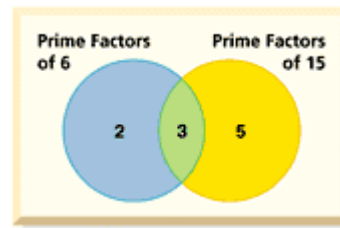


Lesson 4-5

Example 1 Simplify Fractions

Write $\frac{6}{15}$ in simplest form.

$$\begin{aligned} 6 &= 2 \cdot 3 && \text{Factor the numerator.} \\ 15 &= 3 \cdot 5 && \text{Factor the denominator.} \end{aligned}$$



The GCF of 6 and 15 is 3.

$$\begin{aligned} \frac{6}{15} &= \frac{6 \div 3}{15 \div 3} && \text{Divide the numerator and the denominator by the GCF.} \\ &= \frac{2}{5} && \text{Simplest form} \end{aligned}$$

Example 2 Simplify Fractions

Write $\frac{21}{84}$ in simplest form.

$$\begin{aligned} \frac{21}{84} &= \frac{\overset{1}{\cancel{3}} \cdot \overset{1}{\cancel{7}}}{2 \cdot 2 \cdot \underset{1}{\cancel{3}} \cdot \underset{1}{\cancel{7}}} && \text{Divide the numerator and denominator by the GCF, } 3 \cdot 7. \\ &= \frac{1}{4} && \text{Simplify.} \end{aligned}$$

Example 3 Simplify Fractions in Measurement

MEASUREMENT Twenty-one inches is what part of 1 yard?

There are 36 inches in one yard. Write the fraction $\frac{21}{36}$ in simplest form.

$$\begin{aligned} \frac{21}{36} &= \frac{\overset{1}{\cancel{3}} \cdot 7}{2 \cdot 2 \cdot \underset{1}{\cancel{3}} \cdot 3} && \text{Divide the numerator and the denominator by the GCF, 3.} \\ &= \frac{7}{12} \end{aligned}$$

So, 21 inches is $\frac{7}{12}$ of a yard.

Example 4 Simplify Algebraic Fractions

Simplify $\frac{24xy^3}{30x^2y}$.

$$\frac{24xy^3}{30x^2y} = \frac{\overset{1}{\cancel{2}} \cdot 2 \cdot \overset{1}{\cancel{2}} \cdot \overset{1}{\cancel{3}} \cdot \overset{1}{\cancel{x}} \cdot \overset{1}{\cancel{y}} \cdot y \cdot y}{\overset{1}{\cancel{2}} \cdot \overset{1}{\cancel{3}} \cdot 5 \cdot \overset{1}{\cancel{x}} \cdot x \cdot \overset{1}{\cancel{y}}}$$
$$= \frac{4y^2}{5x}$$

Divide the numerator and the denominator by

GCF, $2 \cdot 3 \cdot x \cdot y$.

Simplify.

Example 5 Algebraic Fractions on Standardized Tests

Multiple-Choice Test Item

Which fraction is $\frac{m^2np^3}{mnp^5}$ written in simplest form?

- A. $\frac{mn}{p}$ B. $\frac{m}{p^2}$ C. $\frac{p^2}{m}$ D. $\frac{m^2p^2}{n^2}$

Read the Test Item *In simplest form* means that the GCF of the numerator and denominator is 1.

Solve the Test Item

$$\frac{m^2np^3}{mnp^5} = \frac{m^2 \cancel{n} p^3}{m \cancel{n} p^5}$$

Without factoring, you can see that the variable n will not appear in the simplified fraction. That eliminates A and D.

$$\frac{m^2np^3}{mnp^5} = \frac{\overset{1}{\cancel{m}} \cdot m \cdot \overset{1}{\cancel{n}} \cdot \overset{1}{\cancel{p}} \cdot \overset{1}{\cancel{p}} \cdot \overset{1}{\cancel{p}}}{\overset{1}{\cancel{m}} \cdot \overset{1}{\cancel{n}} \cdot \overset{1}{\cancel{p}} \cdot \overset{1}{\cancel{p}} \cdot \overset{1}{\cancel{p}} \cdot p \cdot p} \text{ Factor.}$$
$$= \frac{m}{p^2}$$

The answer is B.