Section 4 – Topic 6
Complex Numbers – Part 2

We can use imaginary numbers to write complex numbers.

A ***complex number*** is a number that can be expressed in the form $a + bi$.

- a and b are real numbers and i is the imaginary unit that satisfies the equation $i^2 = -1$.
- a is the real part.
- bi is the imaginary part of the complex number.

Consider the following complex numbers. Draw a box around the real part and a circle around the imaginary part.

real = $2-3i$

imaginary = $5+2i$

0

$23-5i$

$10+2i$

What is the difference between a simple imaginary number and a complex number?

Complex number has a + or − sign

Let's Practice!

1. Write an equivalent expression for each of the following.

   a. $(3 + 5i) + (7 - 2i)$ $= 10 + 3i$

   b. $(3 - 5i) - (7 - 2i)$

   $3 - 7 = -4$

   $-5i - (-2i) = -3i$ $\quad -4 - 3i$

   $i^2 = -1$

   c. $(7 + 5i)(4 - 8i)$

$28 - 56i + 20i - 40i^2$

$28 - 36i + 40$

$68 - 36i$

try it:

2. Write an equivalent expression for each of the following.

a. $(5 + 2i) + (5 - 2i)$ $= 10$

b. $(3 - 8i) - (7 - 4i)$ $= -4 - 4i$

c. $(3 + 8i)(5 + 2i)$

$15 + 6i + 40i + 16i^2$

$15 + 46i - 16$

$-1 + 46i$

BEAT THE TEST!

1. Which of the following is equivalent to $\sqrt{-9}$?

   Ⓐ $-9i$
   Ⓑ $-3i$
   Ⓒ $3i^2$
   Ⓓ $3i$

$\sqrt{-1} = i$

$i\sqrt{9}$

$\pm 3i$

$(3i)(3i) = 9i^2$

$(-3i)(-3i)$

2. The table below shows several complex numbers, where i is the imaginary unit.

   Select the cells in the table where the product of the two numbers is a real number.

	$9+3i$	$7i$	-3
$9-3i$	Ⓐ	○	○
$7i$	○	Ⓑ	○
-3	○	○	Ⓒ