LESSON MAKER PRO

Complex Number Moves

Add, subtract, and multiply numbers with i.

HIGH SCHOOL · A2S.NQ.A.1

A2S.NQ.A.1 "Identify numbers written in the form a + bi, where a and b are real numbers and $i^2 = -1$, as complex numbers. a. Add, subtract, and multiply complex numbers using the commutative, associative, and distributive properties."

NAME _____ DATE _____

THE BIG IDEA

A complex number has the form a + bi, where a and b are real numbers and $i^2 = -1$. To add or subtract, combine real parts and imaginary parts separately. To multiply, distribute, replace i^2 with -1, and combine like terms.

WORKED EXAMPLE

Multiply (7 + 8i)(9 - 10i).

1. Distribute: 63 - 70i + 72i - $80i^2$.
2. Replace i^2 with -1: 63 - 70i + 72i + 80.
3. Combine like terms: 143 + 2i.

Answer: 143 + 2i

PRACTICE 6 problems

1 Add (3 + 2i) + (5 - 4i).

ANSWER _____

2 Add (-2 + 5i) + (6 + i).

ANSWER _____

3 Subtract (4 + 3i) - (1 - 2i).

ANSWER _____

4 Subtract (-5 + i) - (2 + 6i).

ANSWER _____

5 Multiply (2 + i)(3 - 2i).

ANSWER _____

6 Multiply (-1 + 4i)(2 + 3i).

ANSWER _____

APPLY IT Show your work

1 A maker club tests two parts of a gaming headset circuit. At one test frequency, their impedances are 3 + 4i ohms and 2 - i ohms. Parts connected in series have impedances that add. What is the total impedance?

WORK SPACE

ANSWER _____

2 In a game, a sprite's position is represented by 2 + i on a complex plane. A transformation multiplies its position by 1 + 2i. What complex number represents the new position?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Compute (2 - i)[(3 + 2i) - (1 - 4i)]. Show the result inside the brackets, then give your final answer in a + bi form.

WORK SPACE AND ANSWER

ANSWER KEY

Complex Number Moves

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Add (3 + 2i) + (5 - 4i).	**8 - 2i**
2	Add (-2 + 5i) + (6 + i).	**4 + 6i**
3	Subtract (4 + 3i) - (1 - 2i).	**3 + 5i**
4	Subtract (-5 + i) - (2 + 6i).	**-7 - 5i**
5	Multiply (2 + i)(3 - 2i).	**8 - i**
6	Multiply (-1 + 4i)(2 + 3i).	**-14 + 5i**

PART 2 · APPLY IT

1. **5 + 3i ohms** Add the real parts, 3 + 2 = 5, and the imaginary parts, 4i - i = 3i.
2. **5i** Distribute to get 2 + 4i + i + $2i^2$. Since $i^2 = -1$, the real terms cancel, leaving 5i.

CHALLENGE

Inside the brackets: 2 + 6i. Final answer: 10 + 10i.

Accept 0 + 5i for the game problem. Require ohms for the circuit answer.