

Mathematics for Science

Assignment 1

Arithmetic of Complex Numbers

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Instructions: Attempt all the Questions

- 1) Plot the following complex numbers on the Argand diagram:
 - i) $3i$
 - ii) $2 + 5i$
 - iii) $1 - 3i$
 - iv) $-2i$
 - v) $-5i + 7$
 - vi) $2 - 9i$
- 2) Determine the modulus of the following complex numbers;
 - i) $9i$
 - ii) $2 - 5i$
 - iii) $1 - 7i$
 - iv) $-2i$
 - v) $-5i + 16$
 - vi) $11 - 2i$
- 3) Evaluate the following;
 - i) $\sqrt{2 + 7i}$ $\sqrt{3 - 5i}$ $\sqrt{7 + 12i}$ $\sqrt{1 - 13i}$
- 4) Derive the formula for finding the square root of a complex number $x + iy$
- 5) Given $z_1 = 2 + 13i$ and $z_2 = 7 - 9i$ evaluate the following;
 - i) $z_1 z_2$
 - ii) $\overline{z_1 z_2}$
 - iii) $z_1 \overline{z_2}$
- 6) Simplify the following into the form $x + yi$;
 - i) $\frac{2}{3-2i}$
 - ii) $\frac{5-7i}{6-11i}$
 - iii) $\frac{9i}{2-23i}$
 - iv) $(3 - 7i)(3 + 7i)$
 - v) $\frac{9}{11i-3}$
 - vi) $\frac{3-17i}{2+7i}$
 - vii) $\frac{7}{i} - 3$
 - viii) i^5
 - ix) $\frac{3i+2}{3-5i}$
- 7) Simplify the following expressions;
 - i) $(2i + 5) + (3 - 11i)$
 - ii) $(4 + 5i)(7 - 2i)$
 - iii) $(5 - 2i) - (3i + 7)$
 - iv) $(23 - 5i)(-9 - 7i)$
 - v) $(i + 3)(2 - 5i)i$
 - vi) $2i(3 - 17i)(5 + 3i)$
- 8) Determine the value of x and y given the following;
 - i) $\frac{x}{2+i} + \frac{y}{3-2i} = 7 + xi + yi$
 - ii) $\frac{x}{3+2i} + \frac{y}{5-3i} = 7 + 3i$
 - iii) $(3 + i)^2 - 5(x - yi) =$
 - iv) $\frac{x}{-2-i} + \frac{iy}{i+7} = \frac{5}{3+i}$