



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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Assigned by

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Question 1

Find all possible values of z such that

$$z^7 = 64\sqrt{2}(1 + i)$$

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

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

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 :

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

 Solution:

?

 Question 7

Solve

 Solution:

?

Question 8

Solve

 Solution:

?

 Question 9

Solve

 Solution:

Question 10

Using the definition show that

$$f(z) = 7z^2 + 8z - 4$$

is differentiable at all points. Also find the derivative.

 Solution:

Question 11

Using the definition, find the derivative of

$$f(z) = \frac{3z - 9}{6z + 8i} \quad \text{at } z = i$$

 Solution: