

SCHOOL OF MATHEMATICS AND PHYSICS

MATH3401

Problem Worksheet

Semester 1, 2025, Week 3

(1) Find the principal argument $\text{Arg } z$ when

$$(a) \ z = \frac{i}{-2 - 2i}; \quad (b) \ z = (\sqrt{3} - i)^6.$$

(2) In each case, find all the roots in rectangular coordinates:

$$(a) \ (-16)^{1/4}; \quad (b) \ (-1)^{1/3}.$$

(3) Find the Möbius transformation that maps the points

$$z_1 = \infty, \quad z_2 = i, \quad z_3 = 0$$

onto the points

$$w_1 = 0, \quad w_2 = i, \quad w_3 = \infty.$$

(4) Find the Möbius transformation that maps the points

$$z_1 = -1, \quad z_2 = \infty, \quad z_3 = i$$

onto the points

$$w_1 = \infty, \quad w_2 = i, \quad w_3 = 1.$$