

**MT1612: EXAMPLE SHEET<sup>1</sup> 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)  $|z + 3i| < 2$ ,  $\mathcal{R}(z) > 0$ ,  $\mathcal{I}(z) > -3$ ,

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

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

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<sup>1</sup>Any feedback to: *M.Heil@maths.man.ac.uk*