

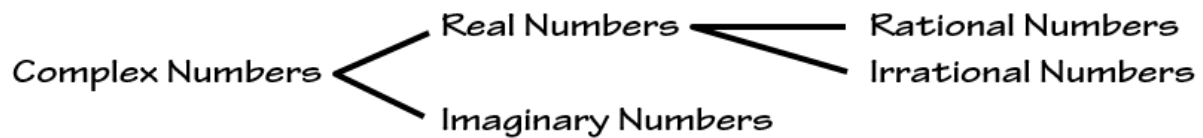
Bellwork: Simplify the expression

$$\begin{array}{r}
 2\sqrt{20} + \sqrt{125} - 3\sqrt{45} \\
 \begin{array}{ccc}
 \begin{array}{c} 10 \text{ } \textcircled{2} \\ \textcircled{5} \textcircled{2} \end{array} & \begin{array}{c} 25 \text{ } \textcircled{5} \\ \textcircled{5} \textcircled{5} \end{array} & \begin{array}{c} 9 \text{ } \textcircled{5} \\ \textcircled{3} \textcircled{3} \end{array}
 \end{array} \\
 \hline
 2 \cdot 2\sqrt{5} + 5\sqrt{5} - 3 \cdot 3\sqrt{5} \\
 \rightarrow 4\sqrt{5} + 5\sqrt{5} - 9\sqrt{5} \\
 9\sqrt{5} - 9\sqrt{5} \\
 = 0
 \end{array}$$

Lesson 1.5 Objective:

I CAN

1. ~~SWBAT~~ add, subtract, & multiply complex numbers.



Complex numbers include all real numbers and all imaginary numbers and can be written in the form $a+bi$

Imaginary numbers are complex numbers where $b \neq 0$.

The number i is a special number defined as follows:

$$\frac{-4i^2}{4} = -4i$$

$$\begin{aligned} i &= \sqrt{-1} \\ i^2 &= -1 \end{aligned}$$

$$\sqrt{-16} = (4i)^2$$

$$-16 = 16(-1)$$

To add and subtract complex numbers, follow the same "like terms" rule we've used before

$$(\underline{2} + \underline{3i}) + (\underline{10} - \underline{7i}) = \underline{12} - \underline{4i}$$

$$(4 + 8i) + (6 - 10i) = 10 - 2i$$

$$(2-i) - (3+3i) = \underbrace{2}_{-3} - i - \underbrace{3}_{-3} - 3i$$
$$\underline{-1 - 4i}$$

To multiply complex numbers, proceed as usual, but remember that $i^2 = -1$ and therefore becomes real.

$$(4i)(5i) = 20i^2 = -20$$
$$20(-1) \uparrow$$

$$\begin{aligned}(-9i)(3i) &= -27i^2 = -27(-1) \\ &= \textcircled{27}\end{aligned}$$

$$\begin{aligned}(2+5i)(6-4i) & \quad \begin{array}{c} 2+5i \\ \begin{array}{|c|c|} \hline 12 & \underline{30i} \\ \hline \underline{-8i} & -20i^2 \\ \hline \end{array} \\ \end{array} \\ 22i+12-20i^2-4i & \\ 22i+12+20 & \\ = \underline{32} + \underline{22i} & \end{aligned}$$

Simplify each of the following

$$(-1)^2 = 1$$

I. $i^7 \quad (i^2)^3 i = (-1)^3 i = -i$

~~★~~ II. $\sqrt{-25} \quad 5i$

★ III. $(2i)^2 \quad 4i^2 = -4$

For each complex number in the form $a + bi$,
identify the values of a and b

I. $10 - 6i \quad a = 10 \quad b = -6$

II. $0 + 23i \quad a = 0 \quad b = 23$

III. $-87 \quad a = -87 \quad b = 0$

