Algebra 2 Unit 2 worksheet: Adding, subtracting and multiplying complex numbers

Name _____ Date _____ Period _____

1. Add or subtract. Write each answer in standard form $a + bi$.

(a) $(8 - 3i) + (-5 + 9i)$ (b) $(-2 + 4i) - (7 - i)$ (c) $\left(\frac{1}{2} + \frac{3}{4}i\right) - \left(\frac{3}{2} - \frac{1}{4}i\right)$

(d) $2(3 - i) - 3(1 - 2i)$

2. Multiply. Write each answer in standard form $a + bi$.

(a) $4i(-2 + 3i)$ (b) $(6i)(-4i)$ (c) $(5 + i)(2 + 3i)$ (d) $(-3 + 2i)(4 - 5i)$

(e) $\sqrt{-4}\ \left(3 - \sqrt{-9}\right)$

3. Write each square or power in standard form.

(a) $(4 + i)^2$ (b) $(2i - 3)^2$ (c) $\left(\sqrt{3} + i\right)^2$ (d) $(1 - i)^4$

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4. Each student made one mistake. Say what it is, and give the correct answer in standard form.

(a) Isabel wrote $(4-3i)^2 = 4^2 + (3i)^2 = 16 - 9 = 7$.

(b) Arjun wrote $(2+5i)(1-i) = 2 - 2i + 5i - 5i^2 = 2 + 3i - 5 = -3 + 3i$.

5. Find the complex number z for which $2z - (3 - i) = i(5 + 7i)$. Check your answer in the original equation.

6. Let $f(x) = x^2 - 4x + 11$. Find $f(-3 - 2i)$ and write it in standard form.

7. Let $z = 2 + 3i$ and $w = 1 - i$. Write each in standard form.

(a) zw (b) $z^2 - w^2$ (c) $(z + w)(z - w)$

(d) Explain why (b) and (c) must come out the same.

8. (a) Find every real number k for which $(k + 4i)^2$ is pure imaginary, and give the square for each one.

(b) Find every real number k for which the real part of $(k + 4i)^2$ minus its imaginary part equals -28.

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