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MTH632 Assignment 1 Solution

Fall 2026

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MTH632 — Complex Analysis and Differential Geometry

Assignment No. 1 — Fall 2026 | Sample Solution

Question 1: Associative law for z1 = 3 + 2i, z2 = 1 + 5i, z3 = 6 + 7i

We check whether (z1 z2) z3 = z1 (z2 z3).

z1 z2 = (3 + 2i)(1 + 5i) = 3 + 15i + 2i + 10i² = 3 + 17i − 10 = −7 + 17i

(z1 z2) z3 = (−7 + 17i)(6 + 7i) = −42 − 49i + 102i + 119i² = −42 + 53i − 119 = −161 + 53i

z2 z3 = (1 + 5i)(6 + 7i) = 6 + 7i + 30i + 35i² = 6 + 37i − 35 = −29 + 37i

z1 (z2 z3) = (3 + 2i)(−29 + 37i) = −87 + 111i − 58i + 74i² = −87 + 53i − 74 = −161 + 53i

Since (z1 z2) z3 = z1 (z2 z3) = −161 + 53i, the associative law with respect to multiplication is verified.

Question 2: Find z1 / z2 for z1 = 7 + 3i, z2 = 5 − 6i

Multiply numerator and denominator by the conjugate of the denominator (5 + 6i):

z1 / z2 = (7 + 3i)(5 + 6i) / ((5 − 6i)(5 + 6i))

= (35 + 42i + 15i + 18i²) / (25 + 36) = (35 + 57i − 18) / 61

= (17 + 57i) / 61 = 17/61 + (57/61)i

Question 3: Find |z1 − z2| for z1 = 4 + 3i, z2 = 5i − 8

z2 = 5i − 8 = −8 + 5i, so z1 − z2 = (4 + 3i) − (−8 + 5i) = 12 − 2i.

|z1 − z2| = √(12² + (−2)²) = √(144 + 4) = √148 = 2√37 ≈ 12.17