#2 ~ Sect. 5.6: Complex Numbers (Part 1)

First we need to review simplifying radicals:

A radical is in simplest form when the number under the radical symbol cannot be split into factors where one of those factors is a perfect square number.

Perfect Square Numbers (excluding 1): 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169 …

a) $\sqrt{4}$ b) $\sqrt{12}$ c) $\sqrt{54}$ d) $3\sqrt{27}$

Imaginary number: Any number of the form $a+bi$, where $b \neq 0$.

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

$$i^2 = -1$$

Square Root of a Negative Number: For any positive real number a,

$$\sqrt{-a} = i\sqrt{a}.$$

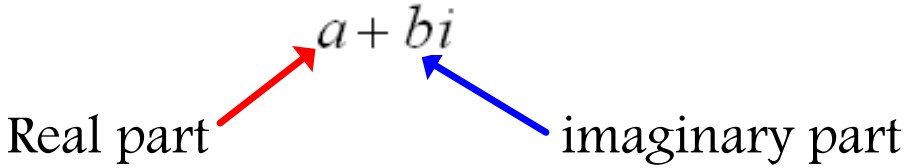
Ex: $\sqrt{-4} = i\sqrt{4} = i \cdot 2 = 2i$

Ex. 1: Simplify each square root.

a) $\sqrt{-54}$ b) $\sqrt{-12}$ c) $\sqrt{-2}$ d) $\sqrt{-36}$

Imaginary numbers and real numbers together makeup the set of complex numbers.

<u>Complex numbers:</u> Any number that can be written in the form $a+bi$, wherea and b are real numbers, including 0.



<u>Ex. 2:</u> Write each complex number in the form $a+bi$.

a) $\sqrt{-121}-7$

b) $\sqrt{-18}+7$

Absolute Value of a Complex Number: $|a+bi| = \sqrt{a^2+b^2}$

Ex. 3: Find each absolute value.

a) $|-7i|$

b) $|10+24i|$