(b) (i) Expand $(1 + x)^3$.

(1)

(ii) Express $(1 + 2\text{i})^3$ in the form $a + b\text{i}$.

(3)

(iii) Given that $z = 1 + 2\text{i}$, find the value of

$$z^* - z^3$$

(2)
(Total 8 marks)

Answers

M1.(a)

$= -3 \pm 5i$

(b) (i)

$= -3 + i$

(ii)

$\Rightarrow m = -1, n = 2$

M2.(a) (i) $x = \pm 3i$

(ii) $x = -2 \pm 3i$

(b) (i) $(1 + x)^3 = 1 + 3x + 3x^2 + x^3$

(ii)$= -11 - 2i$

(iii)

$= 12$