

Lesson 5-3

Example 1 Multiply Fractions

Find $\frac{3}{5} \cdot \frac{5}{7}$. Write the product in simplest form.

$$\begin{aligned}\frac{3}{5} \cdot \frac{5}{7} &= \frac{3 \cdot 5}{5 \cdot 7} && \text{Multiply the numerators and multiply the denominators.} \\ &= \frac{15}{35} \text{ or } \frac{3}{7} && \text{Simplify. The GCF of 15 and 35 is 5.}\end{aligned}$$

Example 2 Simplify Before Multiplying

Find $\frac{3}{8} \cdot \frac{6}{7}$. Write the product in simplest form.

$$\begin{aligned}\frac{3}{8} \cdot \frac{6}{7} &= \frac{3}{\cancel{8}^4} \cdot \frac{\cancel{6}^3}{7} && \text{Divide 8 and 6 by their GCF, 2.} \\ &= \frac{3 \cdot 3}{4 \cdot 7} && \text{Multiply the numerators and multiply the denominators.} \\ &= \frac{9}{28} && \text{Simplify.}\end{aligned}$$

Example 3 Multiply Negative Fractions

Find $\frac{7}{15} \cdot \left(-\frac{5}{9}\right)$. Write the product in simplest form.

$$\begin{aligned}\frac{7}{15} \cdot \left(-\frac{5}{9}\right) &= \frac{7}{\cancel{15}^3} \cdot \left(-\frac{\cancel{5}^1}{9}\right) && \text{Divide 5 and 15 by their GCF, 5.} \\ &= \frac{7 \cdot (-1)}{3 \cdot 9} && \text{Multiply the numerators and multiply the denominators.} \\ &= -\frac{7}{27} && \text{Simplify.}\end{aligned}$$

Example 4 Multiply Mixed Numbers

Find $2\frac{3}{4} \cdot 1\frac{5}{7}$. Write the product in simplest form.

$$\begin{aligned}
 2\frac{3}{4} \cdot 1\frac{5}{7} &= \frac{11}{4} \cdot \frac{12}{7} && \text{Rename } 2\frac{3}{4} \text{ as } \frac{11}{4} \text{ and rename } 1\frac{5}{7} \text{ as } \frac{12}{7}. \\
 &= \frac{11}{\cancel{4}^1} \cdot \frac{\cancel{12}^3}{7} && \text{Divide by the GCF, 4.} \\
 &= \frac{11 \cdot 3}{1 \cdot 7} && \text{Multiply.} \\
 &= \frac{33}{7} \text{ or } 4\frac{5}{7} && \text{Simplify.}
 \end{aligned}$$

Example 5 Multiply Algebraic Fractions

Find $\frac{3m^2}{n} \cdot \frac{p}{m}$. Write the product in simplest form.

$$\begin{aligned}
 \frac{3m^2}{n} \cdot \frac{p}{m} &= \frac{3 \cdot \cancel{m}^1 \cdot m}{n} \cdot \frac{p}{\cancel{m}^1} && \text{The GCF of } m^2 \text{ and } m \text{ is } m. \\
 &= \frac{3mp}{n} && \text{Simplify.}
 \end{aligned}$$

Example 6 Use Dimensional Analysis to Solve a Problem

VACATION The Green Family is driving to reach a vacation destination at a rate of 64 miles per hour. How far does the Green Family travel in $\frac{3}{4}$ hour?

Words Distance equals the rate multiplied by the time.

Variable Let d = distance, r = rate, and t = time.

Formula $d = rt$ Write the formula.

$$d = 64 \text{ miles per hour} \cdot \frac{3}{4} \text{ hour} \quad \text{Include the units.}$$

$$\begin{aligned}
 &= \frac{\cancel{64}^1 \text{ miles}}{1 \cancel{\text{hour}}^1} \cdot \frac{3}{\cancel{4}^1} \text{ hour} && \text{Divide by the common factors and units.} \\
 &= 48 \text{ miles} && \text{Simplify.}
 \end{aligned}$$

The Green Family travels 48 miles in $\frac{3}{4}$ hour.

CHECK The problem asks for the distance traveled. When you divide the common units, your answer is expressed in miles. So the answer is reasonable.