ALBERT

Name _____ Date _____

Complex Numbers Worksheet

Algebra 2 · Common Core 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.

Practice

Builds the skill step by step.

1. Write $\sqrt{-25}$ in terms of i.

2. What is i^2?

3. What is the real part of $7 - 3i$?

4. For $7 - 3i$ written as $a + bi$, what is b?

5. Which number is purely imaginary?

   A. $6i$

   B. 6

   C. $6 + i$

   D. i^2

6. Write $\sqrt{-49}$ in terms of i.

7. Simplify i^3.

8. What is i^4?

9. Which statement is true?

   A. Every complex number is a real number.

   B. i is a real number.

   C. Every real number is a complex number with b = 0.

   D. No real number is a complex number.

10. Write $4 + \sqrt{-9}$ in the form a + bi.

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On Level

Grade-level practice.

1. $\sqrt{-18} = k\sqrt{2} \cdot i$. What is k?

2. What is i^{10}?

3. Simplify i^{23}.

4. Write $5 - \sqrt{-16}$ in the form a + bi.

5. What is i^{100}?

6. Explain why $\sqrt{-4}$ is not a real number, and how i lets you write it.

7. $3x + 4i = 12 + 2yi$, where x and y are real. What are x and y?

8. Which equals i^7?

   A. 1

   B. i

   C. -1

   D. $-i$

9. What is $\sqrt{-3} \cdot \sqrt{-3}$?

10. Write $-2 + \sqrt{-36}$ in the form a + bi.

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Challenge

Multi-step and word problems that stretch it.

1. What is $\sqrt{-4} \cdot \sqrt{-9}$?

2. What is $i + i^2 + i^3 + i^4$?

3. Simplify $i + i^2 + i^3 + \ldots + i^{10}$.

4. What is $(2i)^2$?

5. A student writes $\sqrt{-4} \cdot \sqrt{-9} = \sqrt{36} = 6$. What is wrong?

   A. $\sqrt{a} \cdot \sqrt{b} = \sqrt{(ab)}$ doesn't hold when a and b are both negative.

   B. $\sqrt{36}$ is 18.

   C. $\sqrt{-4}$ is -2.

   D. Nothing is wrong.

6. $(x - 2) + (y + 1)i = 5 - 3i$, where x and y are real. What are x and y?

7. Simplify $1 \div i$.

8. Explain how to find i^{50} without multiplying 50 times.

9. What is $(\sqrt{-25})^2$?

10. $i^k = -1$, and k is a whole number between 5 and 9. What is k?