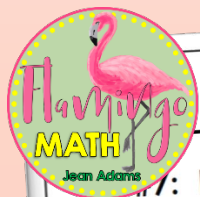


Algebra 2 Honors

Complex Numbers



Dividing Complex Numbers

Find the quotient for each expression. Simplify completely.
Write your answer in $a + bi$ form.

$$A. \left(\frac{5-4i}{5+4i} \right) \left(\frac{5-4i}{5-4i} \right) = \frac{25 - 20i - 20i + 16i^2}{25 + 16}$$

$$\frac{25 - 40i - 16}{41} = \frac{9 - 40i}{41}$$

$$= \frac{9}{41} - \frac{40}{41}i$$

Completely Editable

4.8

Lesson 8: Complex Numbers

Imaginary unit	the complex number whose square is -1 , that is, _____ and _____
Imaginary number	any number of the form _____ where a and b are real numbers and $b \neq 0$.
Complex number	the set of real numbers and imaginary numbers.
Pure imaginary number	the number $a + bi$ is a pure imaginary number if $a = 0$ and $b \neq 0$, that is, _____.
Complex number plane	a plane similar to the coordinate plane, used to plot complex numbers. The ordered pair (a, b) represents the complex number $a + bi$. The horizontal axis is the REAL axis, the vertical axis is the IMAGINARY axis.
Absolute value of a complex number	the distance from the origin on the complex number plane, in general, _____.
Complex conjugates	number pairs of the form _____ and _____.

Visual Vocabulary

EX #1: Definition Square Root of a Negative Number
For any positive number a ,

$$\sqrt{-a} = \sqrt{-1 \cdot a} = \sqrt{-1} \cdot \sqrt{a} = i\sqrt{a}$$

Complex Numbers ($a + bi$)

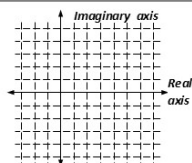
Real Numbers
($a + 0i$)

Imaginary Numbers
($a + bi$, $b \neq 0$)

Pure Imaginary Numbers
($0 + bi$, $b \neq 0$)

EX #2: Graph the following numbers.

- A. $2 + 3i$
- B. $4 - 3i$
- C. $2i$
- D. $-1 + 0i$



Simplifying a Number Using i

EX #3: Simplify completely.

A. $\sqrt{-12}$

B. $\sqrt{-25}$

C. $\sqrt{-7}$

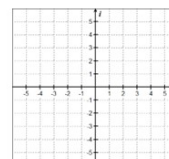
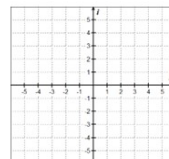
D. Explain why $\sqrt{-64} \neq -\sqrt{64}$

Graphing in the Complex Number Plane

EX #4: Graph and find the absolute value of each complex number.

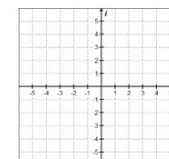
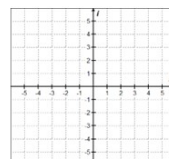
A. $2 - i$

B. $-3 - 2i$



C. $1 + 4i$

D. $3i$



Adding and Subtracting Complex Numbers

EX #5: Find each sum or difference.

A. $(7 - 2i) + (-3 + i)$

B. $(1 + 5i) - (3 - 2i)$

C. $(8 + 6i) - (8 - 6i)$

D. $(-3 + 9i) + (-3 + 9i)$

Multiplying Complex Numbers

EX #6: Find the product of each expression.

A. $(7i)(3i)$

B. $(2 - 3i)(4 + 5i)$

Dividing Complex Numbers

EX #7: Find the quotient for each expression. Simplify completely.
Write your answer in $a + bi$ form.

A. $\frac{5 - 4i}{5 + 4i}$

B. $\frac{4 - i}{6i}$

NOTES

$i^2 =$

$i^5 =$

$i^3 =$

$i^6 =$

Name _____ Date _____

4.8

Complex Numbers Practice

Problems 1 – 6, simplify each number using the imaginary number i .

1. $\sqrt{-81}$

2. $\sqrt{-24}$

3. $\sqrt{-200}$

4. $\sqrt{-169}$

5. $\sqrt{-15}$

6. $\sqrt{-48}$

Problems 7 – 24, simplify each expression.

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

8. $(-7 + 6i) + (7 - 6i)$

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

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

11. $(3 + 4i)(-2 - 4i)$

12. $(2 + i)(-3 + 5i)$

13. $(4 + 3i)(4 - 3i)$

14. $(-2 + 3i)^2$

15. $(4 - i)^2$

16. $(-3i)(7i)(-i)$

17. $(-1 - \sqrt{-2}) + (7 - \sqrt{-2})$

18. $(5 + \sqrt{-9}) + (-3 + \sqrt{-36})$

19. $(8 - \sqrt{-25}) - \sqrt{-81}$

20. $4i(5 + 2i)$

21. $3(2 + 5i) - i(-4 + 5i)$

22. $(4 + \sqrt{-9})(-1 + \sqrt{-4})$

23. $(2 + i^4)(-3 - i^3)$

24. $-5(3 - 2i) - 4i(-2 + i)$

Problems 25 – 28, write each quotient as a complex number.

25. $\frac{3+2i}{5i}$

26. $\frac{5i}{-2+i}$

27. $\frac{2-i}{4-3i}$

28. $\frac{6}{5+2i}$

Problems 29-32, solve each equation.

29. $x^2 + 4 = 0$

30. $4x^2 + 36 = 0$

31. $x^2 = -12$

32. $2x^2 + 7 = -29$

Problems 33 – 36, find all the solutions to each quadratic equation.

33. $x^2 + 3x + 7 = 0$

34. $-x^2 + 2x = 10$

Practice Sets

Lesson Warm-Ups

Name _____ Date _____ Period _____	
Lesson 4.8: Complex Numbers	
Warm-Up # 1	
1. Simplify completely. $\sqrt{-50}$	2. Simplify, write your answer in standard form. $(-3 + 6i) - (-5 - 3i)$
3. Multiply. $(-2 - i)(4 + i)$	4. Divide, simplify completely. $\frac{10 - 5i}{-6 + 6i}$

Name _____ Date _____	
Lesson 4.8: Complex Numbers	
1. Simplify completely. $\sqrt{-48}$	2. Simplify,
3. Multiply. $(1 - 7i)^2$	4. Divide, s

4.8 Complex Numbers		Form A
Name _____		
Date _____	Period _____	
1. Simplify completely: $\sqrt{-98}$		
2. Simplify, write your answer in standard form. $(9 + 7i) - (14 + 5i)$		
3. Multiply. $(3 + 2i)(5 - 4i)$		
4. Divide, simplify completely. $\frac{3-2i}{1+i}$		
5. Graph and find absolute value of $2 + 3i$		
		

4.8 Complex Numbers	Form B
Name _____	
Date _____ Period _____	
1. Simplify completely: $\sqrt{-75}$	
2. Simplify, write your answer in standard form. $(11 + 5i) - (6 + 9i)$	
3. Multiply. $(4 + 3i)(2 - i)$	
4. Divide, simplify completely. $\frac{2+3i}{1-i}$	
5. Graph and find absolute value of $-3 + 4i$	
	

Daily Lesson Quiz

Grade:

Grade: