Chapter 1

Reviewing Algebra Basics

The basics of Algebra II consist of the processes learned in earlier exposures to algebra — in this case, all lumped together in one chapter. It's hard to cover every little thing that you'll need to continue your algebra study in this one book, but this is a really good place to start. Under the guise of solving some equations and inequalities, you get to review many of the most important properties and procedures needed to be successful. Anything missing in this discussion is covered in later chapters as part of the problems' explanations.

The Problems You'll Work On

In this chapter, you'll work with simplifying expressions and solving equations and inequalities in the following ways:

- Multiplying binomials and trinomials
- Expanding higher powers of binomials
- Solving linear equations and absolute value equations
- Solving linear inequalities
- Simplifying radical expressions
- Rewriting expressions involving imaginary numbers

What to Watch Out For

Don't let common mistakes trip you up; watch for the following when working with simplifying expressions and solving equations and inequalities:

- Distributing the factor over every term in the parentheses
- Multiplying terms by a negative factor
- Reversing the inequality sense when multiplying or dividing by a negative factor

- Correctly multiplying a binomial and its conjugate
- Simplifying expressions involving powers of *i*

Multiplying Binomials and Trinomials

1–8 *Simplify the expressions by performing the operations and combining like terms.*

1. $(2x+3)(4x-2)=$

2. $3x^2+(x+4)(x-1)=$

3. $(3x+1)(x-3)+(x+2)(5x-4)=$

4. $5(x-3)(x+2)+3(x-3)(x-2)+1=$

5. $(x+4)\left(x^2-3x+5\right)=$

6. $(x-1)\left(3x^2+2x-1\right)=$

7. $(2x+1)(x-3)(x+4)=$

8. $(x-3)(x+3)(7x+11)=$

Using Pascal's Triangle to Multiply Binomials

9–12 *Use Pascal's Triangle to expand the binomial powers.*

9. $(x-3)^3=$

10. $(x+2)^5=$

11. $(3x-2y)^4=$

12. $\left(a^2+b\right)^6=$

Solving Linear Equations

13–18 *Solve the linear and absolute value equations for x.*

13. $4x + 2 = 3(x - 3)$

14. $5x + 2(x + 7) = 3(x - 2)$

15. $|3x - 2| = 14$

16. $|4x + 1| - 2 = 3$

17. $4|x - 6| = 8$

18. $3|2x - 5| + 5 = 8$

Solving Linear Equations for Variables

19–24 *Solve for the indicated variable.*

19. Solve for l in $P = 2l + 2w$.

20. Solve for s_1 in $P = 2s_1 + s_2$.

21. Solve for b_2 in $A = \frac{1}{2}h(b_1 + b_2)$.

22. Solve for F in $C = \frac{5}{9}(F - 32)$.

23. Solve for t in $A = P + Prt$.

24. Solve for n in $a_n = a_1 + (n - 1)d$.

Solving Linear Inequalities

25–34 Solve the inequalities.

25. $3x - 4 \le 5x + 6$

26. $4(x - 3) > x + 6$

27. $-3 \le 2x + 7 < 9$

28. $0 < 7 - 3x < 13$

29. $|x + 6| < 4$

30. $|2x - 3| \ge 5$

31. $|4x - 5| + 1 \le 4$

32. $2|6x - 5| > 20$

33. $4x - 9 < 2x + 1 \le 3x - 1$

34. $2x + 6 \le x + 3 < 3x + 11$

Making Radical Expressions Simpler

35–44 Simplify the radical expressions.

35. $\sqrt{50}$

36. $\sqrt{300}$

37. $\sqrt{180}$

38. $\sqrt{960}$

39. $(1 + \sqrt{2})^2$

40. $(\sqrt{3} - \sqrt{5})^2$

41. $\frac{2}{2+\sqrt{6}}$

42. $\frac{10}{5-\sqrt{5}}$

43. $\frac{4+\sqrt{10}}{4-\sqrt{10}}$

44. $\frac{12-\sqrt{3}}{4-2\sqrt{3}}$

Working with Complex Expressions

45–50 Simplify the complex numbers.

45. i^{138}

46. i^{1001}

47. $(4-i)^2$

48. $(3+2i)^2$

49. $i(2i)^3$

50. $4i^{21}(1+i)^2$