MCINTYRE MATHS · MATHEMATICS EXTENSION 2

# Practice worksheet

Lesson 4 · The Argand diagram

Name: _____ Date: _____

## Plotting and transformations

**1.** Let $z = -4 + 2i$. Plot $z$, $\overline{z}$, $-z$ and $iz$ on one Argand diagram and describe each transformation.

**2.** Let $z = 2 + i$. Plot $z$, $iz$, $i^2 z$ and $i^3 z$ and name the shape they form.

**3.** Show that if $z = a + ib$ then $z$, $iz$ and $O$ form a right-angled isosceles triangle.

## Lines, regions and loci

**4.** Sketch each region.

(a) $\text{Re}(z) > 1$ (b) $-1 \leq \text{Im}(z) < 2$

(c) $\text{Re}(z) \leq 3$ and $\text{Im}(z) \geq 0$

**5.** Find and sketch the locus of $z$ if (a) $z\overline{z} = 9$, (b) $(z+1)(\overline{z}+1) = 4$.

**6.** Show that $z + \overline{z} = 2$ is a line, and find its Cartesian equation.

## HSC-style

**7.** Given that $\dfrac{1}{z}+\dfrac{1}{\overline{z}}=2$, find the locus of $z$ and sketch it, clearly indicating any excluded points.

