

Section 2.4 Complex Numbers

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

Course Number

Instructor

Date

Important Vocabulary

Define each term or concept.

Complex number

Imaginary number

Complex conjugates

I. The Imaginary Unit i (Page 162)

Mathematicians created an expanded system of numbers using the **imaginary unit i** , defined as $i = \underline{\hspace{2cm}}$, because . . .

What you should learn

How to use the imaginary unit i to write complex numbers

By definition, $i^2 = \underline{\hspace{2cm}}$.

If a and b are real numbers, then the complex number $a + bi$ is said to be written in $\underline{\hspace{2cm}}$. If $b = 0$, the number $a + bi = a$ is a(n) $\underline{\hspace{2cm}}$. If $b \neq 0$, the number $a + bi$ is a(n) $\underline{\hspace{2cm}}$. If $a = 0$, the number $a + bi = bi$, where $b \neq 0$, is a(n) $\underline{\hspace{2cm}}$.

The set of complex numbers consists of the set of $\underline{\hspace{2cm}}$ and the set of $\underline{\hspace{2cm}}$.

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

II. Operations with Complex Numbers (Pages 163–164)

To add two complex numbers, . . .

What you should learn

How to add, subtract, and multiply 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 (Page 165)

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

_____ number.

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

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

What you should learn
How to use complex conjugates to write the quotient of two complex numbers in standard form

IV. Complex Solutions of Quadratic Equations (Page 166)

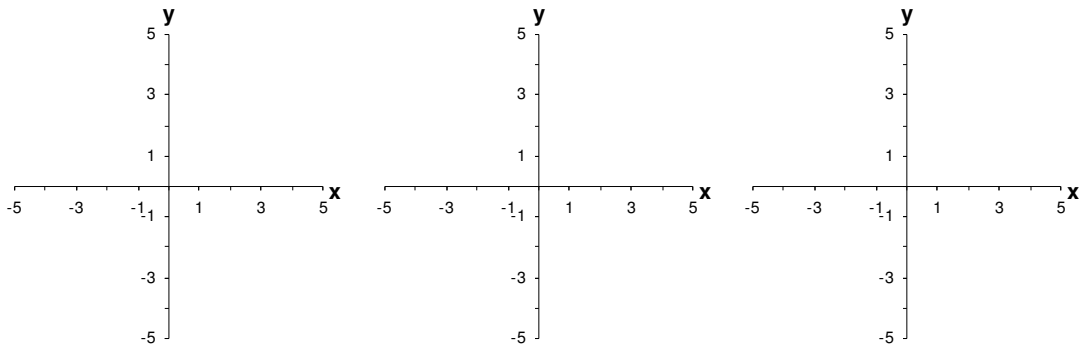
If a is a positive number, the **principal square root** of the negative number $-a$ is defined as _____.

What you should learn
How to find complex solutions of quadratic equations

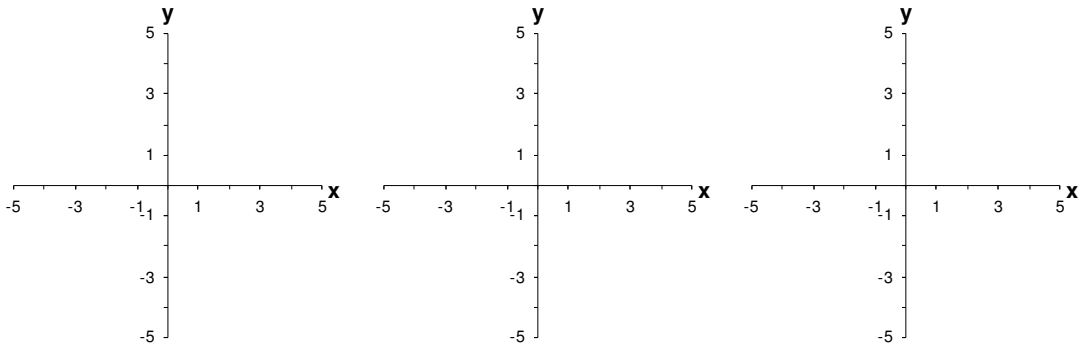
To avoid problems with square roots of negative numbers, be sure to convert complex numbers to _____ before multiplying.

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

Additional notes



Additional notes



Homework Assignment

Page(s)

Exercises