

COMPLEX NUMBERS (Q 4, PAPER 1)

2004

4 (a) Given that $i^2 = -1$, simplify

$$4(2-i) + i(3+5i)$$

and write your answer in the form $x + yi$, where $x, y \in \mathbf{R}$.

(b) (i) Let $w = 1 - 2i$.

Plot w and \bar{w} on an Argand diagram, where \bar{w} is the complex conjugate of w .

(ii) Solve $z^2 - 10z + 26 = 0$.

Write your answers in the form $a + bi$, where $a, b \in \mathbf{R}$.

(c) Let $z_1 = 5 + 12i$ and $z_2 = 2 - 3i$.

(i) Find the value of the real number k such that $|z_1| = k|z_2|$.

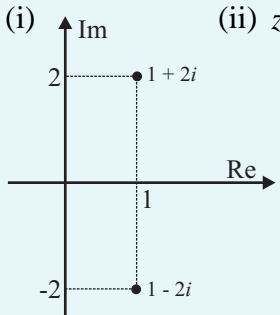
(ii) p and q are real numbers such that

$$\frac{z_1}{z_2} = p(q + i).$$

Find the value of p and the value of q .

ANSWERS

4 (a) $3 - i$

(b) (i)  (ii) $z = 5 \pm i$

(c) (i) $k = \sqrt{13}$ (ii) $p = 3, q = -\frac{2}{3}$