Algebra 2Y
Section 5.7: Complex Numbers
Homework

Name: Answer Key
Period: **Date:**
Score: **/ 5 Points**

Solve each equation using square roots.

1. $x^2 = -7$

$\sqrt{x^2} = \sqrt{-7}$

$x = \pm\sqrt{-7}$

$x = \pm i\sqrt{7}$

$\boxed{x = -i\sqrt{7},\ i\sqrt{7}}$

2. $x^2 + 25 = 0$

$-25 \quad -25$

$\sqrt{x^2} = \sqrt{-25}$

$x = \pm i\sqrt{25}$

$x = \pm i5$

$\boxed{x = -5i,\ 5i}$

3. $3x^2 + 2 = -62$

$-2 \quad -2$

$\frac{\cancel{3}x^2}{\cancel{3}} = \frac{-64}{3}$

$\sqrt{x^2} = \sqrt{\frac{-64}{3}}$

$x = \pm\frac{8i}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$

$\boxed{x = -\frac{8i\sqrt{3}}{3},\ \frac{8i\sqrt{3}}{3}}$

4. $-5x^2 - 3 = 0$

$+3 \quad +3$

$\frac{\cancel{-5}x^2}{\cancel{-5}} = \frac{3}{-5}$

$\sqrt{x^2} = \sqrt{\frac{3}{-5}}$

$x = \pm\frac{i\sqrt{3}}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}}$

$\boxed{x = -\frac{i\sqrt{15}}{5},\ \frac{i\sqrt{15}}{5}}$

Simplify each expression.

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

$(-3+4) + (-5i + -2i)$

$1 + (-7i)$

$\boxed{1 - 7i}$

6. $(12 + 5i) - (2 - i)$

$(12 - 2) + (5i - -i)$

$\boxed{10 + 6i}$

7. $(8 + i)(2 + 7i)$

FOIL

$16 + 56i + 2i + 7i^2$

$16 + 58i + 7(-1)$

$16 + (-7) + 58i$

$\boxed{9 + 58i}$

8. $(-6 - 5i)(1 + 3i)$

FOIL

$-6 + (-18i) + (-5i) + (-15i^2)$

$-6 + (-23i) + [-15(-1)]$

$-6 + (15) + (-23i)$

$\boxed{9 - 23i}$

Write each quotient as a complex number.

9. $\frac{3 - 2i}{5i} \cdot \frac{5i}{5i}$

$= \frac{15i - 10i^2}{25i^2}$

$= \frac{15i - 10(-1)}{25(-1)}$

$= \frac{15i + 10}{-25} = \boxed{-\frac{2}{5} - \frac{3i}{5}}$

10. $\frac{-2i}{1 + i} \cdot \frac{(1 - i)}{(1 - i)}$

$= \frac{-2i + 2i^2}{1 - i^2}$

$= \frac{-2i + 2(-1)}{1 - (-1)}$

$= \frac{-2i - 2}{2} = \boxed{-1 - i}$

11. $\frac{4 - 3i}{-1 - 4i} \cdot \frac{(-1 + 4i)}{(-1 + 4i)}$

$= \frac{-4 + 16i + 3i - 12(-1)}{1 - 16(-1)}$

$= \frac{-4 + 12 + 19i}{1 + 16}$

$= \frac{8 + 19i}{17} = \boxed{\frac{8}{17} + \frac{19i}{17}}$

12. $\frac{i + 2}{i - 2} \cdot \frac{(i + 2)}{(i + 2)}$

$= \frac{i^2 + 2i + 2i + 4}{i^2 - 4}$

$= \frac{(-1) + 4i + 4}{(-1) - 4}$

$= \frac{3 + 4i}{-5} = -\frac{3}{5} - \frac{4i}{5}$

13. $\frac{3 + 2i}{(1 + i)^2}$

$= \frac{3 + 2i}{(1 + i)(1 + i)}$

$= \frac{3 + 2i}{1 + i + i + i^2}$

$= \frac{3 + 2i}{1 + (-1) + 2i}$

$= \frac{3 + 2i}{2i}$

$\frac{3 + 2i}{2i} \cdot \frac{2i}{2i}$

$= \frac{6i + 4(-1)}{4(-1)}$

$= \frac{-4 + 6i}{-4} = \boxed{1 - \frac{3}{2}i}$