

COMPLEX NUMBERS (Q 4, PAPER 1)

2009

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

$$2(3 - 5i) + 7i(2 + 3i)$$

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

(b) Let $u = 3 + 5i$.

(i) Show that u is a solution of the equation $z^2 - 6z + 34 = 0$.

(ii) Express $\frac{17}{u}$ in the form $x + yi$.

(c) Let $z = 3 - 4i$.

(i) Calculate $|z|$.

(ii) Find the real numbers p and q such that

$$|z|(p + qi) + (q - pi) = 17 + 7i.$$

ANSWERS

4 (a) $-15 + 4i$

(b) (ii) $\frac{3}{2} - \frac{5}{2}i$

(c) (i) 5

(ii) $p = 3, q = 2$