2.4 Complex Numbers

What will you learn?

- **To use the imaginary unit *i* to write complex numbers**
- **To Add, Subtract & Multiply complex numbers**
- **To use complex conjugates**
- **To plot complex numbers in the complex plane**

Operations with Complex Numbers

Addition & Subtraction

+/- real parts; +/- imaginary parts

If $a + bi$ and $c + di$ are complex numbers written in standard form, their sum and difference are defined as follows:

Sum $(a + bi) + (c + di) = (a + c) + (b + d)i$

Difference $(a + bi) - (c + di) = (a - c) + (b - d)i$

Additive Identity _____

Additive Inverse _____

Example 1 - Adding & Subtracting Complex Numbers

a.) $(3 - i) + (2 + 3i)$

b.) $2i + (-4 - 2i)$

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

d.) $(3 + 2i) + (4 - i) - (7 + i)$

See p. 133; exercise 19

Complex Conjugates

$(a + bi)(a - bi) =$

Example 3 - Multiplying Conjugates

Multiply $(3 - 5i)$ by its conjugate

See p.133; exercise 37

Example 4 - Writing a Quotient of Complex Numbers in Standard For m

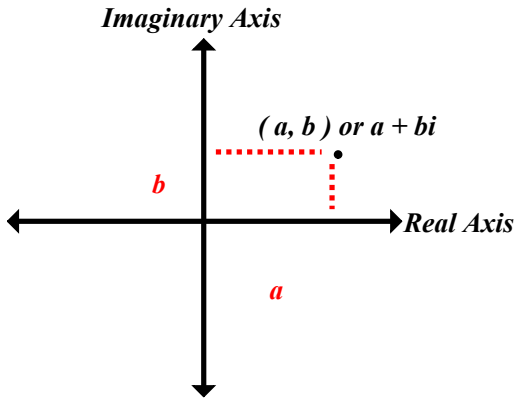
Write in standard form $\dfrac{2+3i}{4-2i}$

See p. 134; exercise 49

Fractals & the Mandelbrot Set

a general description

Complex Plane



Example 5 - Plotting Complex Numbers

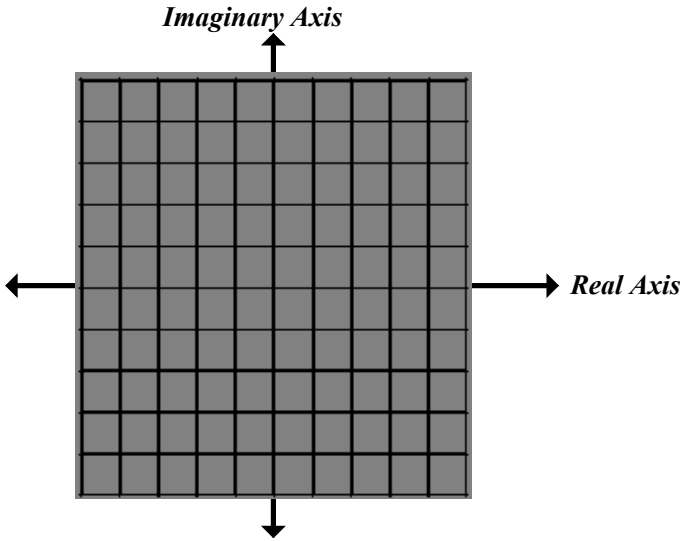
Plot each complex number in the complex plane

a.) $2 + 3i$

b.) $-1 + 2i$

c.) 4

d.) $-3i$



See p. 134; exercise 67