

Imaginary Number Moves

Use i^2 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

CHALLENGE

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

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.