



# III BRAC University

Department of Mathematics and Natural Sciences

**Total Points: 15**

**Assignment-01**

**Course Code: MAT215**

Complex

**Name: SABAH ISLAM SAFIA**

**Student ID: 24310009**

**Section: 12**

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**Submission Date:** \_\_\_\_\_

*Assigned by*

**Partho Sutra Dhor**  
Lecturer, Department of MNS  
BRAC University

## Question 1

Find all possible values of  $z$  such that

$$z^6 = \frac{729\sqrt{2}(-1 - i)}{2}$$

Locate them in the complex plane. Show that they are contained in a circle and find the radius of that circle. Also find the angular distance between two adjacent roots.

 **Solution:**

**Question 2**

Consider the equation

$$\left| \frac{z + 4i}{z - 4i} \right| = 3$$

Describe the above locus in the complex plane.

 **Solution:**

**Question 3**

Consider the inequality

$$\left| \frac{z + 9i}{z - 9i} \right| \geq 2$$

Describe the above locus in the complex plane.

 **Solution:**

**?** Question 4

Solve the following equation for  $z$ :

$$e^{5z} = -\frac{5}{2} + \frac{5\sqrt{3}i}{2}$$

Express  $z$  as  $x + iy$  where  $x, y, \in \mathbb{R}$ .

 Solution:

**?** Question 5

Prove that

$$\sin^{-1} z = \frac{1}{i} \ln \left( iz + \sqrt{1 - z^2} \right),$$

 Solution:

**Question 6**

Solve for  $z$ :

$$\tanh^{-1} z = 5 - bi$$

 Solution: