Course Number

Instructor

Date

Section 2.4 Complex Numbers

Objective: In this lesson you learned how to perform operations with complex numbers.

Important Vocabulary Define each term or concept.

Complex number

Imaginary number

Complex conjugates

I. The Imaginary Unit *i* (Page 236)

What you should learn
How to use the imaginary unit *i* to write complex numbers

Mathematicians created an expanded system of numbers using the **imaginary unit *i*,** defined as $i =$ _____, because . . .

By definition, $i^2 =$ _____.

For the complex number $a + bi$, if $b = 0$, the number $a + bi = a$ is a(n) _____. If $b \neq 0$, the number $a + bi$ is a(n) _____.If $a = 0$, the number $a + bi = bi$ is a(n) _____.

The set of complex numbers consists of the set of _____ _____ and the set of _____.

Two complex numbers $a + bi$ and $c + di$, written in standard form, are equal to each other if . . .

II. Operations with Complex Numbers (Pages 237–238)

What you should learn
How to add, subtract, and multiply complex numbers

To add two complex numbers, . . .

To subtract two complex numbers, . . .

The **additive identity** in the complex number system is _____.

The **additive inverse** of the complex number $a + bi$ is

_____.

Example 1: Perform the operations:
$(5 - 6i) - (3 - 2i) + 4i$

To multiply two complex numbers $a + bi$ and $c + di$, . . .

Example 2: Multiply: $(5 - 6i)(3 - 2i)$

III. Complex Conjugates and Division (Page 239)

What you should learn
How to use complex conjugates to divide complex numbers

The product of a pair of complex conjugates is a(n)

_____ number.

To find the quotient of the complex numbers $a + bi$ and $c + di$, where c and d are not both zero, . . .

Example 3: Divide $(1 + i)$ by $(2 - i)$. Write the result in standard form.

IV. Complex Solutions of Quadratic Equations (Page 240)

What you should learn
How to use the Quadratic Formula to find complex solutions of quadratic equations

If a is a positive number, the **principal square root** of the negative number $-a$ is defined as _____.

To avoid problems with multiplying square roots of negative numbers, be sure to convert to _____ before multiplying.

Example 4: Perform the operation and write the result in standard form: $(5-\sqrt{-4})^2$

Given the existence of the set of complex numbers, if the discriminant b^2-4ac of the quadratic equation $ax^2+bx+c=0$, $a\neq 0$, is negative, then . . .

Example 5: Use the discriminant to find the number and type of solutions of the quadratic equation $4x^2-4x+5=0$. Then find the solutions of the equation.

Additional notes

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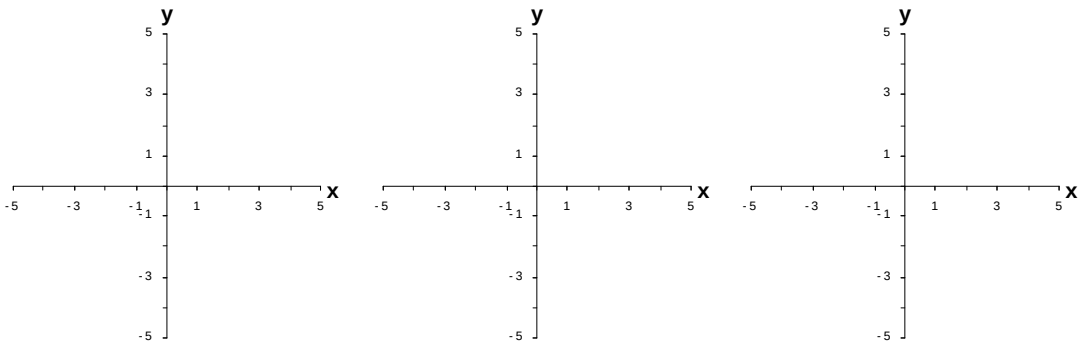

Homework Assignment
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