**Dividing with Imaginary & Complex Numbers**

**Rules:**

\*No i's in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\*Make sure i's are in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ form…meaning nothing is \_\_\_\_\_\_\_\_\_\_\_\_\_\_ than “\_\_\_\_”

We saw in Keeper # 4, that sometimes the “i” in the denominator eliminates itself simply by subtracting exponents.

**Ex. # 1: Simplify completely.**



But what happens when there are no other “i’s” in the problem to do that? We must \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

to eliminate the “i.”

**Steps to Rationalizing the Denominator:**

1.) Simplify the “\_\_\_\_\_\_\_” completely

2.) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ & \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by “i”

3.) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the fraction completely

**Ex. # 2: Simplify completely.**



**Ex. # 3: Simplify completely.**

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**Special Cases:**

When there is a complex number (real number + imaginary number) in the denominator, we must multiply by the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in order to rationalize the denominator.

**Complex Conjugates**

(What to multiply by in order to get rid of the "i")

**- 2 + 3i ---> \_\_\_\_\_\_\_\_\_\_\_\_**

**1 - i ---> \_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Ex. # 4: Simplify completely.**

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**Ex. # 5: Simplify completely.**



**Graphing Imaginary & Complex Numbers**

Because complex numbers consist of both real and imaginary parts, we must use a special coordinate plane, called the complex plane, to graph them.



The real numbers run \_\_\_\_\_ and \_\_\_\_\_.

The imaginary numbers run \_\_\_ and \_\_\_\_\_\_\_\_.

In the complex plane, the value of a single complex number is represented by the position of the point, so each complex number A + B*i* can be expressed as the ordered pair \_\_\_\_\_\_\_\_…however, it does not represent a single point like the coordinate plane.

**Ex. # 6: Graph the complex numbers.**



A.) 4 – 3i

B.) 5 + 2i

C.) 6i

D.) – 7 + 5i

The **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a**complex number**,** a+bi, is defined as the \_\_\_\_\_\_\_\_\_\_\_\_\_ between the \_\_\_\_\_\_\_\_\_\_\_\_\_ and the point \_\_\_\_\_\_\_\_\_\_\_ in the complex plane.

**Ex # 7: Find the value.**



**Ex. # 8: Find the distance between point B and point D.**