



# **BRAC University**

Department of Mathematics and Natural Sciences

**Total Points: 15**

 **Assignment-01**

**Course Code: MAT215**

Complex

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 **Section: 12**

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

*Assigned by*


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### Question 1

Find all possible values of  $z$  such that

$$z^{10} - 64\sqrt{2}(1+i) = 0$$

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

$$\left| \frac{z + 5i}{z - 5i} \right| = 5$$

Describe the above locus in the complex plane.


 Solution:

### Question 3

Consider the inequality

$$|z + 9i| + |z - 9i| < 25$$

Describe the above locus in the complex plane.


 Solution:

### Question 4

Solve the following equation for  $z$ :

$$e^{5z} = 6i$$

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

 Solution:

### Question 5

Prove that


$$\coth^{-1} z = \frac{1}{2} \ln \left( \frac{z+1}{z-1} \right).$$

 Solution:

## Question 6

Solve for  $z$ :

$$\sinh^{-1} z = 3 - bi$$

 Solution: