LESSON MAKER PRO

Imaginary Number Moves

Use i² to write complex numbers in standard form.

HIGH SCHOOL · HSN-CN.A.1

CCSS.Math.Content.HSN-CN.A.1 "Know there is a complex number i such that i 2 = -1, and every complex number has the form a + bi with a and b real."

NAME _____ DATE _____

THE BIG IDEA

The imaginary unit i has the property $i^2 = -1$. Every complex number can be written as a + bi, where a and b are real numbers. When you see i^2, replace it with -1, then combine the real terms.

WORKED EXAMPLE

Write $8i^2 + 1$ in a + bi form.

1. Use $i^2 = -1$.
2. $8i^2 + 1 = 8(-1) + 1$.
3. $8(-1) + 1 = -7$.

Answer: -7 + 0i

PRACTICE 6 problems

1 Write $6i^2$ in a + bi form.

ANSWER _____

2 Write $-4i^2$ in a + bi form.

ANSWER _____

3 Write 11 - 3i in a + bi form.

ANSWER _____

4 For 5 + 12i, state a and b.

ANSWER _____

_____

5 Write i^{15} in a + bi form.

ANSWER _____

6 Write $9 + 5i^2$ in a + bi form.

ANSWER _____

APPLY IT Show your work

1 An electronics club uses a complex-number circuit model. A correction value is $15 + 6i^2$. Write the correction value in a + bi form.

WORK SPACE

ANSWER _____

2 A student coding a music visualizer gets the complex output $-11i^2 + 13i$. Write the output in a + bi form.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Simplify $12i^2 - 5i + 9$. Write your answer in a + bi form.

WORK SPACE AND ANSWER

ANSWER KEY

Imaginary Number Moves

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Write $6i^2$ in a + bi form.	**-6 + 0i**
2	Write $-4i^2$ in a + bi form.	**4 + 0i**
3	Write 11 - 3i in a + bi form.	**11 - 3i**
4	For 5 + 12i, state a and b.	**a = 5, b = 12**
5	Write i^{15} in a + bi form.	**0-i**
6	Write $9 + 5i^2$ in a + bi form.	**4 + 0i**

PART 2 · APPLY IT

1. **9 + 0i** Replace i^2 with -1. Then 15 + 6(-1) = 9, so the imaginary part is 0.
2. **11 + 13i** Replace i^2 with -1. Then -11(-1) + 13i = 11 + 13i.

CHALLENGE

-3 - 5i

Accept equivalent standard forms, including -i for 0 - i and real-number answers written with an imaginary coefficient of 0. For each item, students should replace i^2 with -1 before combining real terms.