Subtracting Mixed Fractions

To subtract fractions with unlike denominators, express the fractions into equivalent fractions with the same denominator. First we'll look at models for subtracting mixed fractions using fraction bars and then we'll examine the steps for solving subtraction problems without the fraction bars. We'll also look at borrowing.

Write fraction answers using the form in these examples.
Example 1: two-thirds is written as 2/3.
Example 2: five and three fourths is written as 5 3/4.

Fraction Bars

Subtracting Mixed Fractions Using Fraction Bars

Subtracting Mixed Fractions

Subtracting Mixed Fractions from Whole Numbers

Subtracting Mixed Fractions and Borrowing Using Fraction Bars

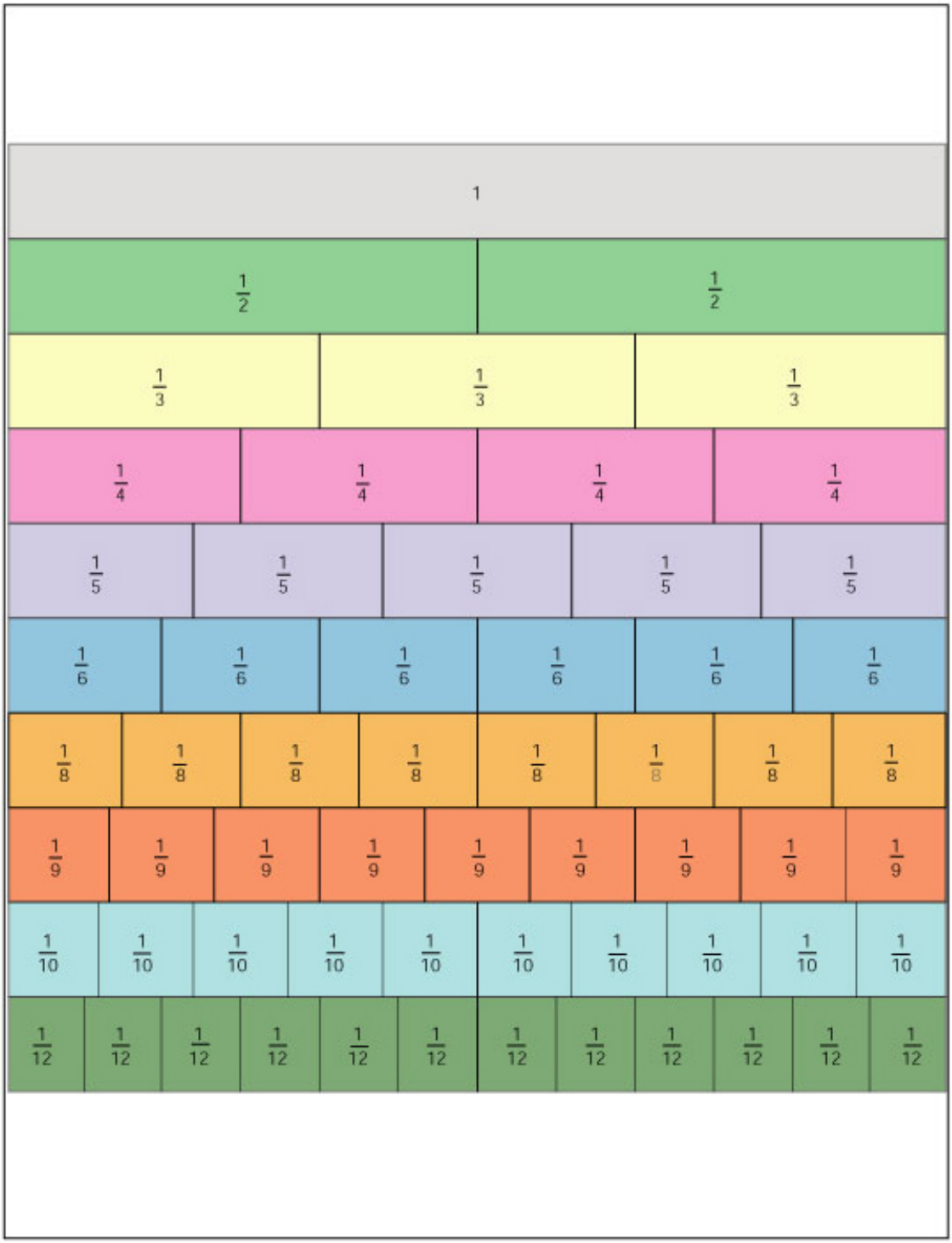
Subtract Mixed Fractions with Borrowing

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.

