

SIXTH FORM INDUCTION – FURTHER MATHS

Q1.

Express each of the following in the form $a + bi$ where a and b are real numbers.

(i) $(3 + 2i) + (2 - i)$.

(ii) $(4 + i) - (2 - i)$.

(iii) $(3 + 2i)(2 - i)$.

(iv) $\operatorname{Re}(6 - 7i)$.

(v) $\operatorname{Im}(3 - 2i)$.

Q2.

Find x and y if $(x + 3i)(2 + yi) = 5 + 5i$, and $x, y \in \mathbf{R}$

Q3.

Simplify each of the following expressions into the form $a + ib$, where a and b are real.

(i) $(1 + 6i)(1 - 3i)$.

(ii) $(1 + i)^3$.

(iii) $(1 - i)(1 + i)$.

(iv) $(3 + 2i)(3 - 2i)$.

(v) $(3 + 7i) - (2 + i)$.

Q4.

Solve the equation

$$(1 + i)(x + iy) = -2 + i.$$

where $x, y \in \mathbf{R}$, by deducing simultaneous equations in x and y .

Q5.

The complex numbers z_1 and z_2 are given by

$$z_1 = p + 2i \text{ and } z_2 = 1 - 2i$$

where p is an integer.

(a) Find $\frac{z_1}{z_2}$ in the form $a + bi$ where a and b are real. Give your answer in its simplest form in terms of p .

(4)

Given that $\left| \frac{z_1}{z_2} \right| = 13$,

(b) find the possible values of p .

(4)