

Algebra II Worksheet #7 Unit 5 Selected Solutions

Find the indicated absolute values. (Simplify any square roots.)

$$2. \quad |1 + 7i| = \sqrt{(1)^2 + (7)^2} = \sqrt{1 + 49} = \sqrt{50} = \sqrt{25} \sqrt{2} = \underline{5\sqrt{2}}$$

Perform the indicated operations. If the answer is a complex number, then write it using $a + bi$ form.

$$6. \quad (4 - 9i) + (-1 + 3i) = \underline{3 - 6i}$$

$$7. \quad (8 + 3i) - (5 + 7i) = \underline{3 - 4i}$$

$$= (8 + 3i) + (-5 - 7i)$$

$$12. \quad (2i)^3 = \underline{-8i}$$

$$= 2^3 \cdot i^3 = 8(-i) =$$

(Since $i^2 = -1$, $i^3 = i^2 \cdot i = -1i = -i$.)

$$13. \quad 3i(5 + 2i) = \underline{-6 + 15i}$$

$$= 15i + 6i^2 =$$

$$15. \quad (2 - 7i)(1 - 3i) = \underline{-19 - 13i}$$

$$= 2 - 6i - 7i + 21i^2 =$$

$$18. \quad (2 - i)^3 = \underline{2 - 11i}$$

$$(2 - i)^2 = 4 - 4i + i^2 = 3 - 4i$$

$$(2 - i)^3 = (3 - 4i)(2 - i)$$

$$= 6 - 3i - 8i + 4i^2 =$$

$$17. \quad (7 - i)^2 = \underline{48 - 14i}$$

$$= 49 - 14i + i^2 =$$

$$19. \quad (3 + 5i)(3 - 5i) = \underline{34}$$

$$= 9 - 15i + 15i - 25i^2 =$$

$$21. \quad \frac{5 - 4i}{3i} = \boxed{\frac{-4}{3} - \frac{5}{3}i}$$

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

$$22. \quad \frac{3 + i}{1 + 3i} = \boxed{\frac{3}{5} - \frac{4}{5}i}$$

$$\frac{(3 + i)(1 - 3i)}{(1 + 3i)(1 - 3i)} = \frac{3 - 9i + i - 3i^2}{1 - 9i^2} = \frac{6 - 8i}{10}$$

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

$$29. \quad 5 + 2i$$

$$\frac{1}{5 + 2i} = \boxed{\frac{5}{29} - \frac{2}{29}i}$$

$$\frac{1(5 - 2i)}{(5 + 2i)(5 - 2i)} = \frac{5 - 2i}{25 - 4i^2} = \frac{5 - 2i}{29}$$