4.3 Adding Fractions (Unlike Denominators)

Cross-References
Rational Numbers and Square Roots

Student Workbook pages 8–11

Key Objectives
The student will:
- add fractions concretely, pictorially, and symbolically.

Key Terms
sum, addends, numerator, denominator, unit fraction, proper fraction, improper fraction, mixed number, equivalent fractions, simplest terms, lowest common multiple (LCM), lowest common denominator (LCD)

Prerequisite Skills
- Find multiples, common multiples, and lowest common multiples of given whole numbers.
- Demonstrate and explain the meaning of fractions, improper fractions, and mixed numbers.
- Demonstrate equivalency of proper fractions, improper fractions, and mixed numbers.
- Add fractions and mixed numbers with like denominators.

Lesson Description

This lesson focuses on using concrete models and number sentences to add fractions with unlike denominators.

In the **Introduction**, students examine the ancient Egyptian system of writing fractions as the sum of unit fractions. Amounts of grain are indicated by addition expressions which students must simplify. At first, these expressions have common denominators. One example is $\frac{1}{4} + \frac{1}{4}$. In the **Summary**, students represent other amounts of grain by adding unit fractions with unlike denominators.

The **Tutorial** and **Examples** detail several concrete models for fraction addition, including pattern blocks, fraction circles, and fraction strips. In each case, students model two fractions and then change one or both models to restate the fractions with same-sized parts. By choosing the largest possible part size to represent both fractions, students model the least common denominator.

The second **Example** helps students move from concrete models to symbolic methods as they rename fractions with the least common denominator.

In the third and fourth **Examples**, students apply what they have learned about addition to mixed numbers and improper fractions.