October 26, 2021

# Handout: Two Methods for Adding Fractions

Suppose you want to solve the problem

$$\frac{1}{4} + \frac{5}{6} = ?$$

The denominators are different, 4 and 6, so you need to start by getting them to be the same.

## Method 1: Multiply each fraction using the denominator of the other fraction

(1a) Multiply the denominators in order to find the easiest common multiple, 24.

(1b) Convert each fraction to 24ths by multiplying each by a fraction that equals one:

$$\frac{1}{4}\left(\frac{6}{6}\right) + \frac{5}{6}\left(\frac{4}{4}\right) = \frac{6}{24} + \frac{20}{24}$$

(1c) Now we can add up the numerators, since the denominators are the same:

$$\frac{6}{24} + \frac{20}{24} = \frac{26}{24}$$

(1d) Step (1c) gave us the answer, but it should be simplified. Notice that the numerator and denominator are even, so we can divide each by two to get our simplified answer:

$$\frac{26}{24} = \frac{13}{12} = 1\,\frac{1}{12}$$

## Method 2: Use least common multiples

(2a) Find the least common multiple of 4 and 6 somehow, perhaps by prime factorization. It turns out to be 12.

(2b) Convert the fractions into twelfths instead of fourths and sixths, so the problem becomes

$$\frac{3}{12} + \frac{10}{12} = ?$$

(2c) Now we can add up the numerators, since the denominators are the same:

$$\frac{3}{12} + \frac{10}{12} = \frac{13}{12} = 1\,\frac{1}{12}$$