COMPLEX NUMBERS (Q 4, PAPER 1)

2006

4 (a) Let $u = 3 - 6i$ where $i^2 = -1$.
Calculate $|u + 2i|$.

(b) (i) Solve $z^2 - 4z + 29 = 0$.
Write your answers in the form $x + yi$ where $x,\ y \in \mathbf{R}$.

(ii) Write in its simplest form $i(i^4 + i^5 + i^6)$.

(c) (i) Express $\dfrac{3-2i}{1-4i}$ in the form $x + yi$.

(ii) Hence, or otherwise, find the values of the real numbers p and q such that

$$p + 2qi = \frac{17(3-2i)}{1-4i}.$$

ANSWERS

4 (a) 5

(b) (i) $z = 2 \pm 5i$ (ii) $-2 - i$

(c) (i) $\frac{11}{17} + \frac{10}{17}i$ (ii) $p = 11,\ q = 5$