

## Algebra II Worksheet #6 Unit 5 Selected Solutions

Perform the indicated operations. Answers that are complex numbers must be expressed using  $a + bi$  form.

$$1. (7 + 5i) + (2 - 8i) = 9 - 3i$$

$$2. (3 + 9i) - (5 - 3i) = -2 + 12i \\ (3 + 9i) + (-5 + 3i) =$$

$$7. 2i(5 - 7i) = 10i - 14i^2 = 14 + 10i$$

$$8. -3(2 - i) = -6 + 3i$$

$$11. (2 + 7i)(3 - 2i) = 40 + 17i \\ 6 - 4i + 21i - 14i^2$$

$$15. (2 + 5i)^2 = -21 + 20i \\ 4 + 20i + 25i^2$$

$$17. \frac{8 + 3i}{2i} = \frac{3}{2} - 4i$$

$$20. \frac{3 + 2i}{2 + i} = \frac{8}{5} + \frac{1}{5}i$$

$$\frac{i(8 + 3i)}{i(2i)} = \frac{8i + 3i^2}{2i^2} = \frac{-3 + 8i}{-2}$$

$$\frac{(3 + 2i)(2 - i)}{(2 + i)(2 - i)} = \frac{6 - 3i + 4i - 2i^2}{4 - i^2} = \frac{8 + i}{5}$$

$$21. \frac{5 - 3i}{4 - 5i} = \frac{35}{41} + \frac{35}{41}i$$

$$25. \frac{-2i}{3 + i} = -\frac{1}{5} - \frac{3}{5}i$$

$$\frac{(5 - 3i)(4 + 5i)}{(4 - 5i)(4 + 5i)} = \frac{20 + 25i - 12i - 15i^2}{16 - 25i^2} = \frac{35 + 13i}{41}$$

$$\frac{-2i(3 - i)}{(3 + i)(3 - i)} = \frac{-6i + 2i^2}{9 - i^2} = \frac{-2 - 6i}{10}$$

Write the multiplicative inverse of each of the following using  $a + bi$  form.

$$27. 2 + 3i \quad \frac{1}{2 + 3i} = \frac{2}{13} - \frac{3}{13}i$$

$$28. 5 - 4i \quad \frac{1}{5 - 4i} = \frac{5}{41} + \frac{4}{41}i$$

$$\frac{1(2 - 3i)}{(2 + 3i)(2 - 3i)} = \frac{2 - 3i}{4 - 9i^2} = \frac{2 - 3i}{13}$$

$$\frac{1(5 + 4i)}{(5 - 4i)(5 + 4i)} = \frac{5 + 4i}{25 - 16i^2} = \frac{5 + 4i}{41}$$