3.2 Imaginary / Complex Numbers (Day 2)

OBJ: To simplify complex numbers using addition/subtraction/multiplication/division

Complex number – a number that can be written as $a+bi$

Complex #'s $(a+bi)$ Ex $2+2i, \frac{1}{2}-5i$

Real #'s $(b=0)$ Ex. $2, \frac{1}{2}, -3$ $2+0i \quad -3+0i$

Imaginary #'s $(a=0)$ Ex $2i, -5i$ $0+2i \quad 0-5i$

Imaginary unit – $(i)^2=(\sqrt{-1})^2$

* $i^2=-1$

Simplify each number by using the imaginary unit, *i*: 1. $\sqrt{-1}$ $= i$ 2. $\sqrt{-100}$ $10i$ 3. $\sqrt{-27}$ $\sqrt{9}\cdot\sqrt{3}$ $3i\sqrt{3}$ 4. $\sqrt{-13}$ $i\sqrt{13}$

Simplify each expression by performing the following operations:

5a. $(9+6x)+(2+x)$ $+ \; 2+x$ $11+7x$

5b. $(9+6i)+(2+i)$ $2+i$ $11+7i$

5c. $2i+(-4-7i)$ $-4-7i$ $-4-5i$

6a. $(9+6x)-(2+x)$ $-2-x$ $7+5x$

6b. $(9+6i)-(2+i)$ $-2-i$ $7+5i$

7a. $(9+6x)(2+x)$ $= 18+9x+12x+6x^2$ $= 18+21x+6x^2$ $= 6x^2+21x+18$

7b. $(9+6i)(2+i)$ $= 18+9i+12i+6i^2$ $= 18+21i+6(-1)$ $= 18+21i-6$ $= 12+21i$

8a. $(-2x)(5+4x)$ $= -10x-8x^2$ $= -8x^2-10x$

8b. $(-2i)(5+4i)$ $= -10i-8i^2$ $= -10i-8(-1)$ $= -10i+8$ $= 8-10i$

9. $(-12i)-(3+3i)$ $-3-3i$ $-3-15i$

10. $(2-i)(2+i)$ $= 4+2i-2i-i^2$ $= 4+0-(-1)$ $= 4+1$ $= 5$

Write each quotient as a complex number. Your final answer should be in the form of $a+bi$.

11. $\frac{5+4i}{0+7i} \cdot \frac{-7i}{-7i} = \frac{-35i-28i^2}{-49i^2} = \frac{-35i-28(-1)}{-49(-1)} = \frac{-35i+28}{49} = -\frac{35}{49}i+\frac{28}{49} = \frac{4}{7}-\frac{5}{7}i$

Conjugate of denom: $0-7i$

12. $\frac{(2-6i)}{(2-3i)} \cdot \frac{(2+3i)}{(2+3i)} = \frac{4+6i-12i-18i^2}{4+6i-6i-9i^2} = \frac{4-6i-18(-1)}{4-9(-1)} = \frac{4-6i+18}{4+9} = \frac{22-6i}{13} = \frac{22}{13}-\frac{6}{13}i$

Conjugate denom -6: $2+3i$

13. Solve $x^2+49=0$ $x=?$ $-49 \quad -49$ $\sqrt{x^2}=\sqrt{-49}$ $x=\pm 7i$

3.2 Simplifying Complex Numbers (Day 2) Name_____

Simplify each number by using the imaginary number, *i*: 1. $\sqrt{-9}$ 2. $\sqrt{-28}$ 3. $\sqrt{-17}$ 4. $\sqrt{-121}$

Simplify each expression by performing the following operations:

5. $(3+8i)-(2-5i)$ 6. $(9+6i)+(2+i)$ 7. $2i(-4-7i)$

8. $(3+5i)(2-3i)$ 9. $(-10i)-(5+6i)$ 10. $(9+6i)-(2+i)+3i$

11. $(2+3i)-(1-5i)$ 12. $(5+6i)(2+i)$ 13. $(7+3i)-(4+i)+6i$

Write each quotient as a complex number. Your final answer should be in the form of _____.

14. $\frac{-1+5i}{3-2i}$

15. $\frac{1-i}{4-3i}$

16. Solve $x^2+25=0$ 17. Solve $x^2-12=6$

3.2 Imaginary / Complex Numbers (Day 2)

OBJ: To simplify complex numbers using addition/subtraction/multiplication/division

Warm-Up

1. Evaluate $-\sqrt{49}$
2. Evaluate $\sqrt{-49}$
3. Evaluate $\pm\sqrt{49}$
4. Solve $x^2 = -49$

Warm-Up

Factor

1. $x^2 - 2x - 63$

2. Write down questions that you should ask yourself

as you're solving a quadratic equation.

Warm-Up

Solve $\begin{matrix} -10y+4x=20 \\ 5y+3x=40 \end{matrix}$

Bring Chromebooks!