

COMPLEX NUMBERS (Q 4, PAPER 1)

2010

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

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

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

(b) Let $u = 4 + 3i$ and $w = 6 - 8i$.

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

(ii) Express $\frac{w}{u}$ in the form $x + yi$.

(c) Let $z = a + bi$, where $a, b \in \mathbf{R}$.

Find the value of a and the value of b for which

$$3z - 10i = (2 - 3i)z.$$

ANSWERS

4 (a) $14 + 2i$

(b) (i) $k = \frac{1}{2}$ (ii) $0 - 2i$

(c) $a = 3, b = 1$