COMPLEX NUMBERS (Q 4, PAPER 1)

2003

4 (a) Given that $i^2 = -1$, find the value of:

(i) i^8

(ii) i^7.

(b) Let $z_1 = 2 + 3i$ and $z_2 = 5 - i$.

(i) Plot z_1 and z_2 and $z_1 + z_2$ on an Argand diagram.

(ii) Investigate whether $|z_1 + z_2| > |z_1 - z_2|$.

(c) Let $w = 1 + i$.

(i) Simplify $\frac{6}{w}$.

(ii) a and b are real numbers such that

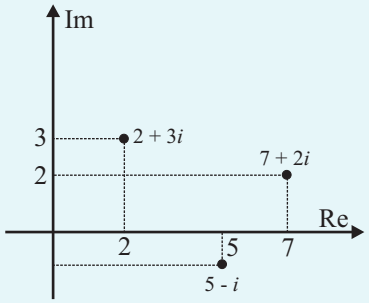
$$a\left(\frac{6}{w}\right) - b(w+1) = 3(w+i).$$

Find the value of a and the value of b.

ANSWERS

4 (a) (i) 1 (ii) $-i$

(b) (i) $z_1 + z_2 = 7 + 2i$ (ii) $\sqrt{53} > \sqrt{25}$ (True)



(c) (i) $3 - 3i$ (ii) $a = -1, b = -3$