4-1 Review of Complex Numbers

Objective: Students will be able to:

Know the parts of a complex number

Know how to add, subtract, and multiply 2 complex numbers

Know what a conjugate is and how to find one

$$i = \sqrt{-1} \qquad \text{and} \qquad \qquad i^2 = -1$$

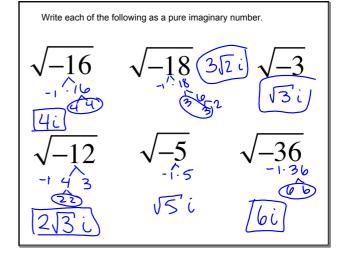
Definition

Complex numbers are numbers of the form a+bi where a and b are real numbers. The real number a is called the real part and the number b is called the imaginary part.

Identify the real and imaginary parts of each complex number.

4+5iReal: 4

Non Real: 5 2:3 1:0 3 1:7



Write each in Standard Form. State the real and imaginary parts.

$$2 - \sqrt{-25}$$

$$-1.25$$

$$3 + \sqrt{-50}$$

$$-1.25$$

$$3 + \sqrt{-50}$$

$$-1.25$$

$$3 + \sqrt{-12}$$

$$2$$

$$3 + \sqrt{-12}$$

$$4 + \sqrt{-12}$$

$$5 + \sqrt{-12}$$

$$5 + \sqrt{-12}$$

$$5 + \sqrt{-12}$$

$$6 + \sqrt{-12}$$

$$7 + \sqrt{-12}$$

Add:
$$(4) - 3i) + (-2) + 5i) = 2 + 2i$$

$$(4 + \sqrt{-25}) + (-6 - \sqrt{-16})$$

$$(4 + 5i) + (-6 - 4i) = -2 + i$$
Subtract:
$$(-3 + 7i) + (5 + 4i) = -8 + 11i$$

$$(3 + \sqrt{-12}) - (-2 - \sqrt{-27})$$

$$(3 + 2) = -3 + 11i$$

$$(3 + 5) = -3 + 11i$$

$$(3 + 5) = -3 + 11i$$

$$(3 + 5) = -3 + 11i$$

$$(4 - \sqrt{-4}) + (-7 + \sqrt{-9})$$

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

Multiply
$$4i(3-6i)$$

$$12i-24i^{2}$$

$$12i+24$$

$$(-2+4i)(3-i)$$

$$-6+2i+12i(4i^{2})$$

$$-6+14i+44$$

$$-2+14i$$

Remember from before:

$$\sqrt[n]{a}\sqrt[n]{b} = \sqrt[n]{ab}$$

only works when $\sqrt[p]{a}$ and $\sqrt[p]{b}$ are real numbers

This means that

$$\sqrt{a}\sqrt{b} \neq \sqrt{ab}$$
 if $a < 0$ or $b < 0$

Multiply

$$\sqrt{-25}\sqrt{-4} = \sqrt{100} = \sqrt{25}$$

Since $\sqrt{2} = \sqrt{100}$

Simplify Radicals First

 $(2 + \sqrt{-16})(1 - \sqrt{-4})$
 $(2 + 4i)(1 - 2i)$
 $2 - 4i + 4i - 8i^2$
 $2 + 8 = 10$

You Try
$$\sqrt{-9}\sqrt{-36}$$

$$\left(2+\sqrt{-36}\right)\left(4-\sqrt{-25}\right)$$
Multiply (What Happens?)
$$\left(4+3i\right)\left(4-3i\right)$$

$$\left(6+9\right)$$

$$\left(6+9\right)$$

$$\left(6+9\right)$$

