

## Section Overview

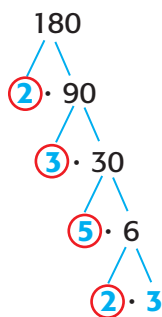
## Prime Factorization

Lesson 3-1

**Why?** Being able to find the prime factorization of numbers makes it much easier to find both the greatest common divisor and the least common multiple of two or more numbers. This concept is important for work with fractions.

## Two Ways to Find the Prime Factorization of 180

## Factor Tree



## Step Diagram

$$\begin{array}{r} 2 \overline{)180} \\ 2 \overline{)90} \\ 3 \overline{)45} \\ 3 \overline{)15} \\ 5 \end{array}$$

$$180 = 2^2 \cdot 3^2 \cdot 5$$

## Greatest Common Divisor

Lesson 3-2

**Why?** Knowing how to find the greatest common divisor is an important skill for computing with and simplifying fractions.

## Find the greatest common divisor (GCD) of 60 and 72.

$$60 = 2 \cdot 2 \cdot 3 \cdot 5$$

$$72 = 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3$$

$$\text{GCD} = 2 \cdot 2 \cdot 3 = 12$$

The **GCD** is the product of the common prime factors: 2, 2, and 3.

## Least Common Multiple

Lesson 3-3

**Why?** The least common multiple will be used in later chapters to find the least common denominator of two or more fractions. Common denominators are necessary to add and subtract fractions and mixed numbers.

## Find the least common multiple (LCM) of 45 and 12.

$$45 = 3^2 \cdot 5$$

$$12 = 2^2 \cdot 3$$

$$\text{LCM} = 2^2 \cdot 3^2 \cdot 5 = 180$$

The **LCM** is the product of the greater powers of each prime factor:  $2^2$ ,  $3^2$ , and 5.