Tutorial exercise in Complex Numbers

Exercice 1

Let's consider z and z' as complex numbers: $z = 3 + \sqrt{3}\, i$ et $z' = -1 + 2\, i$

Write the following complex numbers in algebraic form $\boldsymbol{z_1 = z - \bar{z}'}$; $\boldsymbol{z_2 = z\,.\,\bar{z}}$; $\boldsymbol{z_3 = z^2}$ $\boldsymbol{z_4 = z'^3}$; $\boldsymbol{Z_5 = \frac{z}{z'}}$

Exercice 2

Write the following complex numbers in algebraic form a + ib :

1. Modulus of a complex number is 2 and the argument π/3.
2. Modulus of a complex number is 3 and the argument −π/6.

Exercice 3

Perform the following operations.

1. (3 + 2i) (1 − 3i).
2. Product of the complex number (modulus 2 and argument π/3) by the complex number of (modulus 3 and argument −5π/6.
3. $\frac{3+2\,i}{1-3\,i}$

Exercice 4

For a complex number z : z=x+i y, with real x and y, $z \neq -1$, let consider the complex z′ defined by:

$$z' = \frac{Z - i}{Z + 1}$$

1. On note $Z' = x' + i\,y'$, avec *x*' et *y*' réels. Exprimer *x*′ et *y*′ en fonction de *x* et *y* ?
2. We note $Z' = x' + i\,y'$, with x' et y' are real numbers. Express x′ et y′ as a function of x and y ?
3. Find the set of points M with affix z such z′ is real?

Exercice 5

Find the modulus, argument and exponential form of each of the following complex numbers:

$z_1 = \sqrt{6} - i\sqrt{2}$, $z_2 = -\frac{1}{2} - i\frac{1}{2}$ et $z_3 = -\frac{1}{2} + \frac{\sqrt{3}}{2}i$

Deduce the module and argument of $z_1 . z_2$, $z_1 . z_3$ et $(z_2)^2$

Exercice 6

Linearize

- $A(\theta) = \cos^3(\theta)$;
- $B(\theta) = \sin^3(\theta)$;