COMPLEX NUMBERS (Q 4, PAPER 1)

2007

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

$3(2-4i)+i(5-6i)$

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

(b) Let $z = 5-3i$.

(i) Plot z and $-z$ on an Argand diagram.

(ii) Calculate $|z-1|$.

(iii) Find the value of the real number k such that $ki + 4z = 20$.

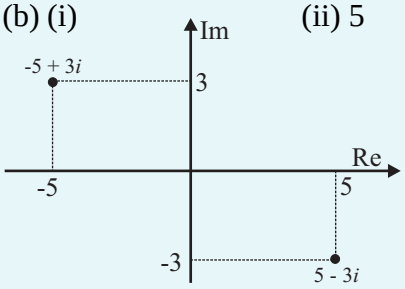
(c) Let $u = 3 + 2i$.

(i) Find the value of $u^2 + \bar{u}^2$, where $\bar{u}$ is the complex conjugate of u.

(ii) Investigate whether $\frac{13}{u} = \bar{u}$.

ANSWERS

4 (a) $12-7i$

(b) (i) 

(ii) 5 (iii) $k = 12$

(c) (i) 10 (ii) Yes