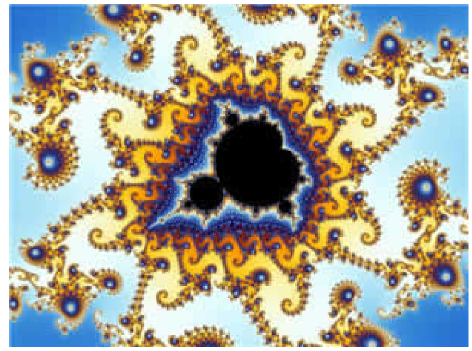
5.2 Complex Graphing

Practice Tasks



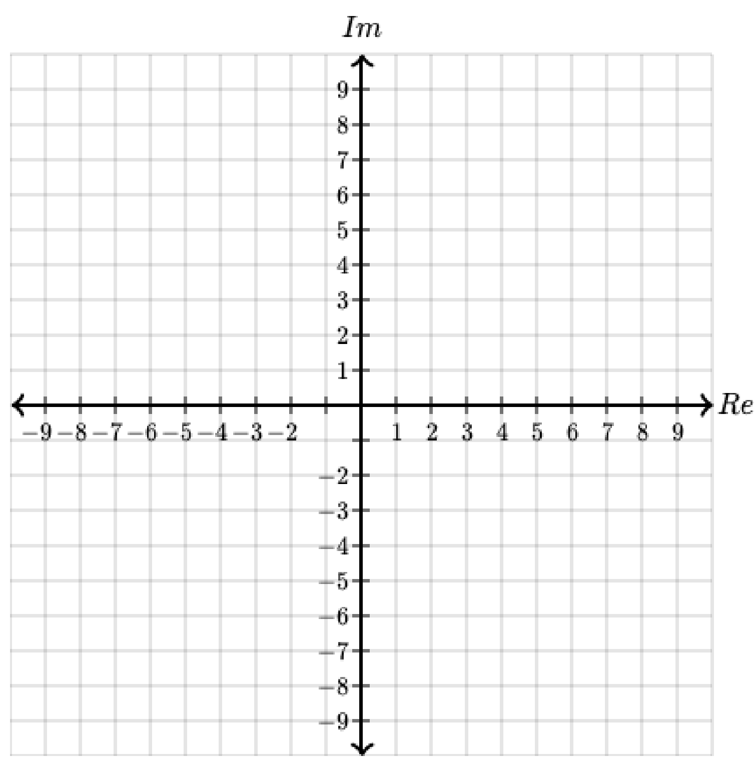
I. Concepts and Procedures

1. Describe the <u>geometric effect</u> of the following:

   a. Adding a real number

   b. Adding an imaginary number

   c. Taking the complex conjugate



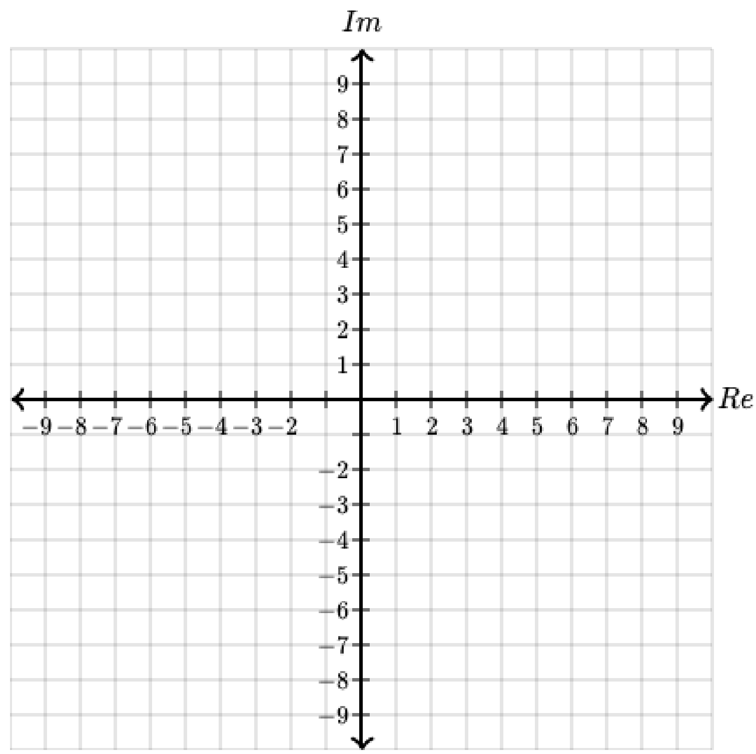
2. Show an answer graphically for each of the following problems. Label the points with capital letters. (A, etc.)

   a. $(-6 - 2i) + (6 - 5i)$

   b. $(-5 + 3i) - (4 - 5i)$

   c. $(5 + 6i) + (2 - 7i)$

3. Given the complex numbers $w = 2 - 3i$ and $z = -3 + 2i$, graph each of the following. Label the points with capital letters. (A, etc.)



