2023/2024	**Tutorial=2**	Department: Common Core in Mathematics
Analysis 1	Complex numbers	and Computer Science Batna 2-University.

Exercise 1

Put the following complex numbers into algebraic form:

1. $\dfrac{1}{i}$
2. $\dfrac{2+i}{5-i}$
3. $\dfrac{i}{i+1}$
4. $\dfrac{1}{2-i}$
5. $\dfrac{1}{2+i}+\dfrac{1}{2-i}$
6. $\dfrac{1}{1+i}+\dfrac{i}{1+i}$

Exercise 2

Determine the modulus and an argument for each complex number :

1. -2
2. $3i$
3. $2e^{-2i}$
4. $-1+i\sqrt{3}$
5. $\dfrac{1+i}{\sqrt{3}-1}$
6. $(\sqrt{3}-i)^9$

Exercise 3

Find the points of the complex plane which satisfy the following conditions.

1. $|z| \leq 2$
2. $z+\overline{z}=1$
3. $|z-3+5i|=2$

Exercise 4

Let $\alpha \in \mathbb{R}$. Express $\cos 5\alpha$ as a function of $\cos\alpha$, then $\sin 5\alpha$ as a function of $\sin\alpha$, give the value of $\cos\dfrac{\pi}{10}$.

Exercise 5

Find the square roots of the following complex numbers:

1. 5+i
2. 6-8i
3. $4\sqrt{3}$+i

Exercise 6

Solve the following equation in $\mathbb{C}$:

1. $z^2+(2-2i)z=3i+1$
2. $z^3=\dfrac{1+i}{\sqrt{2}}$
3. $z^6=27i$

Exercise 7

1. For all $x \in \mathbb{R}$, compute the following sums using the exponential form of a complex number:

$$A=\cos x+\cos 2x+\cos 3x+\cos 4x+\cos 5x+\cos 6x+\cos 7x$$
$$B=\sin x+\sin 2x+\sin 3x+\sin 4x+\sin 5x+\sin 6x+\sin 7x$$

2. by using Euler formulas, linearize: $\cos x^3, \sin x^3,\ \cos x^3 \sin x^4$.