Math 2

Imaginary Numbers

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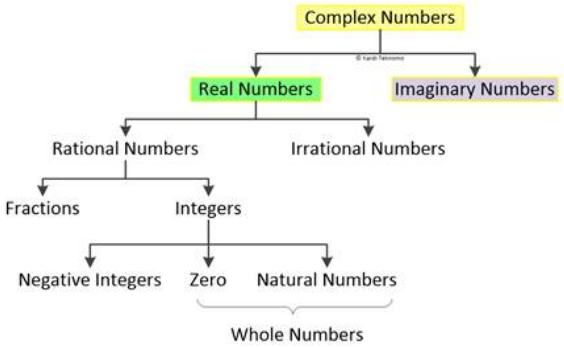
I. The Complex Number Tree



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II. Rational vs. Irrational

Rational Numbers:

These are numbers such as $\frac{2}{7}, \frac{3}{4}, and\ -9$ that can be written as the ratio of two integers. When written as decimals, rational numbers terminate or repeat.

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Irrational Numbers:

Real numbers that are not rational, such as $\sqrt{2}$ and π . When written as decimals, irrational numbers do not terminate and do not repeat.

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Identify each question as Rational or Irrational.

1. $\sqrt{11}$

2. $\sqrt{25}$

3. $0.6\overline{6}$

4. $\sqrt{5}$

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III. Complex Numbers

All numbers are complex.

There is a special subset of them that we call imaginary.

Imaginary numbers solve the issue of negative numbers under a square root.

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Imaginary Numbers

$\sqrt{-36}$

$\sqrt{-1} = i$

$i =$

$i^2 =$

$i^3 =$

$i^4 =$

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$\sqrt{-25}$ $\sqrt{-45}$ $\sqrt{-8}$

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"Pop out the ***i's*** before you multiply or simplify."

$\sqrt{-2}\cdot\sqrt{-8}$ $\sqrt{-5}\cdot\sqrt{-15}$

$\sqrt{-6}\cdot\sqrt{3}$ $(-2\sqrt{-8})(3\sqrt{-2})$

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$(6\sqrt{-24})(-3\sqrt{6})$ $\frac{36i}{4i}$

$(-5i)^2$

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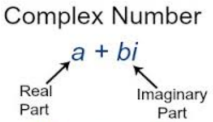
IV. Operations with Complex Numbers



Write each number in complex number form.

1. 2 + √-3

2. 6 - √-28

3. -√-50 - 2

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Adding and Subtracting, we can only add the parts that are alike:

Examples:

1. $(11+5i)+(3+2i)$ 2. $(18-3i)-(12-i)$

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Multiplying, we treat them just like a polynomial! Be sure to clean up any imaginary numbers raised to a power.

1. $(10+7i)(2+3i)$

2. $(5-6i)(9+3i)$

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You Try!

1) $(4+3i)+(-6-2i)$

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

3) $(7-7i)-(1-7i)$

4) $(-7i)(5i)(5+3i)$

5) $(-8-4i)(6+5i)$

6) $(1-3i)^2$

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Using Imaginary #'s to Solve!

1. $x^2+36=0$

2. $4x^2+9=0$

3. $3x^2 + 10 = -6x^2 + 9$

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