COMPLEX NUMBERS & MATRICES (Q 3, PAPER 1)

2003

3 (a) Evaluate $(1 \quad -2)\begin{pmatrix} 3 & 0 \\ -5 & 1 \end{pmatrix}\begin{pmatrix} 1 \\ -2 \end{pmatrix}$.

3 (b) (i) Given that $z = 2 - i$, calculate $|z^2 - z + 3|$ where $i^2 = -1$.

(ii) k is a real number such that $\dfrac{-1 + i\sqrt{3}}{-4\sqrt{3} - 4i} = ki$. Find k.

3 (c) 1, ω, ω^2 are the three roots of the equation $z^3 - 1 = 0$.

(i) Prove that $1 + \omega + \omega^2 = 0$.

(ii) Hence, find the value of $(1 - \omega - \omega^2)^5$.

ANSWERS

3 (a) (17)

3 (b) (i) 5 (ii) $k = -\frac{1}{4}$

3 (c) (ii) 32