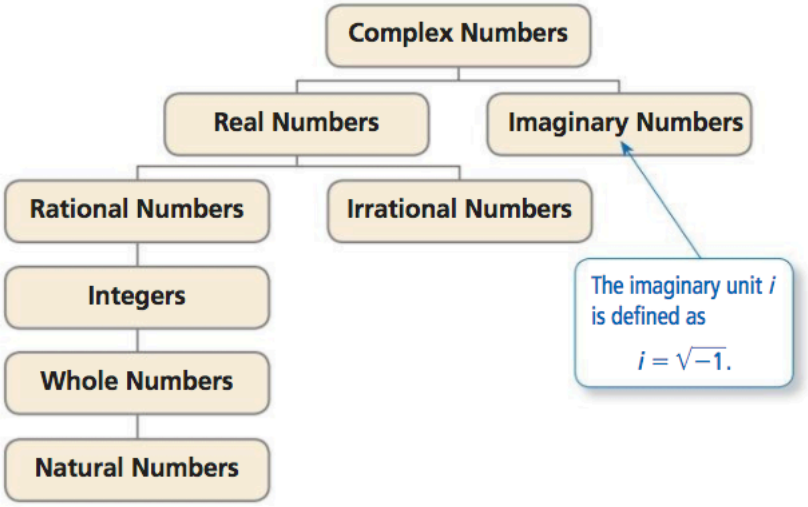
3.1 Complex Numbers

Types of numbers:



Complex:

Real:

Rational:

Irrational:

Integers:

Whole:

Natural:

Complex numbers written in standard form:

Ex1: Simplify

1. $\sqrt{-25}$
2. $\sqrt{-32x^2}$
3. $\sqrt{-72m^3p^4}$

Key notes: Copy this chart!

- $i =$
- $i^2 =$
- $i^3 =$
- $i^4 =$

Ex2: find the values of x and y that satisfy the equations:

1. $2x - 7i = 10 + yi$

2. $9 + 4yi = -2x + 3i$

Ex3: Adding and Subtracting Complex Numbers

1. $(8 - i) + (5 + 4i)$

2. $(7 - 6i) - (3 - 6i)$

Ex4: Multiplying complex numbers:

1. $4i(-6 + i)$

2. $(9 - 2i)(-4 + 7i)$

Ex5: Solving Quadratics

1. $x^2 + 4 = 0$

2. $2x^2 - 11 = -47$

Ex6: Finding Zeros of a Quadratic

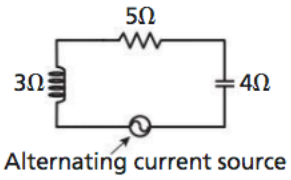
Find the zeros of $f(x) = 4x^2 + 20$

Check!

Ex7: Real world problems:

Electrical circuit components, such as resistors, inductors, and capacitors, all oppose the flow of current. This opposition is called *resistance* for resistors and *reactance* for inductors and capacitors. Each of these quantities is measured in ohms. The symbol used for ohms is Ω, the uppercase Greek letter omega.

Component and symbol	Resistor	Inductor	Capacitor
Resistance or reactance (in ohms)	R	L	C
Impedance (in ohms)	R	Li	$-Ci$



The table shows the relationship between a component's resistance or reactance and its contribution to impedance. A *series circuit* is also shown with the resistance or reactance of each component labeled. The impedance for a series circuit is the sum of the impedances for the individual components. Find the impedance of the circuit.

Homework: 5, 9, 14, 18, 20, 31, 35, 37-43 odd, 49-61odd