

MTH101: Tutorial 1

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Exercise 1.1

Verify that for any $z \in \mathbb{C}$ we have

$$|z_1 \cdot z_2| = |z_1| \cdot |z_2|.$$

Exercise 1.2

Find the expression of $\arg(z)$ and $\text{Arg}(z)$ for the following Complex Numbers:

$$z_1 = 1 + i, \quad z_2 = -1 + i, \quad z_3 = \sqrt{3} - i, \quad z_4 = -\sqrt{3} - i.$$

Exercise 1.3

*Write in **Polar Form** the Complex Numbers of the previous Exercise.*

Exercise 1.4

Write in **Exponential Form** the Complex Numbers of the previous Exercise.

Exercise 1.5

Compute the following quantities:

$$z_1 \cdot z_2, \quad \frac{z_2}{z_3}, \quad z_3 \cdot z_4, \quad \frac{z_1}{z_4}.$$

Exercise 1.6

Find the solutions of the equation $z^4 = i$.

Exercise 1.7

Solve the equation: $z^4 - 6iz^2 + 16 = 0$

Exercise 1.8

Write the following Complex Functions in the form of $f = u + iv$:

1. $f(z) = |z|^2 + \bar{z} - 5z,$

2. $f(z) = \frac{1}{\bar{z}}.$