Simplifying Fractions

If we cut a pizza into 8 slices and eat 4 of them, would we say we ate four-eighths or $\frac{4}{8}$ of the pizza. We could also say we ate one-half, $\frac{1}{2}$ as both are **EQUIVALENT FRACTIONS**. One half is simpler because it uses smaller numbers, so we are more likely to say one half instead of four eighths.

SIMPLIFYING FRACTIONS means to reduce a fraction until it is as simple as possible.

HOW DO WE REDUCE FRACTIONS?

When we want to reduce a fraction, we have to find the **GREATEST COMMON FACTOR** between the numerator and denominator. Then we divide both numerator and denominator by the greatest common factor to reduce our fraction.

The greatest common factor of four and eight is 4. If we divide both numerator and denominator by 4 we have one-half!

Let's review the steps in more detail:

Remember that a factor is a number we multiply together to get another number:

$$4 \times 6 = 24$$

factor   factor

In this equation both 4 and 6 are factors of 24.

A number can have multiple factors.

Example 1:

How many factors are there of 24?

1 x 24 = 24,

2 x 12 = 24

3 x 8 = 24

4 x 6 = 24

> 1, 2, 3, 4, 6, 8, 12, 24
>
> are factors of 24

Remember: what is a common factor?

A common factor is when the factors of two or more numbers are the same.

Example 2:

What are the common factors of 12 and 30?

Factors of 12 are: 1, 2, 3, 4, 6, 12

Factors of 30 are: 1, 2, 3, 5, 6, 10, 15, 30

The factors they both have in common are: 1, 2, 3, 6

The **GREATEST COMMON FACTOR** is the **largest** number of the common factors.

So for this example, the greatest common factor is 6.

Example 3:

What is the greatest common factor of 24 and 30?

Factors of 24 are: 1, 2, 3, 4, 6, 8, 12, 24

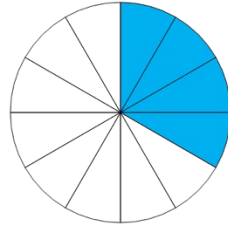Factors of 30 are: 1, 2, 3, 5, 6, 10, 15, 30

The factors they both have in common are: 1, 2, 3, 6

The greatest common factor between both numbers is 6

> Therefore, when we want to reduce fractions we have to find the greatest common factor between both the numerator and the denominator.

Example 4:

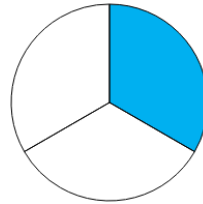Reduce the fraction $\dfrac{4}{12}$

Factors of 4: 1, 2, 4

Factors of 12: 1, 2, 3, 4, 6, 12

The factors they both have in common are: 1, 2, 4

Therefore, the greatest common factor between 4 and 12 is 4, so we divide **BOTH** the numerator and the denominator by 4.

$$\frac{4 \div 4}{12 \div 4} = \frac{1}{3}$$

← Reduced fraction

Greatest common factor

The fraction reduces to $\dfrac{1}{3}$

We can also say that $\dfrac{4}{12}$ is equivalent to $\dfrac{1}{3}$

Example 5:

Reduce the fraction $\dfrac{10}{35}$

Factors of 10: 1, 2, 5, 10

Factors of 35: 1, 5, 7, 35

The factors they both have in common are: 1, 5

So, the greatest common factor between 10 and 35 is 5.

We need to divide the numerator and the denominator by 5.

$$\frac{10 \div 5}{35 \div 5} = \frac{2}{7}$$

The fraction reduces to $\dfrac{2}{7}$ and is equivalent to $\dfrac{10}{35}$