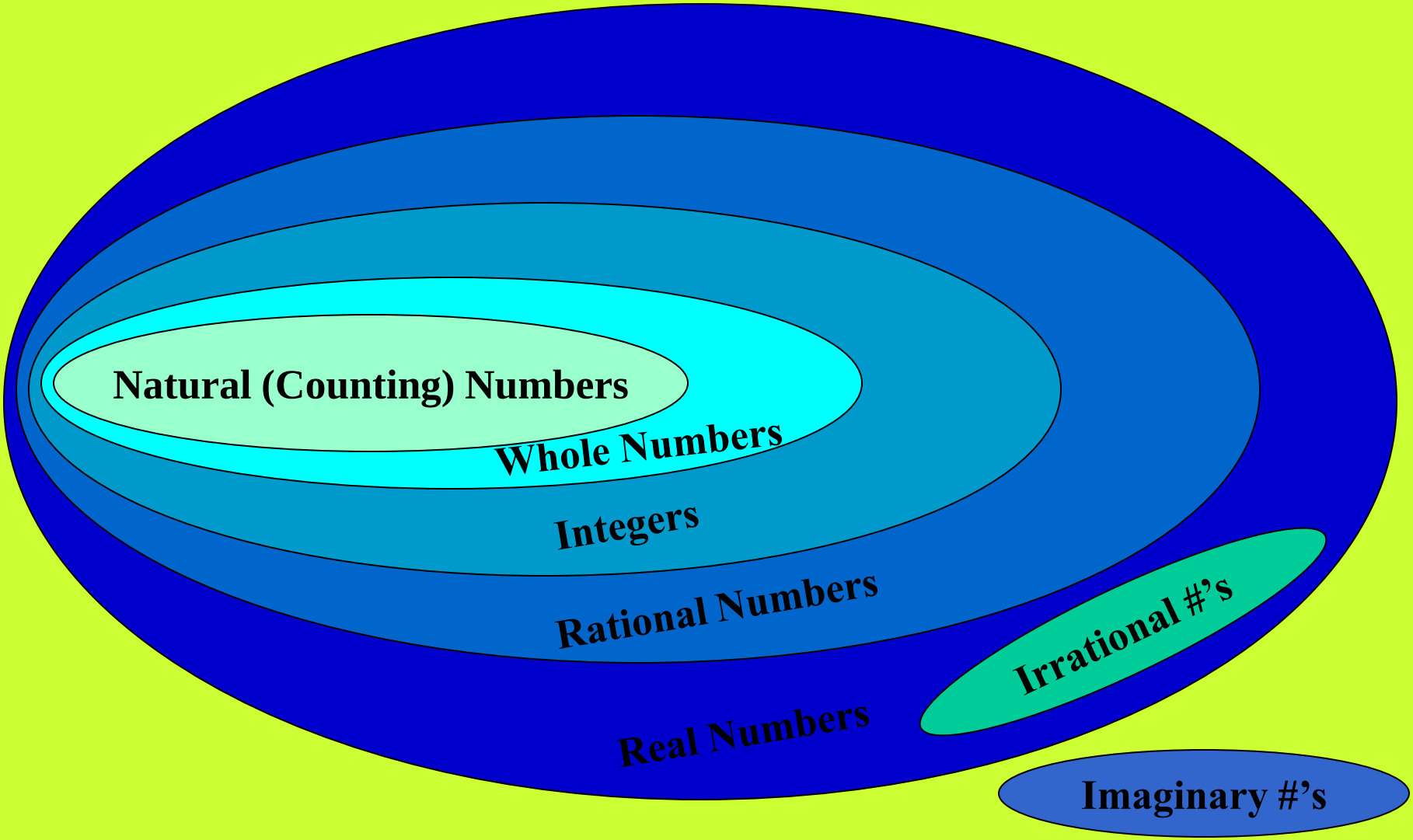
Introduction to Complex Numbers

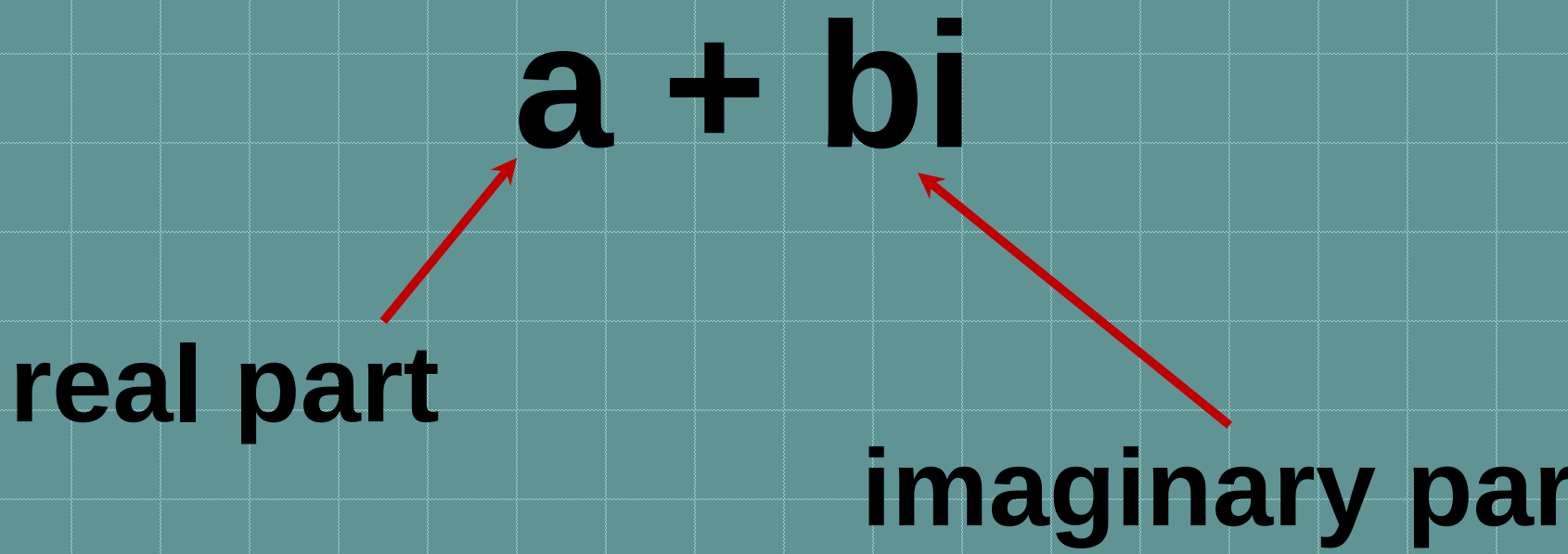
Adding, Subtracting, Multiplying And Dividing Complex Numbers

