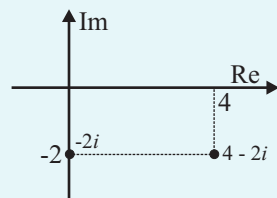## COMPLEX NUMBERS (Q 4, PAPER 1)

## 2005

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

(b)  Let $w = 1 + 3i$.

(i)  Express $\frac{2}{w}$ in the form $x + yi$, where $x, y \in \mathbf{R}$.

(ii)  Investigate whether $|iw + w| = |iw| + |w|$.

(c)  Let $z = 1 - 2i$.
(i)  Write down $\bar{z}$, the complex conjugate of $z$.

(ii)  Find the real numbers $k$ and $t$ such that
$$kz + t\bar{z} = 2z^2.$$

ANSWERS

4    (a)



(b) (i) $\frac{1}{5} - \frac{3}{5}i$        (ii) False

(c) (i) $\bar{z} = 1 + 2i$      (ii) $t = -5,\ k = -1$