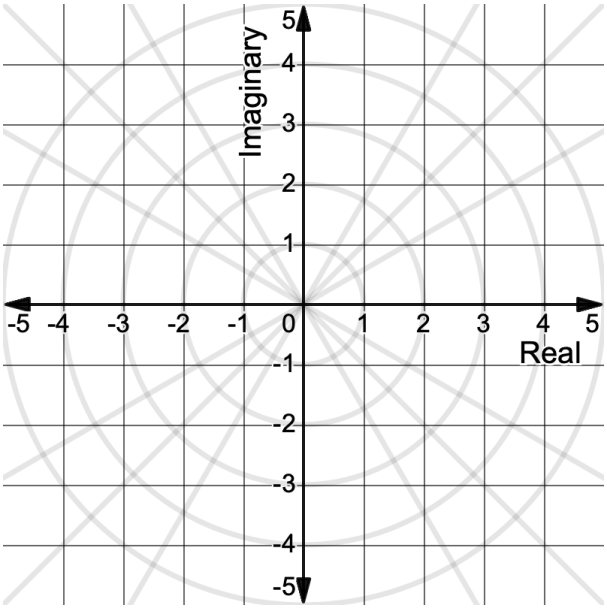
Why So Complex?

In elementary school, you learned how to graph real numbers on a number line. Later, you learned that there were also complex numbers: numbers that had a real component and an imaginary component. How do we graph these points?

1. Consider the complex number $3 + 2i$. What is the real component of this number? What is the imaginary component?

2. In the complex plane, the horizontal axis represents the real axis, and the vertical axis represents the imaginary axis. Graph a point that represents the number $3 + 2i$ on the complex plane. What are the coordinates of the point?

3. What are the coordinates of this complex number in polar coordinates?



4. A complex number can be represented using the point $\left(4, \frac{5\pi}{6}\right)$ in polar coordinates.
   a. Graph the point on the complex plane above.
   b. What is its real component?

   c. What is its imaginary component?

   d. Write this complex number in Cartesian form, $a + bi$.

5. Just like the size, or magnitude, of a number is its absolute value (distance from 0), the magnitude of a complex number is its distance from the origin on the complex plane. What is the magnitude of the complex number $1 - 4i$?

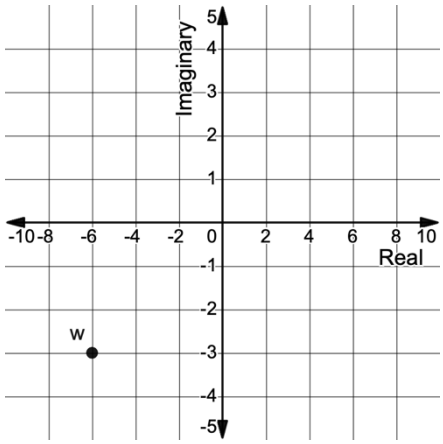
Lesson 8.2 – Complex Numbers

QuickNotes

Check Your Understanding

1. A complex number, w, is graphed below.
   a. Write w in rectangular form.

   b. Write w in polar form.



2. A complex number is represented in polar coordinates as $\left(5, \frac{2\pi}{3}\right)$. Find its real and imaginary component.

3. Write the complex number $8\left(\cos\left(\frac{\pi}{2}\right) + i\sin\left(\frac{\pi}{2}\right)\right)$ in standard (rectangular) form.

4. Write the number $4 - 4i$ in polar form.