

## Reducing Fractions Using Prime Factorization

You already have learned two methods to reduce fractions into their lowest terms; one is by dividing and other method is by cutting numerator and denominator. This lesson gives another choice to learn simplifying fractions.

This skill needs the basic knowledge of prime factorization of numbers. For example; the prime factors of  $8 = 2 \times 2 \times 2$  (not  $2 \times 4$ , as 4 is not a prime number) and prime factorization of  $12 = 2 \times 2 \times 3$ .

Now we'll use the above method to simplifying fractions into lowest terms.

For example; let's reduce  $\frac{8}{12}$  into lowest terms by using the prime factors of these numbers.

$$\frac{8}{12} = \frac{\cancel{2} \times \cancel{2} \times 2}{\cancel{2} \times \cancel{2} \times 3}$$

$$= \frac{2}{3}, \quad \text{Just cut the common factors at top and bottom of the fraction}$$

**Example 2 >> Reduce**  $\frac{36}{45}$  *into lowest terms.*

**Solution:** Again we will use prime factors of 36 and 45 to do the task.

Prime factors of 36 =  $2 \times 2 \times 3 \times 3$

Prime factors of 45 =  $3 \times 3 \times 5$

Let's rewrite our fraction using prime factors of its numerator and denominator

$$\frac{36}{45} = \frac{2 \times 2 \times 3 \times 3}{3 \times 3 \times 5}$$

Now cut the common factors at top and bottom, we have two three at each spot to cancel.

$$\frac{2 \times 2 \times \cancel{3} \times \cancel{3}}{\cancel{3} \times \cancel{3} \times 5} = \frac{2 \times 2}{5} = \frac{4}{5} \text{ is the answer}$$

**Note:** *A prime number is that which can't be divided by any other number but 1.*