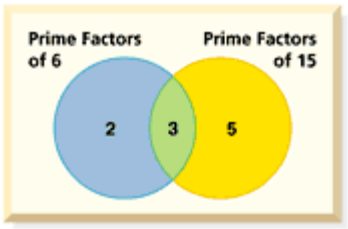
Lesson 4-5

Example 1 Simplify Fractions

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



$6 = 2 \cdot 3$ Factor the numerator.

$15 = 3 \cdot 5$ Factor the denominator.

The GCF of 6 and 15 is 3.

$\frac{6}{15} = \frac{6 \div 3}{15 \div 3}$ Divide the numerator and the denominator by the GCF.

$= \frac{2}{5}$ Simplest form

Example 2 Simplify Fractions

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

$\frac{21}{84} = \frac{\overset{1}{\cancel{3}} \cdot \overset{1}{\cancel{7}}}{2 \cdot 2 \cdot \underset{1}{\cancel{3}} \cdot \underset{1}{\cancel{7}}}$ Divide the numerator and denominator by the GCF, $3 \cdot 7$.

$= \frac{1}{4}$ Simplify.

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.

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

$= \frac{7}{12}$

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

Example 4 Simplify Algebraic Fractions

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

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

Divide the numerator and the denominator by GCF, $2 \cdot 3 \cdot x \cdot y$.

$$= \frac{4y^2}{5x}$$

Simplify.

Example 5 Algebraic Fractions on Standardized Tests
Multiple Choice Test Item

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

A. $\dfrac{mn}{p}$ **B.** $\dfrac{m}{p^2}$ **C.** $\dfrac{p^2}{m}$ **D.** $\dfrac{m^2p^2}{n^2}$

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.

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

Factor.

$$= \frac{m}{p^2}$$

The answer is B.