Fractions and Mixed Numbers

3

SECTION 3.7

Multiplication and Division with Mixed Numbers

Objectives

A Multiply mixed numbers.

B Divide mixed numbers.

Multiplication and Division with Mixed Numbers

The figure here shows one of the nutrition labels.

It is from a can of Italian tomatoes.

Notice toward the top of the label, the number of servings in the can is $3\frac{1}{2}$.

The number $3\frac{1}{2}$ is called a *mixed number*.

CANNED ITALIAN TOMATOES

Nutrition Facts

Serving Size 1/2 cup (121g)
Servings Per Container: about 3 1/2

Amount Per Serving	
Calories 25	Calories from fat 0
	% Daily Value*
Total Fat 0g	**0%**
Saturated Fat 0g	**0%**
Cholesterol 0mg	**0%**
Sodium 300mg	**12%**
Potassium 145mg	**4%**
Total Carbohydrate 4g	**2%**
Dietary Fiber 1g	**4%**
Sugars 4g	
Protein 1g	

Vitamin A 20%	•	Vitamin C 15%
Calcium 4%	•	Iron 15%

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

Multiplication and Division with Mixed Numbers

If we want to know how many calories are in the whole can of tomatoes, we must be able to multiply $3\frac{1}{2}$ by 25 (the number of calories per serving).

Multiplication with mixed numbers is one of the topics we will cover in this section.

The procedures for multiplying and dividing mixed numbers are the same.

The only additional work involved is in changing the mixed numbers to improper fractions before we actually multiply or divide.

A Multiplying Mixed Numbers

Example 1

Multiply: $2\frac{3}{4} \cdot 3\frac{1}{5}$

Solution:

We begin by changing each mixed number to an improper fraction, and multiply numerators and multiply denominators.

$$\frac{11}{4} \cdot \frac{16}{5} = \frac{11 \cdot 16}{4 \cdot 5}$$

$$= \frac{11 \cdot \cancel{4} \cdot 4}{\cancel{4} \cdot 5}$$

$$= \frac{44}{5} \quad \text{or} \quad 8\frac{4}{5}$$

B Dividing Mixed Numbers

Dividing Mixed Numbers

Dividing mixed numbers also requires that we change all mixed numbers to improper fractions before we actually do the division.

Example 3

Divide: $1\frac{3}{5} \div 2\frac{4}{5}$.

Solution:

We begin by rewriting each mixed number as an improper fraction.

$$1\frac{3}{5} = \frac{8}{5} \quad \text{and} \quad 2\frac{4}{5} = \frac{14}{5}$$

We multiply by the reciprocal of the divisor.

Here is the complete problem:

$$1\frac{3}{5} \div 2\frac{4}{5} = \frac{8}{5} \div \frac{14}{5}$$

Change to improper fractions.

Example 3 – *Solution*

cont'd

$$= \frac{8}{5} \cdot \frac{5}{14}$$

To divide by $\frac{14}{5}$, multiply by $\frac{5}{14}$.

$$= \frac{4 \cdot \cancel{2} \cdot \cancel{5}}{\cancel{5} \cdot \cancel{2} \cdot 7}$$

Divide out factors common to the numerator and denominator.

$$= \frac{4}{7}$$

Answer in lowest terms.