Chapter 4 Complex Numbers

Course Number

Instructor

Date

Section 4.1 Complex Numbers

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

Important Vocabulary	Define each term or concept.
Complex numbers	
Complex conjugates	

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

I. The Imaginary Unit *i* (Page 310)

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

By definition, $i^2 =$ _____.

Each complex number can be written in the **standard form** _____, where the number _____ is called the **real part** of the complex number, and the number _____ is called the **imaginary part** of the complex number.

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 311–312)

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 313)

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 314)

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: $(5-\sqrt{-4})^2$

Example 5: Find the solutions of the quadratic equation $4x^2-4x+5=0$.

Additional notes

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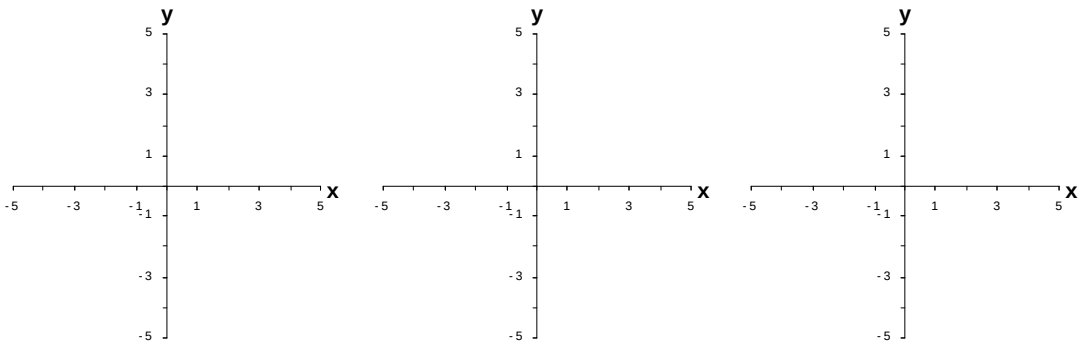

Homework Assignment
Page(s)

Exercises