LESSON MAKER PRO

Imaginary Number Moves

Add, subtract, and multiply with i.

HIGH SCHOOL · HSN-CN.A.2

CCSS.Math.Content.HSN-CN.A.2 "Use the relation i 2 = -1 and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers."

NAME _____ DATE _____

COMBINE AND SIMPLIFY

For addition and subtraction, combine the real parts and combine the i parts. For multiplication, distribute to multiply every term, then replace each i^2 with -1 before combining like terms.

WORKED EXAMPLE

Simplify (8 + 3i)(2 - 5i).

1. Distribute: 16 - 40i + 6i - $15i^2$
2. Replace i^2 with -1: 16 - 34i + 15
3. Combine real parts: 31 - 34i

Answer: 31 - 34i

PRACTICE 6 problems

1 Simplify (4 + 7i) + (9 - 6i).

ANSWER _____

2 Simplify (-11 + 16i) + (17 - 9i).

ANSWER _____

3 Simplify (13 - 4i) - (6 + 10i).

ANSWER _____

4 Simplify (-15 + 11i) - (-7 - 12i).

ANSWER _____

5 Simplify (4 + i)(9 - 7i).

ANSWER _____

6 Simplify (10 - 7i)(-4 + 9i).

ANSWER _____

APPLY IT Show your work

1 In a music-production app, two tracks at the same instant are represented by complex signal values 6 + 11i and 14 - 7i. What complex value represents the combined signal?

WORK SPACE

ANSWER _____

2 A video game represents a point on a screen as 6 + 11i. A visual effect multiplies the point by 4 - 7i. What complex number represents the new point?

WORK SPACE

ANSWER _____

CHALLENGE One step up

Simplify (12 + 7i)(-4 - 9i) - (15 - 11i). Then explain why the final answer has no real part.

WORK SPACE AND ANSWER

ANSWER KEY

Imaginary Number Moves

HIGH SCHOOL · HSN-CN.A.2

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Simplify (4 + 7i) + (9 - 6i).	**13 + i**
2	Simplify (-11 + 16i) + (17 - 9i).	**6 + 7i**
3	Simplify (13 - 4i) - (6 + 10i).	**7 - 14i**
4	Simplify (-15 + 11i) - (-7 - 12i).	**-8 + 23i**
5	Simplify (4 + i)(9 - 7i).	**43 - 19i**
6	Simplify (10 - 7i)(-4 + 9i).	**23 + 118i**

PART 2 · APPLY IT

1. **20 + 4i** Add the real parts, 6 + 14, and add the i parts, 11i - 7i. The combined signal is 20 + 4i.
2. **101 + 2i** Distribute to multiply (6 + 11i)(4 - 7i), then replace $-77i^2$ with 77. Combine the real and imaginary terms to get 101 + 2i.

CHALLENGE

-125i. The product is 15 - 136i, and subtracting 15 - 11i makes the real parts 15 - 15, which equals 0.

Accept equivalent standard-form answers such as 13 + 1i or 0 - 125i. Students should distribute fully in multiplication and use $i^2 = -1$ before combining terms.