



# III 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

$$z^5 = 16\sqrt{2}(1 + i)$$

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

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

Describe the above locus in the complex plane.

 **Solution:**

**?** Question 3

Consider the inequality

$$|z - 6| - |z + 6| \geq 8$$

Describe the above locus in the complex plane.

 Solution:

**Question 4**

Solve the following equation for  $z$ :

$$e^{3z} = -6$$

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  $z$ :

$$\sin^{-1} z = 4 + bi$$

 Solution: