ALGEBRA PROBLEM SESSION #11 - PRACTICE PROBLEMS

Radical Equations

1. Is $\sqrt{x^2-4x+4} = x-2$? What are the exceptions?

2. If both sides of an equation are raised to the same power, the resulting equation might not be equivalent to the original equation. Explain.

3. Explain why you must check each apparent solution of a radical equation.

4. Analyze the following solution and explain what, if anything, is wrong with it.

$$\sqrt{x-3} + 5 = x$$
$$(\sqrt{x-3} + 5)^2 = x^2$$
$$x - 3 + 5 = x^2$$
$$x^2 - x - 2 = 0$$
$$(x - 2)(x + 1) = 0$$
$$x - 2 = 0 \text{ or } x + 1 = 0$$
$$x = 2 \text{ or } x = -1$$

5. Solve $\sqrt[3]{2x} = \sqrt{x}$. (Hint: Square and then cube both sides.)

6. Solve: a. $\sqrt{x+20} - 2 = \sqrt{x+4}$ b. $3\sqrt{x} = \sqrt{3x+12}$

7. Solve:

a. $\sqrt{2x+5} + 11 = 6$ b. $\sqrt{2x+1} = x - 7$ c. $\sqrt{6x+2} = \sqrt{5x+3}$ d. $\sqrt[3]{4x-3} - 5 = 0$

e. $2\sqrt{x-3} + 4 = x + 1$ f. $(2x+3)^{\frac{1}{4}} + 7 = 10$ g. $\sqrt{x+2} + \sqrt{3x+7} = 1$ h. $2(x-1)^{\frac{1}{3}} = (x^2+2x)^{\frac{1}{3}}$

Complex Numbers

1. When is the sum of two imaginary numbers (both not pure imaginary numbers) a pure imaginary number?

2. When will the quotient of two complex numbers be real?

3. Tell how to decide whether two complex numbers are equal.

4. Define the complex conjugate of a complex number and then find the complex conjugate of 7 – 2i.

5. Express each number in terms of *i* and simplify: a. $\sqrt{-21}$ b. $7 + \sqrt{-4}$

Perform the indicated operation and write results in the form $a + bi$.

6. $(11 + 8i) - (2 + 5i)$ 7. $(-7 + 5i) - (9 - 11i)$ 8. $15i - (12 - 11i)$

9. $8i(4i - 3)$ 10. $(7 - 2i)(-3 + 6i)$ 11. $\left(5 - i\sqrt{3}\right)\left(5 + i\sqrt{3}\right)$

12. $\sqrt{-16} \cdot \sqrt{-4}$ 13. $\frac{5i}{2-3i}$ 14. $\frac{5-i}{3-2i}$

Simplify: 15. i^{14} 16. i^{400} 17. $(-i)^6$

Selected problems were taken from Blitzer Algebra For College Students