It's A Parallelogram, You Say?

Name _____

Class _____

Adding and Subtracting Complex Numbers

Complex numbers, **a + bi**, may be graphed as either points or vectors on a coordinate plane. On a graph, the **real axis** is the horizontal axis and the **imaginary axis** is the vertical axis.

The ordered pair for a point on the complex coordinate plane is **(real, imaginary)**.

The complex number a + bi is graphed either as the point (a, b) or is graphed as an arrow (or vector) which starts at the origin and ends at the point (a, b).

The graph to the right displays the graphed, vector form of the complex number 3 – 2i.

Notice the vector starts at (0, 0) and terminates at (3, -2).
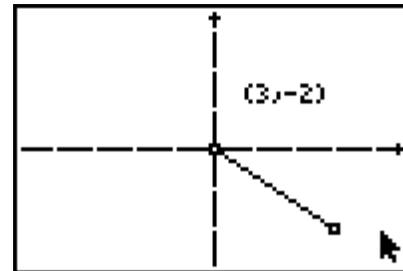
Press APPS and select **Cabri Jr.** to start the application. Then press Y=, select **Open…** and choose the file **COMPLEX**.

Explore the addition of complex numbers. Grab and drag points **(A, B)** and **(C, D)** to change the value of the complex number.

To grab a point, move the cursor until the point begins to flash. Then press ALPHA to grab it and use the arrow keys to move it. Once at the desired location, press ENTER to release it.
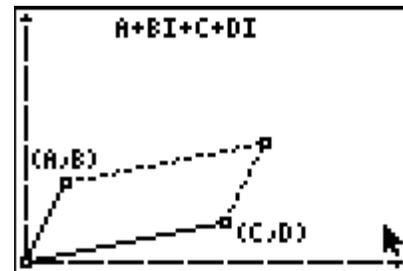
- Describe the relationship between the two complex numbers being added and the diagonal (or resultant) of the parallelogram

The subtraction of a complex number is equivalent to adding the opposite value, so (a + bi) – (c + di) is equivalent to (a + bi) + (–c – di).

For example, (2 – 3i) – (5 + 2i) = (2 – 3i) + (–5 – 2i).

Grab and drag origin to the middle of the screen. Then drag the points **(A, B)** and **(C, D)** to show (1 – 2i) – (3 + 2i).

Sketch your results at the right.
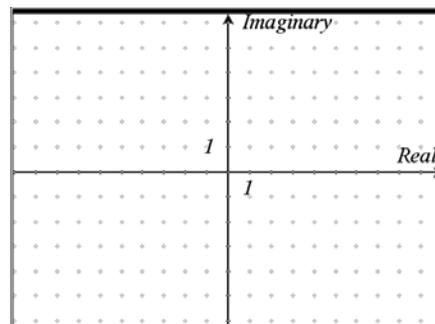
Homework

For Questions 1–7, sketch parallelograms and resultants to illustrate the given addition or subtraction problems.

1. Find $(2 + 3i) + (-5 + 2i)$.

   Answer:_____
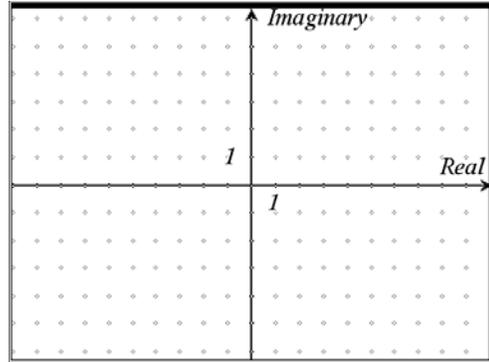
2. Find $(2 + 3i) - (-5 + 2i)$.

