Solve by completing the square.

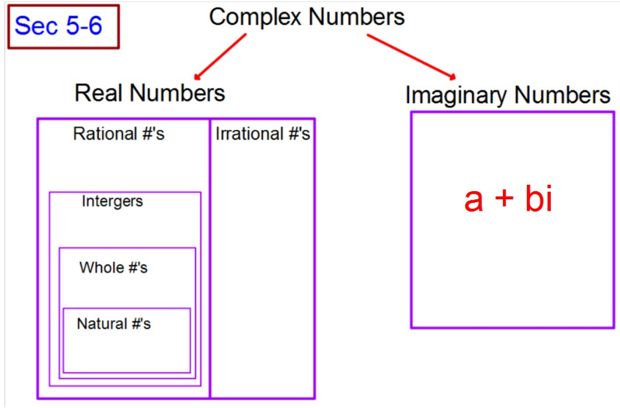
$$x^2 + 6x + 15 = 0$$

$$-15 \quad -15$$

$$x^2 + 6x \underline{+9} = -15 + 9$$

$$\sqrt{(x+3)^2} = \sqrt{-6}$$

No Real Sol



Imaginary Numbers:

$$\sqrt{-1} = i$$

i is called the imaginary unit.

Simplify each.

1. $\sqrt{24}$

$\sqrt{4 \cdot 6}$

$\sqrt{4} \cdot \sqrt{6}$

$\boxed{2\sqrt{6}}$

2. $\sqrt{-24} = \boxed{2i\sqrt{6}}$

$\sqrt{-1 \cdot 4 \cdot 6}$

$\sqrt{-1} \cdot \sqrt{4} \cdot \sqrt{6}$

$i \cdot 2 \cdot \sqrt{6}$

Simplify each.

1. $\sqrt{-98}$

$\sqrt{-49 \cdot 2}$

$= 7i\sqrt{2}$

2. $\sqrt{-256}$

$16i$

3. $\sqrt{-39}$

$i\sqrt{39}$

4. $5\sqrt{-18}$

$5\sqrt{-9 \cdot 2}$

$5 \cdot 3i\sqrt{2}$

$= 15i\sqrt{2}$

Complex Numbers:

any number that can be written in the form: $a + bi$ (a and b can be any real #)

$\underbrace{a}_{\text{Real Part}} + \underbrace{bi}_{\text{Imaginary Part}}$

Standard Form of a Complex Number

Real Number: when $b=0$

Imaginary Number: when $b \neq 0$ (a may or may not be zero)

Examples of Imaginary #'s: 10 - 7i or 13i

The terms Complex Number and Imaginary Number are quite often used interchangeably.

Even though they are NOT the same thing!

Write each as a Complex Number in $\underbrace{\text{Standard Form}}_{a+bi}$

1. $2 + \sqrt{-9}$

$\boxed{2 + 3i}$

2. $\sqrt{-12} - 5$

$-5 + \sqrt{-12} \rightarrow \sqrt{4 \cdot 3}$

$= \boxed{-5 + 2i\sqrt{3}}$

Simplify each expression:

1. $(6 - \sqrt{-64}) + (5 + \sqrt{-49})$

$(6 - 8i) + (5 + 7i) = \boxed{11 - i}$

2. $(-11 + \sqrt{-9}) - (6 - \sqrt{144})$

$(-11 + 3i) - (6 - 12)$

$(-11 + 3i) - (-6) = \boxed{-5 + 3i}$