

Series 01

Exercise 01 :

1. Write in the standard form "algebraic form" the following complex numbers

- $z = \frac{(1+i)^9}{(1-i)^7}$,
- $z = \frac{1+\alpha i}{2\alpha + (\alpha^2 - 1)i}$, $\alpha \in \mathbb{R}$.

2. Write in the trigonometric and exponential form the complex number:

- $z = \frac{1+i\sqrt{3}}{1-i}$.

Exercise 02 : Represent geometrically the following sets in the complex plan

- A) $\{z \in \mathbb{C}, |z - 3i| \leq |z - 3|\}$,
- B) $\{z \in \mathbb{C}, |z - i| < 3\}$,
- C) $\{z \in \mathbb{C}, \operatorname{Re}(z) - \operatorname{Im}(z) < 1\}$,

Exercise 03 : Let the complex function $f : \mathbb{C} \rightarrow \mathbb{C}$ defined by

$$f(z) = \frac{z-2}{z+i}$$

- Determine the set of points for which $f(z) \in \mathbb{R}$,
- Determine the set of points for which $f(z) \in i\mathbb{R}$.