

Adding Fractions with Like Denominators

Fraction bars help us understand computations with fractions. We'll first solve addition problems using fraction bars.

Improper fractions, fractions in which the numerator is larger than the denominator, may be expressed as mixed fractions and simplified to lowest terms.

To add fractions with the same denominator (bottom number), add the numerators (top numbers) only. The denominator will remain the same. The “d” in denominator is a signal that the denominator is “down” at the bottom of the fraction.

To add fractions with different denominators we find the least common denominator (LCD). Sometimes the LCD is called least common multiple (LCM).

Write fraction answers using the form in these examples.

Example 1: two-thirds is written as $\frac{2}{3}$.

Example 2: five and three fourths is written as $5\frac{3}{4}$.

Fraction Bars

Adding Fractions with Like Denominators Using Fraction Bars

Improper Fractions to Mixed Fractions

Adding Fractions with Like Denominators

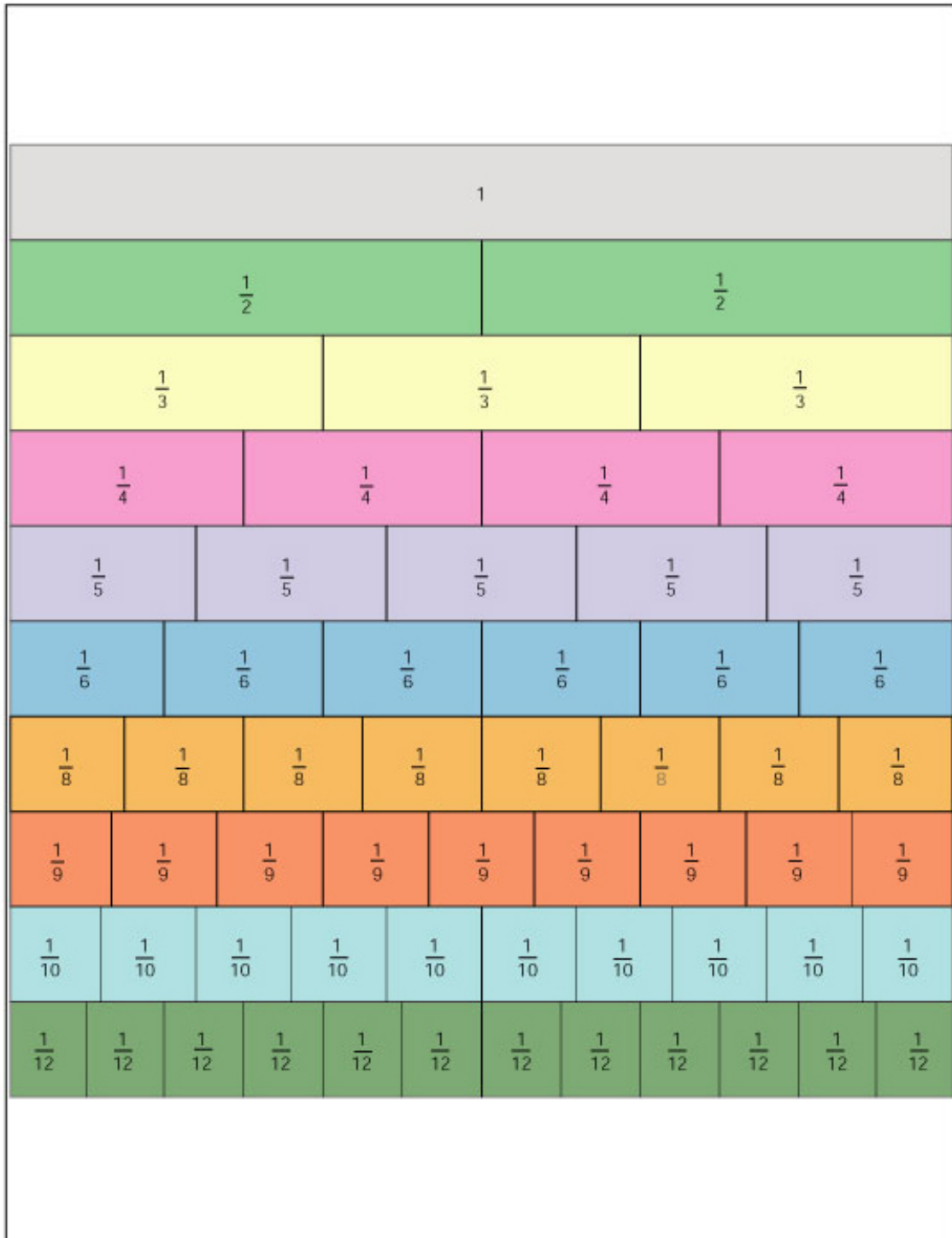
Finding LCM

Fraction Bars

Look over these fraction strips. Each strip represents 1 whole.

$1 = 2$ halves, 3 thirds, 4 fourths, 5 fifths, 6 sixths, and so on.

