

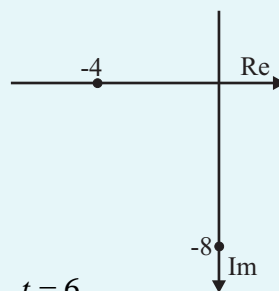
COMPLEX NUMBERS (Q 4, PAPER 1)

1998

- 4 (a) Let $w = 2i$, where $i^2 = -1$. Plot
- (i) w^2 ,
 - (ii) w^3
- on an Argand diagram.
- (b) (i) Verify that $4 - 3i$ is a root of
- $$z^2 - 8z + 25 = 0$$
- and write down the other root.
- (ii) Investigate if
- $$|2 + 14i| = |10(1 - i)|.$$
- (c) Let $u = 2 - i$.
- (i) Express $u + \frac{1}{u}$ in the form $a + bi$, $a, b \in \mathbf{R}$.
 - (ii) Hence, solve
- $$k(u + \frac{1}{u}) + ti = 18$$
- for real k and real t .

ANSWERS

4 (a) $w^2 = -4 + 0i$, $w^3 = 0 - 8i$



(b) (i) $4 + 3i$

(ii) Yes

(c) (i) $\frac{12}{5} - \frac{4}{5}i$

(ii) $k = \frac{15}{2}$, $t = 6$