MCINTYRE MATHS · MATHEMATICS EXTENSION 2

Practice worksheet

Lesson 8 · Rotation, dilation and geometry

Name: _____ Date: _____

Rotation and dilation

1. Find the image of $z = 3 - i$ when it is (a) rotated 90° anticlockwise about O, (b) rotated 90° clockwise about O, (c) rotated 60° anticlockwise about O and tripled in distance from O.

2. The point P represents $4 + i$. Find the point Q obtained by rotating P through $\dfrac{\pi}{2}$ anticlockwise about the point A representing $1 + 2i$.

Vertices of shapes

3. $OABC$ is a square, labelled anticlockwise, with B at $4 + 6i$. Find A and C.

4. A and B represent $1+i$ and $5+3i$. Find the third vertex C of the equilateral triangle ABC lying above AB (anticlockwise order A, B, C).

Proofs

5. Show that if $z_2 = iz_1$ then z_1, z_2 and the origin form an isosceles right-angled triangle.

6. A, B, C represent z_1, z_2, z_3. If $z_3 - z_1 = i(z_2 - z_1)$, show that $\triangle ABC$ is right-angled and isosceles, and state the right angle.

HSC-style

7. Adapted HSC-style. The complex numbers 0, z and w are the vertices of an equilateral triangle, labelled anticlockwise. (a) Show that $w = z\,\text{cis}\,\frac{\pi}{3}$. (b) Show that $z^2 + w^2 = zw$. (c) Hence show that $\dfrac{z}{w} + \dfrac{w}{z} = 1$.