Lesson 5-5

Example 1 Multiply Fractions
Multiply $\dfrac{1}{4} \times \dfrac{1}{5}$. Write in simplest form.

$\dfrac{1}{4} \times \dfrac{1}{5} = \dfrac{1 \times 1}{4 \times 5}$ 　　　　Multiply the numerators and multiply the denominators.

$\phantom{\dfrac{1}{4} \times \dfrac{1}{5}} = \dfrac{1}{20}$ 　　　　Simplify.

Example 2 Multiply Fractions
Multiply $3 \times \dfrac{2}{5}$. Write in simplest form.

$3 \times \dfrac{2}{5} = \dfrac{3}{1} \times \dfrac{2}{5}$ 　　　　Write 3 as $\dfrac{3}{1}$.

$\phantom{3 \times \dfrac{2}{5}} = \dfrac{3 \times 2}{1 \times 5}$ 　　　　Multiply the numerators and multiply the denominators.

$\phantom{3 \times \dfrac{2}{5}} = \dfrac{6}{5}$ or $1\dfrac{1}{5}$ 　　　　Simplify.

Example 3 Simplify Before Multiplying
Find $\dfrac{3}{4} \times \dfrac{2}{7}$. Write in simplest form.

$\dfrac{3}{4} \times \dfrac{2}{7} = \dfrac{3}{\overset{}{\underset{2}{\cancel{4}}}} \times \dfrac{\overset{1}{\cancel{2}}}{7}$ 　　　　Divide 2 and 4 by their GCF, 2.

$\phantom{\dfrac{3}{4} \times \dfrac{2}{7}} = \dfrac{3 \times 1}{2 \times 7}$ 　　　　Multiply the numerators and multiply the denominators.

$\phantom{\dfrac{3}{4} \times \dfrac{2}{7}} = \dfrac{3}{14}$ 　　　　Simplify.

Example 4 Multiply Mixed Numbers

Find $\dfrac{1}{3} \times 2\dfrac{2}{5}$. Write in simplest form.

$$\dfrac{1}{3} \times 2\dfrac{2}{5} = \dfrac{1}{\cancel{3}_{1}} \times \dfrac{\overset{4}{\cancel{12}}}{5} \qquad \text{Rename } 2\dfrac{2}{5} \text{ as an improper fraction, } \dfrac{12}{5}.$$

$$= \dfrac{1 \times 4}{1 \times 5} \qquad \text{Multiply.}$$

$$= \dfrac{4}{5} \qquad \text{Simplify.}$$

Example 5 Solve Problems Involving Multiplication of Fractions

SHOPPING Samantha wants to purchase $\dfrac{2}{3}$ of a whole turkey breast. The turkey breast weighs $7\dfrac{1}{2}$ pounds. Determine the weight of Samantha's purchase.

Words Samantha's purchase is $\dfrac{2}{3}$ of $7\dfrac{1}{2}$ pounds.

Variable Let x represent the weight of Samantha's purchase.

Equation $x = \dfrac{2}{3} \cdot 7\dfrac{1}{2}$

$$x = \dfrac{2}{3} \cdot 7\dfrac{1}{2} \qquad \text{Write the equation.}$$

$$x = \dfrac{2}{3} \cdot \dfrac{15}{2} \qquad \text{Rename the mixed number as an improper fraction.}$$

$$x = \dfrac{30}{6} \text{ or } 5 \qquad \text{Multiply and simplify.}$$

Samantha purchases 5 pounds of turkey breast.

Example 6 Solve Problems Involving Multiplication of Fractions

HOUSING The Green family is downsizing to a new house. Their new house is $\frac{3}{5}$ the size of their old house. Find the size of their new house given that their old house measured 3,500 square feet.

Words   The Green's new house is $\frac{3}{5}$ of 3,500 square feet.

Variable   Let x represent the size of the Green's new house.

Equation $x = \frac{3}{5} \cdot 3,500$

$x = \frac{3}{5} \cdot 3500$ Write the equation.

$x = \frac{3}{5} \cdot \frac{3500}{1}$ Rename the whole number as an improper fraction.

$x = \frac{10500}{5}$ or 2100 Multiply and simplify.

The Green's new house measures 2,100 square feet.