MT1612: EXAMPLE SHEET[1] I (for Feb. 10, 1999)

1.) Solve the equations

(i) $z^2 + 6z + 25 = 0,$

(ii) $z^2 - 4z + 53 = 0.$

2.) Suppose that $z_1 = 2 - 5i$ and $z_2 = -1 - i$. Find

(i) $z_1 z_2,$

(ii) $z_2^2,$

(iii) $z_1^* / z_2^2.$

3.) Find the modulus and principal argument of

(i) $\sqrt{3} + i$

(ii) $-5 + 5i$

(iii) $-2 - 2\sqrt{3}i$

4.) Sketch the regions of the Argand plane in which z satisfies:

(i) $|z + 3i| < 2, \quad \mathcal{R}(z) > 0, \quad \mathcal{I}(z) > -3,$

(ii) $|z - 1| < 2, \quad |z + 1| > 1, \quad \mathcal{I}(z) > 0,$

(iii) $2 < |z| < 3, \quad \frac{\pi}{6} < \arg z < \frac{3\pi}{4}.$

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