

COMPLEX NUMBERS (Q 4, PAPER 1)

1999

4 (a) Let $z = 5 + 4i$, where $i^2 = -1$.

Plot

(i) z

(ii) $z - 4i$

on an Argand diagram.

(b) Let $u = 3 - 6i$.

(i) Calculate $|u|$.

(ii) Show that $iu + \frac{u}{i} = 0$.

(iii) Express $\frac{u}{u+3i}$ in the form $p+qi$, $p, q \in \mathbf{R}$.

(c) Let $w = i - 2$.

Express w^2 in the form $a+bi$, $a, b \in \mathbf{R}$.

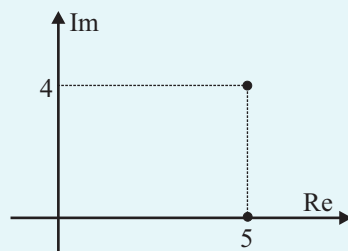
Hence, solve

$$kw^2 = 2w + 1 + ti$$

for real k and real t .

ANSWERS

4 (a)



(b) (i) $|u| = \sqrt{45} = 3\sqrt{5}$

(iii) $\frac{3}{2} - \frac{1}{2}i$

(c) $w^2 = 3 - 4i$; $k = -1$, $t = 2$