Operations with Complex Numbers (Due 9/16 A-Day, 9/17 B-Day)

Definition of Complex Numbers **Name:**

1	What is *i*? Is it a variable? Why or why not?	2	Define a complex number in your own words.
3	Give 2 examples of complex numbers.	4	You and your friend are talking about *i* on the bus ride home. Your friend says that *i* is the "negative square root of one." Is your friend correct? Why or why not?
5	What is *i* equal to? Fill up the space in this box with your answer.	6	Simplify $\sqrt{-8}$

Cycle of i

1	i^{72}	2	i^{91}
3	i^{17}	4	i^{42}
5	i^{44}	6	i^{51}

Simplifying Complex Numbers

1	$\sqrt{-147}$	2	$\sqrt{-36}$
3	$\sqrt{-72}$	4	$\sqrt{-12}$
5	$\sqrt{-128}$	6	$\sqrt{-512}$

Adding/Subtracting Complex Numbers

1	$i + 6i$	2	$3i + i$
3	$-8i - 7i$	4	$-1 - 8i - 4 - i$
5	$-3 + 6i - (-5 - 3i) - 8i$	6	$7 + i + 4 + 4$

Multiplying Complex Numbers

1	$5i \cdot i \cdot -2i$	2	$-4i \cdot 5i$

3	$7i \cdot 3i(-8-6i)$	4	$(-2-i)(4+i)$
5	$(1-7i)^2$	6	$(-2-2i)(-4-3i)(7+8i)$

Rationalizing Imaginary Denominators

1	$\frac{2}{8i}$	2	$\frac{6}{-4i}$
3	$\frac{6+8i}{9i}$	4	$\frac{8i}{-1+3i}$
5	$\frac{-5-9i}{9+8i}$	6	$\frac{-5-3i}{7-10i}$

Examples:

Definition of Complex Numbers

Complex Numbers

Any number in form a+bi, where a and b are real numbers and i is imaginary.

What is an imaginary number?

Cycle of i

Cycle of i

$i^0 = 1$ $\quad$ $i^4 = 1$

$i^1 = i$ $\quad$ $i^5 = i$

$i^2 = -1$ $\quad$ $i^6 = -1$

$i^3 = -i$ $\quad$ $i^7 = -i$

Simplifying Complex Numbers

Try these problems:

1. $-5i \cdot -3i =$ -15

2. $3\sqrt{6} \cdot \sqrt{-3} =$ $9i\sqrt{2}$

3. $i^{13} =$ i

Adding/Subtracting Complex Numbers

When adding or subtracting complex numbers, combine like terms.

Ex: $(8-3i)+(2+5i)$

$(8+2)+(-3i+5i)$

$10+2i$

Multiplying Complex Numbers

Lets do another example.

$(3-2i)(5+3i)$

F O I L

$15+9i-10i-6i^2$

$15+9i-10i+6$ $\quad i^2 = -1$

Next

Don't forget to combine 9i and -10i.

Rationalizing Imaginary Numbers

Lets do an example:

Ex: $\dfrac{8i}{1+3i}$

$\dfrac{8i}{1+3i} \cdot \dfrac{1-3i}{1-3i}$ *Rationalize using the conjugate*

Next

What's the next step?