



## Equivalent Fractions

There are many different fractions that have the same value. A score of  $\frac{3}{5}$  on a test is the same as  $\frac{6}{10}$  or  $\frac{18}{30}$ . These are called **equivalent fractions**.

### CONVERTING A FRACTION

We can change an equation by doing the same thing to both sides. Similarly we can convert a fraction by multiplying the numerator and denominator of a fraction by the same number, or by dividing them by the same number. Sometimes this process is called **multiplying by 1**. You'll see why in these examples.

**Example 1:** Convert  $\frac{3}{5}$  to an equivalent fraction by multiplying through by 6.

**Solution:**

$$\frac{3}{5} = \frac{3 \cdot 6}{5 \cdot 6} = \frac{18}{30}$$

**Note:** Since  $\frac{3}{5}$  is equivalent to 1, just like any fraction of the form  $\frac{x}{x}$ , we are basically multiplying by 1.

**Example 2:** Write an equivalent fraction with the given denominator:  $\frac{5}{6}$ , 48.

**Solution:** What this question is asking is for a fraction, equivalent to  $\frac{5}{6}$ , but with a denominator of 48, or  $\frac{x}{48} = \frac{5}{6}$ .

We know we'll be multiplying the numerator and denominator of the fraction by the same number, but this time we don't know what the number is. We look at the denominators, since that's the part of the problem we know about. We have 6, and we want 48. What number do we multiply 6 by to get 48? We multiply by 8, so that's the number we use:

$$\frac{5}{6} = \frac{5 \cdot 8}{6 \cdot 8} = \frac{40}{48}$$

The answer is  $\frac{40}{48}$ . This problem is good practice for adding or subtracting fractions.

We say that a fraction is in **lowest terms** when the numerator and denominator are both integers, and the integers have no common factors. It is useful to reduce a fraction to its lowest terms because it makes the fraction easier to understand. I could tell you that a math problem has an answer of  $\frac{100}{1000}$ , but it's hard to know what this answer means. If I reduce that horrible fraction, it becomes  $\frac{1}{10}$ , which is much easier to visualize.

**Example 3:** Reduce  $\frac{100}{1000}$  to lowest terms.

**Solution:** Look for common factors in the two parts of the fraction. When you find one, cancel it out and look again. If you don't see the greatest common factor right away, you may need to do this several times before you're done.