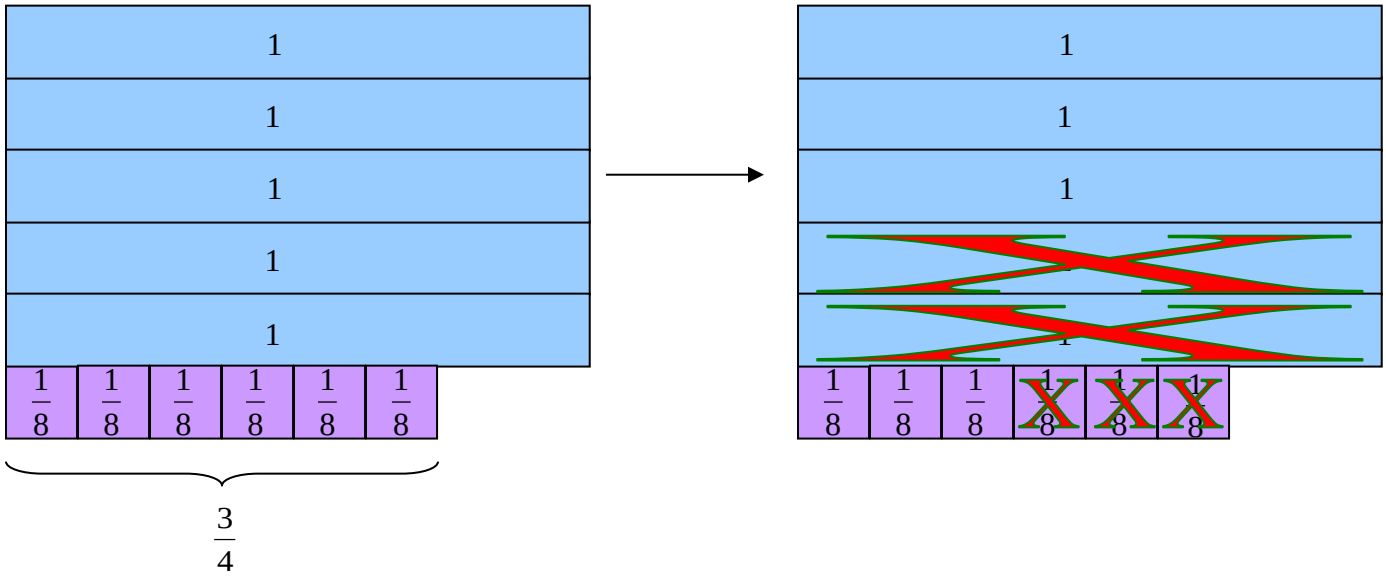
Thus, 1 = 2/2 = 3/3 = 4/4 = 5/5 = 6/6 and so on…



Subtracting Mixed Fractions Using Fraction Bars

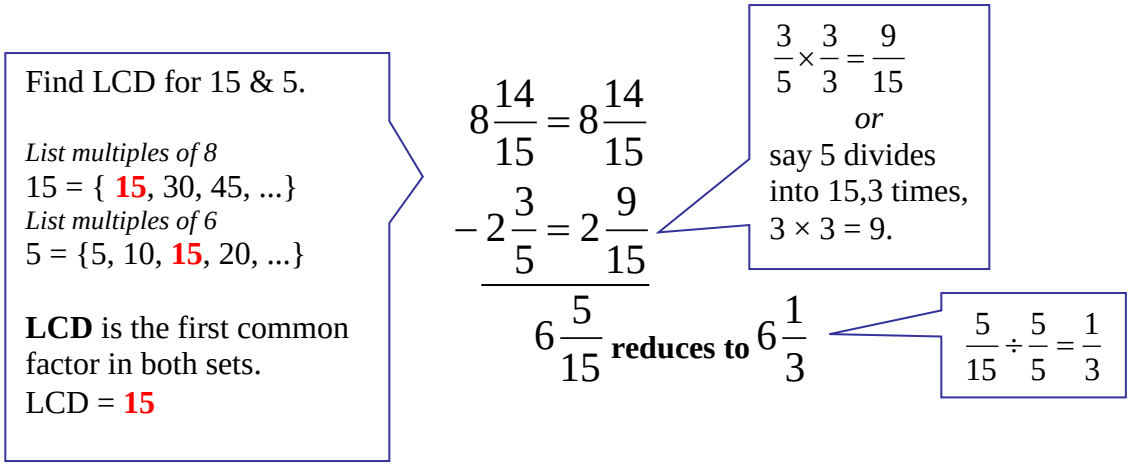
Study the subtraction problem below. To subtract fractions with unlike denominators, express the fractions into equivalent fractions with the same denominator.