   Answer:_____
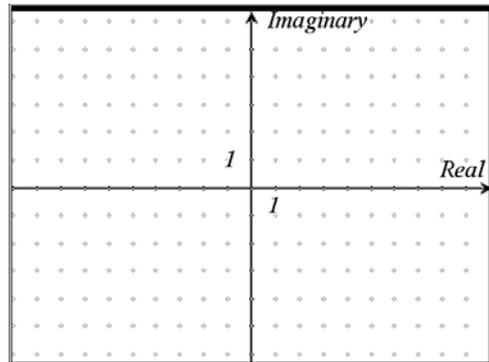
3. Find $(-6 + i) + (-1 + 2i)$.

   Answer:_____
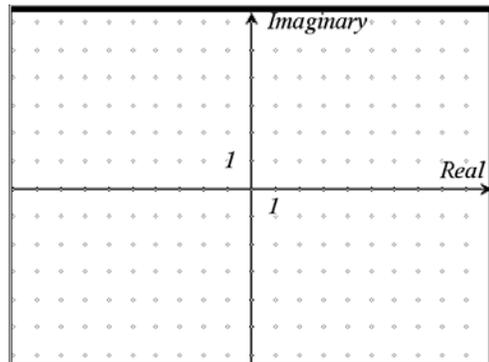
4. Find $(-6 + i) - (-1 + 2i)$.

   Answer:_____
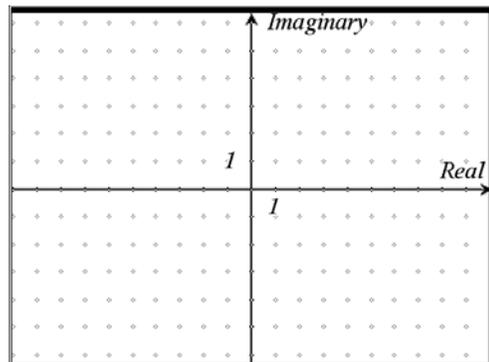
5. Find $(-1.2 - 2.6i) + (-2.8 - 1.7i)$.

    Answer:_____
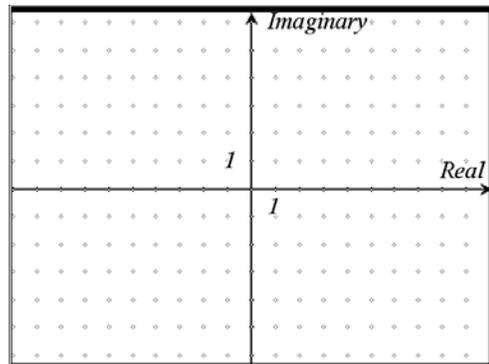
6. Find $(-1.2 - 2.6i) - (-2.8 - 1.7i)$.

    Answer:_____
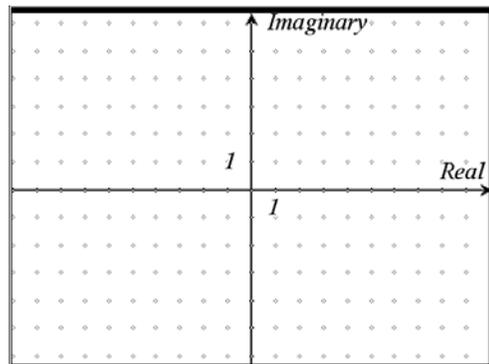
7. Find $(-4 + i) + (4 - i)$.

    Answer:_____
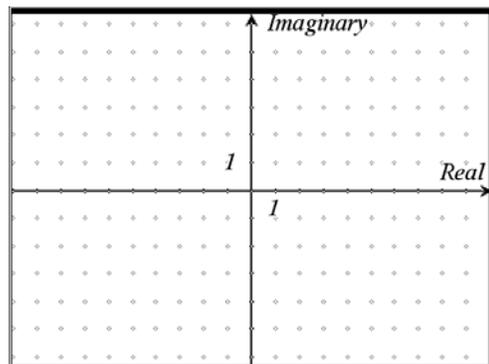
8. What happens graphically when the sum of two complex numbers is zero?