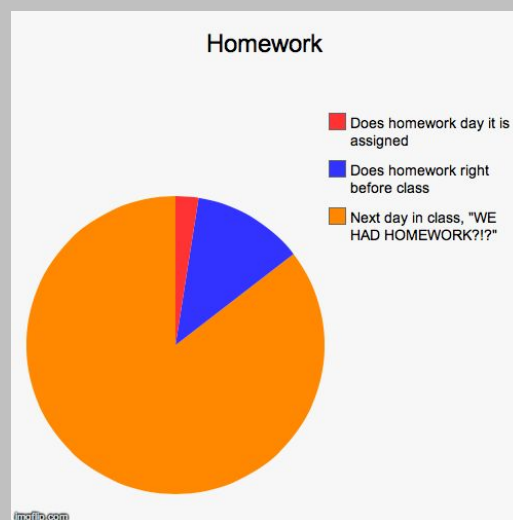


August 12, 2019

1. Take out HW/Calendar
2. Grab Notes/Calculator
3. HW, Finish Notes, Dividing Notes, Review
4. QUIZ



Topic: Dividing Complex Numbers

Name: _____

What am I learning today?

Date: 8/12/19

Vocabulary
Complex Conjugates

Complex numbers of the form $a+bi$ and $a-bi$ are called **conjugates**.
EXAMPLE: $(4 + 5i)$ and $4-5i$

The product of these two numbers is always a **real** number.

$-3i+6$
 $6-3i$

Examples
Find the conjugate

1) $(3 - 4i)$ → $3+4i$

2) $(1 - 2i)$ → $1+2i$

3) $5i$ → $(0+5i)$ → $0-5i$

Notes
Dividing Complex Numbers

Steps for dividing complex numbers:

- Find the **conjugate** of the denominator
- Multiply BOTH the numerator and denominator by the **conjugate**

EXAMPLE

1. Conj: $1+2i$

$$\frac{4+5i}{1-2i} = \frac{(4+5i)(1+2i)}{(1-2i)(1+2i)} = \frac{4+8i+5i+10i^2}{1-4i^2}$$

Numerator = $(4 + 5i)(1+2i)$ Denominator = $(1 - 2i)(1+2i)$

$\begin{array}{r} 4 + 5i \\ 1 \quad \boxed{4} \quad \boxed{5i} \\ +2i \quad \boxed{8i} \quad \boxed{10i^2} \\ \hline 4 + 13i - 10 \end{array}$	$\begin{array}{r} 1 - 2i \\ 1 \quad \boxed{1} \quad \boxed{-2i} \\ +2i \quad \boxed{2i} \quad \boxed{-4i^2} \\ \hline 1 + 4 \end{array}$	$\begin{array}{l} 2i(-2i) \\ -4i^2 \end{array}$
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Answer = $\frac{\text{numerator}}{\text{denominator}} = \frac{-6+13i}{5} = -\frac{6}{5} + \frac{13}{5}i$

Topic: Technology with complex numbers

Date: _____

Examples (cont.) Divide the following complex numbers.

1) $\frac{(4 - 7i)(-5i)}{(5i)(-5i)} = \frac{-20i + 35i^2}{-25i^2}$

2) $\frac{(2 + 5i)(3 + 4i)}{(3 - 4i)(3 + 4i)} = \frac{6 + 8i + 15i + 20i^2}{9 + 16}$

Handwritten work for problem 1:

$$= \frac{-35 - 20i}{25}$$

$$= -\frac{35}{25} - \frac{20i}{25}$$

$$= \boxed{-\frac{7}{5} - \frac{4}{5}i}$$

Handwritten work for problem 2:

$$= \frac{-14 + 23i}{25} = \boxed{-\frac{14}{25} + \frac{23}{25}i}$$

Using Technology



You can use a calculator to find the following:

1. _____
2. _____

Be aware of the instructions. If the instructions say to show work or compute by hand, you must show all of your work to earn credit.

Examples:

- 1) $\sqrt{18x^3}$
- 2) $(2 + 4i) - (3 - 6i)$
- 3) $\frac{2+5i}{3-4i}$
- 4) $(1 - 6i)(2 - 2i)$

Summary

Summarize the lesson in your own words