$$\begin{array}{rcl} 5\frac{3}{4} & = & 5\frac{6}{8} \\ -\ 2\frac{3}{8} & = & 2\frac{3}{8} \\ \hline & & 3\frac{3}{8} \end{array}$$



Subtracting Mixed Fractions

Example 1: Find 8 14/15 – 2 3/5. Simplify, if necessary.



Thus, 8 14/15 – 2 3/5 = 6 1/3.

To check, use estimation to see if your answer is reasonable.

$$(8\frac{14}{15} \approx 9),\ (2\frac{3}{5} \approx 3)$$

$9 - 3 = 6$ which is close to the actual answer, $6\frac{1}{3}$.

Subtracting Mixed Fractions from Whole Numbers

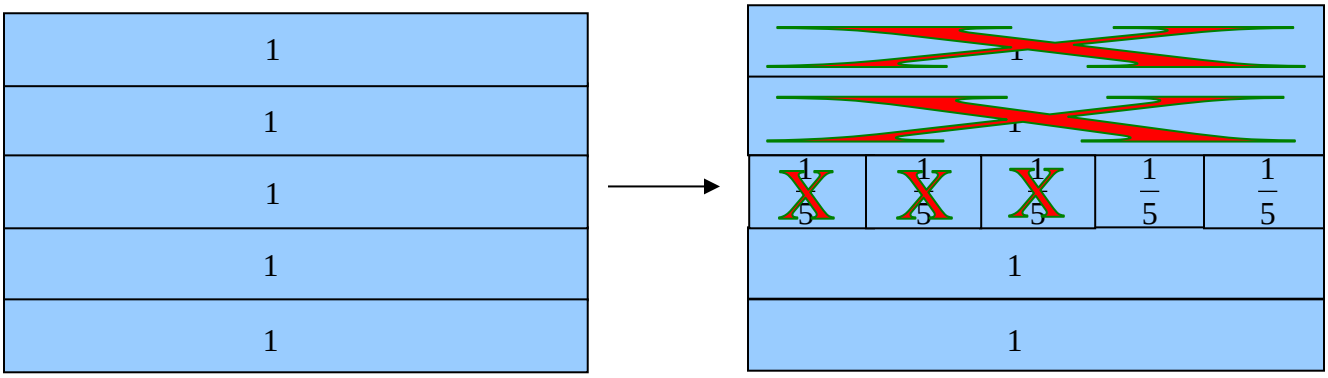
Study the subtraction problem below. To subtract a mixed fraction from a whole number, express the whole number as 1 less. Rename the 1 as a fraction equivalent to **one** that has the same denominator as the mixed number.

Example 1: Find 5 – 2 3/5.

$$5 = 4\frac{5}{5} \qquad (5 = 4 + 1 = 4 + \frac{5}{5})$$

$$-\ 2\frac{3}{5} = 2\frac{3}{5}$$

$$2\frac{2}{5}$$



Example 2: Find 7 – 2 4/13.

