LESSON MAKER PRO

Complex Number Mix

Simplify and operate with complex numbers.

HIGH SCHOOL · A2.N.1.2

A2.N.1.2 "Simplify, add, subtract, multiply, and divide complex numbers."

NAME _____ DATE _____

THE BIG IDEA

Write each result in the form a+bi, where $i^2 = -1$. Combine like parts when adding or subtracting, and distribute when multiplying. To divide, multiply the numerator and denominator by the conjugate of the denominator.

WORKED EXAMPLE

Multiply (11+12i)(13-14i).

1. Distribute: 143-154i+156i-168i^2.
2. Use $i^2 = -1$: 143-154i+156i+168.
3. Combine like parts: 311+2i.

Answer: 311+2i

PRACTICE 6 problems

1 Simplify sqrt(-64)+sqrt(-9).

ANSWER _____

2 Add (2+7i)+(5-9i).

ANSWER _____

3 Subtract (8-3i)-(1+6i).

ANSWER _____

4 Multiply (-2+5i)(4+i).

ANSWER _____

5 Divide (6+2i)/(1-i). Write your answer in the form a+bi.

ANSWER _____

6 Simplify i^{23}.

ANSWER _____

APPLY IT Show your work

1 In a game, a player's moves are recorded as complex numbers. The real part shows east-west movement, and the imaginary part shows north-south movement. The player moves 2+3i, then -4+i. What complex number represents the total move?

WORK SPACE

ANSWER _____

2 A music app represents an audio signal with the complex number 6-2i. An effect multiplies that number by i. What complex number represents the signal after the effect?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Simplify $(3+i)/(1-2i)+(2-i)^2$. Show how you make the denominator real, then write your answer in the form a+bi.

WORK SPACE AND ANSWER

ANSWER KEY

Complex Number Mix

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Simplify sqrt(-64)+sqrt(-9).	**11i**
2	Add (2+7i)+(5-9i).	**7-2i**
3	Subtract (8-3i)-(1+6i).	**7-9i**
4	Multiply (-2+5i)(4+i).	**-13+18i**
5	Divide (6+2i)/(1-i). Write your answer in the form a+bi.	**2+4i**
6	Simplify i^{23}.	**-i**

PART 2 · APPLY IT

1. **-2+4i** Add the moves: (2+3i)+(-4+i) = -2+4i.
2. **2+6i** Multiply: i(6-2i) = 6i-2i^2 = 2+6i.

CHALLENGE

Multiply the fraction by (1+2i)/(1+2i) to get (1+7i)/5. Since $(2-i)^2$ = 3-4i, the sum is 16/5-13/5i.

Accept equivalent complex-number forms with correct real and imaginary parts. For the challenge, look for multiplication by the denominator's conjugate, 1+2i.