a. $w - 2$

b. $z + 2$

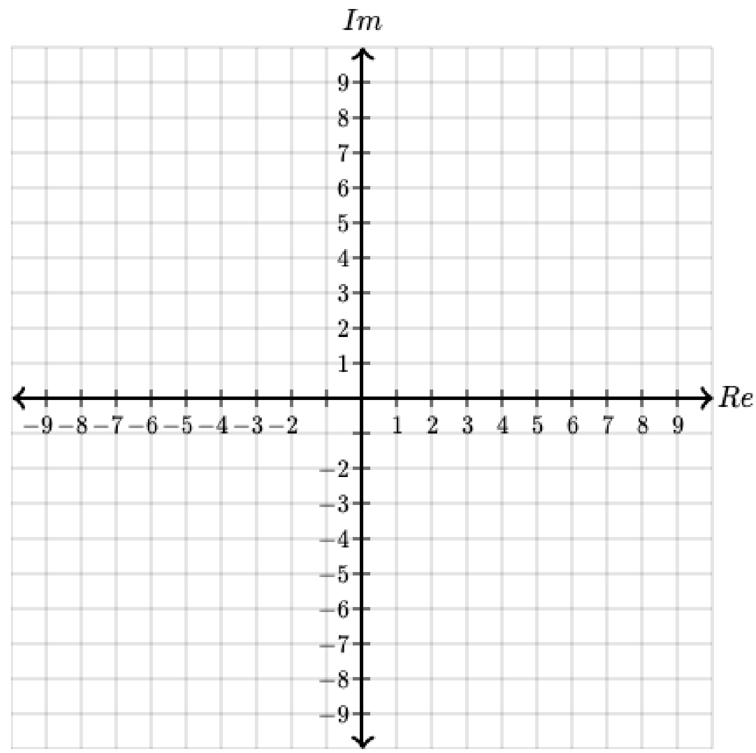
c. $w + 2i$

d. $z - 3i$

e. $w + z$

f. $z - w$

4. Let $z = -4 + 2i$, simplify the following and describe the geometric effect of the operation.



a. $z + 2 - 3i$

b. $z - 2 - 3i$

c. $z - (2 - 3i)$

5. Find the conjugate of each complex number. Then plot the complex number and its conjugate on the complex plane. Label the conjugate with a prime symbol.

   a. $A: 3 + 4i$
   b. $B: -2 - i$
   c. $C: 7$
   d. $D: 4i$

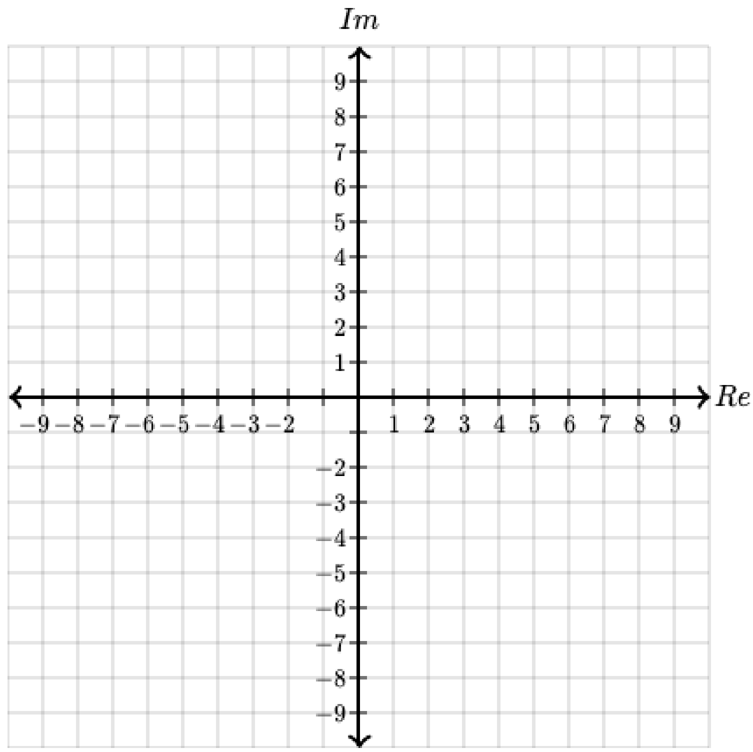
6. Find the modulus and the argument of each complex number below. Then plot each complex number.

   a. 3 + 4i

   b. -2 – i

   c. 7

   d. 4i



7. Given the complex number z, find a complex number z + w where z + w is shifted

   a. $2\sqrt{2}$ in a northeast direction

   b. $5\sqrt{2}$n a southeast direction

II. Problem Solving

1. Given $z = 3 + i, w = 1 + 3i$.

   a. Find $z + w$, and graph z, w, and $z + w$ on the same complex plane. Explain what you discover if you draw line segments from the origin to those points z, w, and $z + w$. Then draw line segments to connect w to $z + w$, and $z + w$ to z.

   b. Find $z - w$, and graph z, w, and $z - w$ on the same complex plane. Explain what you discover if you draw line segments from the origin to those points z, w, and $z - w$. Then draw line segments to connect w to $z - w$, and $z - w$ to z.

III. Reasoning

1. Explain why $|z + w| \leq |z| + |w|$ and $|z - w| \leq |z| + |w|$ geometrically. (Hint: Triangle inequality theorem)