ALBERT

Name _____ Date _____

Operations with Complex Numbers Worksheet

Algebra 2 · Common Core HSN-CN.A.2

> Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.

Practice

Builds the skill step by step.

1. Add: $(3 + 2i) + (4 + 5i)$.

2. Subtract: $(6 + 4i) - (2 + i)$.

3. Multiply: $2i \cdot 3i$.

4. Multiply: $4(2 - 3i)$.

5. Add: $(5 - 2i) + (-3 + 6i)$.

6. Multiply: $i(3 + 2i)$.

7. Subtract: $7i - (2 - 3i)$.

8. $(2 + 3i) + (4 + i) = (2 + 4) + (3i + i)$. Which properties justify this step?

   A. the commutative and associative properties of addition

   B. the distributive property only

   C. the zero property of multiplication

   D. the inverse property of addition

9. Multiply: $-3i \cdot 5i$.

10. Add: $(1 + i) + (1 - i)$.

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On Level

Grade-level practice.

1. Multiply: $(2 + 3i)(1 + 4i)$.

2. Multiply: $(3 - i)(3 + i)$.

3. Simplify $(4 + 2i)^2$.

4. Simplify $(5 - 3i) - (2 - 7i) + (1 + i)$.

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

6. What is the product of $a + bi$ and $a - bi$?

   A. $a^2 + 2abi - b^2$

   B. $a^2 - b^2$

   C. $2a$

   D. $a^2 + b^2$

7. Multiply: $i(4 - 3i)(2i)$.

8. Simplify $(1 + i)^2$.

9. Explain how to multiply $(2 + i)(3 - i)$ and give the product.

10. What is the complex conjugate of $6 - 5i$?

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Challenge

Multi-step and word problems that stretch it.

1. Simplify $(1 + i)^4$.

2. Simplify $(2 + 3i)(2 - 3i) - (2 + 3i)^2$.

3. $(a + 2i)(1 - i) = 5 - i$, where a is real. What is a?

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

5. Simplify $(3 + 2i)^3$.

6. Which product is a real number?

   A. $(4 + 3i)(4 - 3i)$

   B. $(4 + 3i)(4 + 3i)$

   C. $(4 + 3i)(3 + 4i)$

   D. $(4 + 3i) \cdot i$

7. What is the value of $x^2 - 2x + 5$ when $x = 1 + 2i$?

8. Simplify $(2i)^3 \cdot (-i)$.

9. Show that $(a + bi)(a - bi)$ is always a real number when a and b are real.

10. Simplify $(5 + i)(2 - i) + (3 - 4i)$.