SPI 3103.2.1 Describe any number in the complex number system.

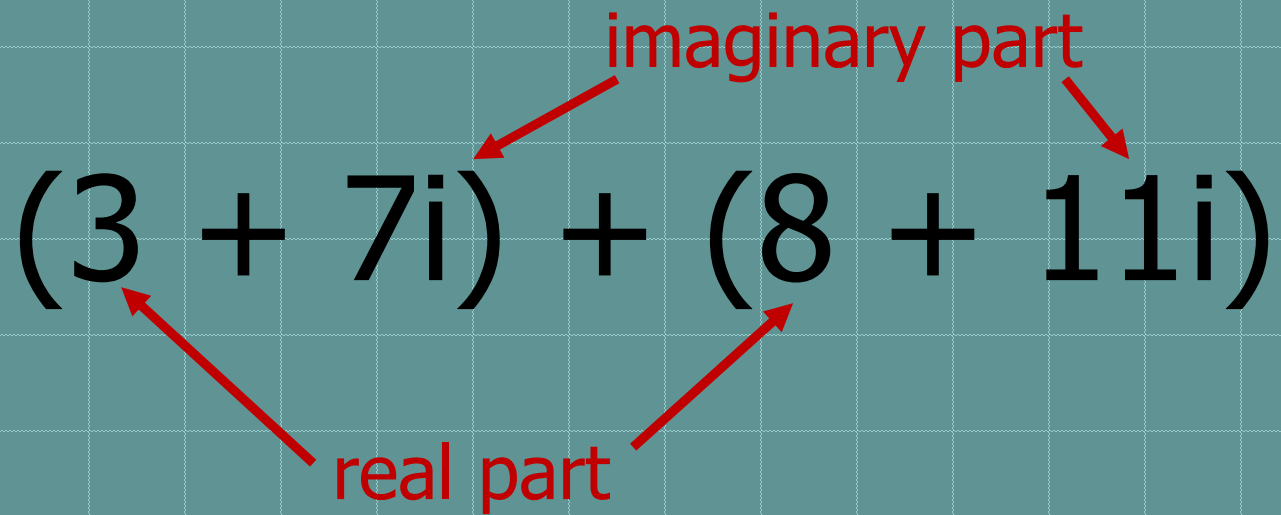
Complex Numbers (a + bi)



Complex Numbers are written in the form a + bi, where a is the real part and b is the imaginary part.



When adding complex numbers, add the real parts together and add the imaginary parts together.



$$11 + 18i$$

When subtracting complex numbers, be sure to distribute the subtraction sign; then add like parts.

$$(5 + 10i) - (15 - 2i)$$

$$5 + 10i - 15 + 2i$$

$$\boxed{-10 + 12i}$$

When multiplying complex numbers, use the distributive property and simplify.

$$(3 - 8i)(5 + 7i)$$

$$15 + 21i - 40i - 56i^2$$

$$15 - 19i + 56$$

$$\boxed{71 - 19i}$$

Remember, $i^2 = -1$

To divide complex numbers, multiply the numerator and denominator by the complex conjugate of the complex number in the denominator of the fraction.

$$\frac{7 + 2i}{3 - 5i}$$

The complex conjugate of $3 - 5i$ is $3 + 5i$.

$$\frac{7 + 2i}{3 - 5i}\ \frac{(3 + 5i)}{(3 + 5i)}$$

$$\frac{21 + 35i + 6i + 10i^2}{9 + 15i - 15i - 25i^2}$$

$$\frac{21 + 41i - 10}{9 + 25}$$

$$\boxed{\frac{11 + 41i}{34}}$$

Try These.

1. $(3 + 5i) - (11 - 9i)$
2. $(5 - 6i)(2 + 7i)$
3. $\dfrac{2 - 3i}{5 + 8i}$
4. $(19 - i) + (4 + 15i)$

Try These.

1. $(3 + 5i) - (11 - 9i)$ $-8 + 14i$

2. $(5 - 6i)(2 + 7i)$ $52 + 23i$

3. $\dfrac{2 - 3i}{5 + 8i}$ $\dfrac{-14 - 31i}{89}$

4. $(19 - i) + (4 + 15i)$ $23 + 14i$

Investigate the powers of i.

Power	Exponential form	simplified
1	i	0+i
2	i^2	-1
3		
4		
5		
6		
7		
8		
9		
12		
27		
70		
-10		