COMPLEX NUMBERS (Q 4, PAPER 1)

2008

4 (a) Let $u = 3 - 4i$, where $i^2 = -1$.
Plot on an argand diagram
(i) u

(ii) $u + 5i$.

(b) Let $w = 2 + 5i$.
(i) Express w^2 in the form $x + yi$, $x, y \in \mathbf{R}$.

(ii) Verify that $|w^2| = |w|^2$.

(c) Let $z = 6 - 4i$.
(i) Find the real number k such that

$$k(z + \overline{z}) = 24$$

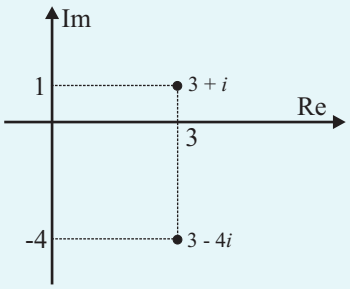
where $\overline{z}$ is the complex conjugate of z.

(ii) Find the real numbers s and t such that

$$\frac{s + ti}{4 + 3i} = z.$$

ANSWERS

4 (a)



(b) (i) $-21 + 20i$

(c) (i) $k = 2$ (ii) $s = 36$, $t = 2$