$$7 = 6\frac{13}{13}$$

$$-\ 2\frac{4}{13} = 2\frac{4}{13}$$

$$4\frac{9}{13}$$

Borrow

7 = 6 + 1 = $6 + \frac{13}{13} = 6\frac{13}{13}$

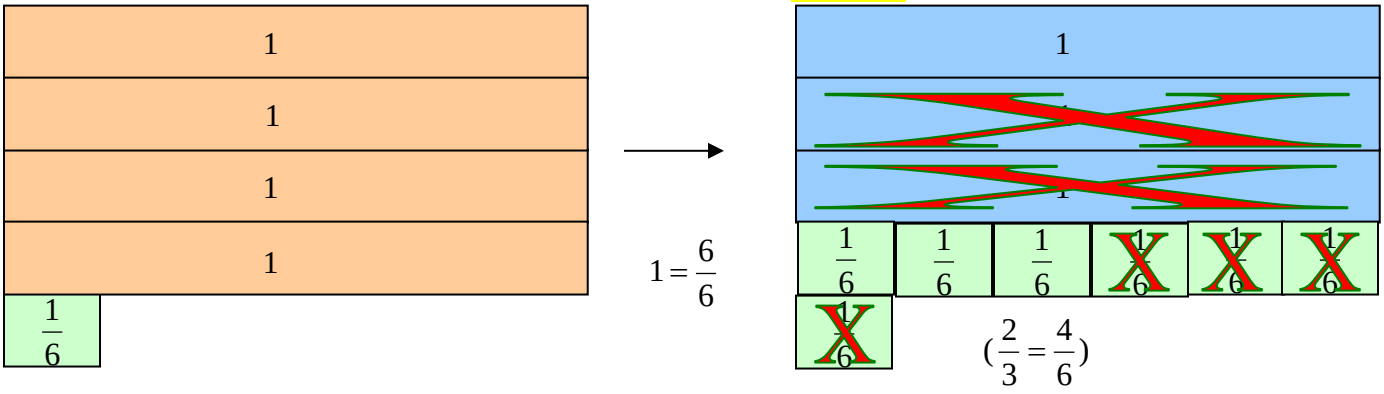
Subtracting Mixed Fractions and Borrowing Using Fraction Bars

Study the subtraction problem below. To subtract fractions with unlike denominators, first express the fractions into equivalent fractions with the same denominator. Then check to see if borrowing is needed to complete the problem.

$$4\frac{1}{6} = 4\frac{1}{6} = 3\frac{7}{6} \qquad (4\frac{1}{6} = 3+1+\frac{1}{6} = 3+\frac{6}{6}+\frac{1}{6} = 3\frac{7}{6})$$

$$-\ 2\frac{2}{3} = 2\frac{4}{6} = 2\frac{4}{6}$$

$$1\frac{3}{6} = 1\frac{1}{2}$$



Subtracting Mixed Fractions with Borrowing

Example 1: Find 9 3/8 – 4 7/8. Simplify, if necessary.

$$9\frac{3}{8} = 8\frac{11}{8}$$
$$-4\frac{7}{8} = 4\frac{7}{8}$$

$4\frac{4}{8}$ **reduces to** $4\frac{1}{2}$

Borrow

$$9\frac{3}{8} = 8 + 1 + \frac{3}{8} = 8 + \frac{8}{8} + \frac{3}{8} = 8\frac{11}{8}$$

A shortcut to find the numerator, 11 in $\frac{11}{8}$, is to add the 3 + 8, in $\frac{3}{8}$ and write it over 8.

Thus, 9 3/8 – 4 7/8 = 4 1/2.

Example 2: Find 5 5/12 – 2 11/18. Simplify, if necessary.

$\frac{5}{12} \times \frac{3}{3} = \frac{15}{36}$ or say 12 divides into 36, 3 times, 5 × 3 = 15.

Find the LCD of 12 & 18.

List multiples of 18
18 = {18, **36**, 54 ...}
List multiples of 12
12 = {12, 24, **36**, 48 ...}

The **LCD** is the first common factor in both sets.

LCD = **36**

$$5\frac{5}{12} = 5\frac{15}{36} = 4\frac{51}{36}$$
$$-2\frac{11}{18} = 2\frac{22}{36} = 2\frac{22}{36}$$
$$2\frac{29}{36}$$

Borrow

$$5\frac{15}{36} = 4 + 1 + \frac{15}{36} = 4 + \frac{36}{36} + \frac{15}{36} = 4\frac{51}{36}$$

A shortcut to find the numerator, 51, in $\frac{51}{36}$, is to add the 15 + 36, in $\frac{15}{36}$ and write it over 36.

$\frac{11}{18} \times \frac{2}{2} = \frac{22}{36}$ or say 18 divides into 36, 2 times, 11 × 2 = 22.

Thus, 5 5/12 – 2 11/18 = 2 29/36.