Course Number

Instructor

Date

Section 6.5 Trigonometric Form of a Complex Number

Objective: In this lesson you learned how to multiply and divide complex numbers written in trigonometric form and how to find powers and *n*th roots of complex numbers.

Important Vocabulary Define each term or concept.

***n*th roots of unity**

I. The Complex Plane (Page 467)

What you should learn
How to find absolute values of complex numbers

The absolute value of the complex number $a + bi$ is defined as . . .

The absolute value of the complex number $z = a + bi$ is given by $|a + bi| = \sqrt{}$.

II. Trigonometric Form of a Complex Number (Pages 468–469)

What you should learn
How to write the trigonometric forms of complex numbers

The **trigonometric form of the complex number** $z = a + bi$ is

$z =$ _____,

where $a =$ _____,

$b =$ _____,

$r = \sqrt{}$, and

$\tan q =$ _____.

The number r is the _____ of z, and q is called an _____ of z.

The trigonometric form of a complex number is also called the _____.

III. Multiplication and Division of Complex Numbers (Pages 469–470)

What you should learn
How to multiply and divide complex numbers written in trigonometric form

Let $z_1 = r_1(\cos q_1 + i \sin q_1)$ and $z_2 = r_2(\cos q_2 + i \sin q_2)$ be complex numbers. Then:

$z_1z_2 =$ _____

$z_1/z_2 =$ _____

Describe how to find the product of two complex numbers.

Describe how to find the quotient of two complex numbers.

IV. Powers of Complex Numbers (Page 471)

What you should learn
How to use De Moivre's Theorem to find powers of complex numbers

State **DeMoivre's Theorem**.

IV. Roots of Complex Numbers (Pages 472–474)

What you should learn
How to find *n*th roots of complex numbers

The complex number $u = a + bi$ is an ***n*th root of the complex number** z if _____.

For a positive integer n, the complex number $z = r(\cos q + i \sin q)$ has _____ given by $\sqrt[n]{r}\left(\cos\frac{q + 2pk}{n} + i\sin\frac{q + 2pk}{n}\right)$, where $k = 0, 1, 2, \ldots, n - 1$.

Homework Assignment

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Exercises