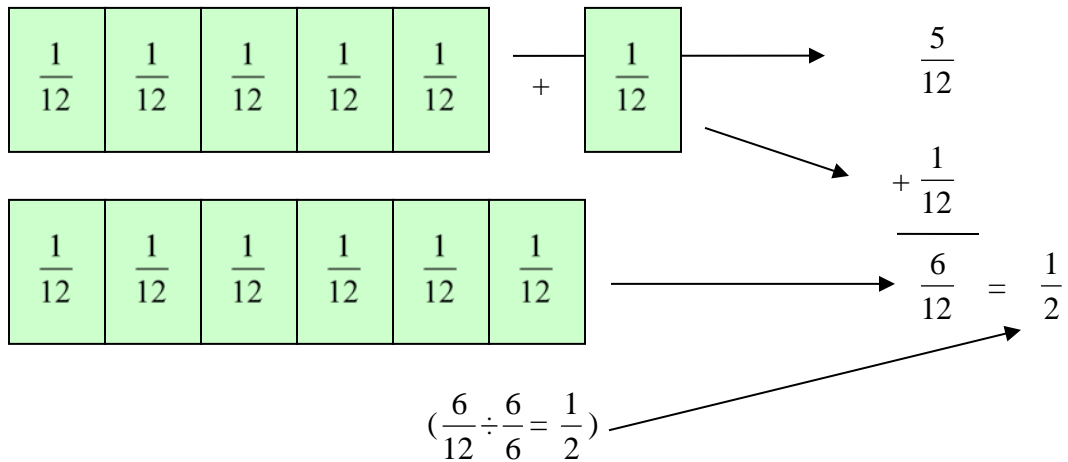
Thus, $1 = 2/2 = 3/3 = 4/4 = 5/5 = 6/6$ and so on...



Adding Fractions with Like Denominators Using Fraction Bars

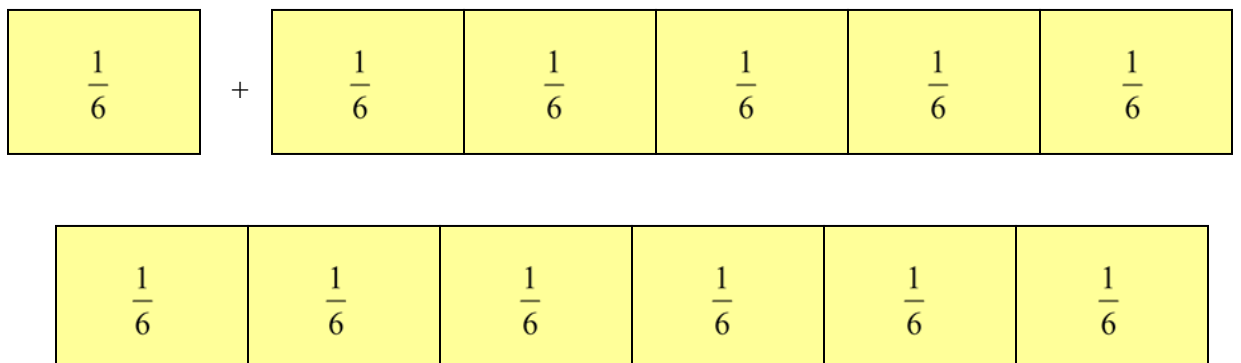
Study the two addition problems below. To add fractions with like denominators, only add the numerators (top numbers of the fractions).

Example 1



Example 2

$$\begin{array}{r} \frac{1}{6} \\ + \frac{5}{6} \\ \hline \frac{6}{6} = 1 \end{array}$$



Improper Fraction to Mixed Fraction

Example 1: Express $13/10$ as a mixed fraction.

Method 1

Express the fraction as two fractions where the first one is equal to the largest whole number within the fraction and the second fraction is the remaining fractional part.

In this problem, the whole number is 1 ($10/10$) and the remaining part is $3/10$.

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

Method 2

Divide the numerator by the denominator and express the remainder as a fraction.

$$\frac{13}{10} = \begin{array}{r} 10 \overline{)13} \\ \underline{10} \\ 3 \end{array} = 1\frac{3}{10}$$

Thirteen-tenths is equal to one and three tenths.

Example 2: Express $15/10$ as a simplified mixed fraction.

$$\frac{15}{10} = \begin{array}{r} 10 \overline{)15} \\ \underline{10} \\ 5 \end{array} = 1\frac{5}{10} \text{ which reduces to } 1\frac{1}{2}$$

Fifteen tenths is equal to one and one-half.

Adding Fractions with Like Denominators

Example 1:

Find $\frac{4}{9} + \frac{2}{9}$

$$\begin{array}{r} \frac{4}{9} \\ + \frac{2}{9} \\ \hline \frac{6}{9} \end{array} \text{ reduces to } \frac{2}{3}$$

Example 2:

Find $\frac{5}{8} + \frac{7}{8}$

$$\begin{array}{r} \frac{5}{8} \\ + \frac{7}{8} \\ \hline \frac{12}{8} \end{array} = 1\frac{4}{8} \text{ simplifies to } 1\frac{1}{2}$$

Finding LCM

To find the Least Common Multiple (LCM)

1. List the multiples of both given numbers.
2. Find the first multiple that is common to both sets of multiples.

Find LCM for 8 and 16.

List multiples of 16

$$16 = \{16, 32 \dots\}$$

List multiples of 8

$$8 = \{8, 16, 24 \dots\}$$

LCM is the first common multiple in both sets.

$$\text{LCM} = 16$$

Find LCM for 9 and 6.

List multiples of 9

$$9 = \{9, 18, 27 \dots\}$$

List multiples of 6

$$6 = \{6, 12, 18, 24 \dots\}$$

LCM is the first common factor in both sets.

$$\text{LCM} = 18$$