Adding Mixed Fractions

We used fraction bars to add simple fractions. Now, we'll use them to add mixed fractions with like and unlike denominators. The fraction bars have helped us understand adding mixed fractions.

We'll also look at adding mixed fractions with like and unlike denominators without the fraction bars.

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

Adding Mixed Fractions with Like Denominators Using Fraction Bars

Adding Mixed Fractions with Like Denominators

Adding Mixed Fractions with Unlike Denominators Using Fraction Bars

Adding Mixed Fractions with Unlike Denominators

Fraction Bars

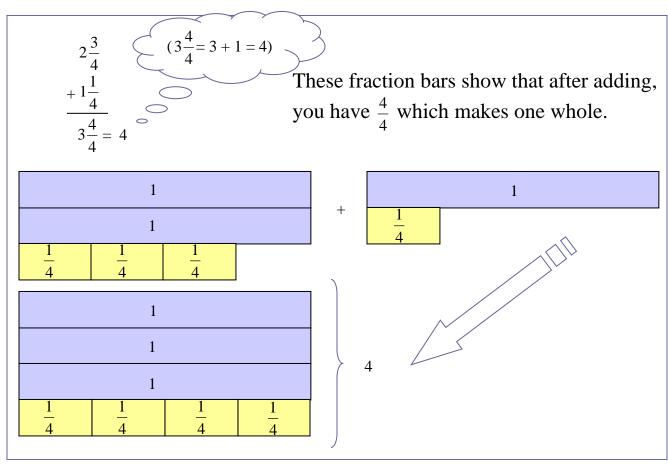Look over these fraction strips. Each strip represents 1 whole.

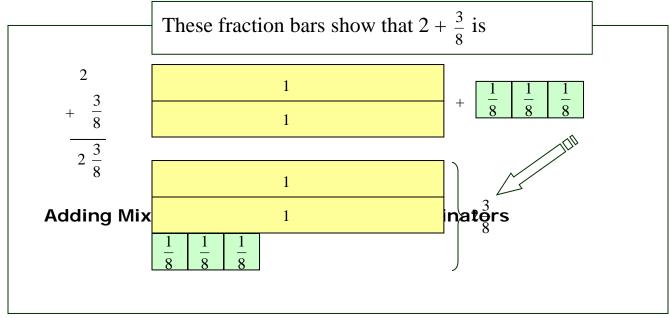1 = 2 halves, 3 thirds, 4 fourths, 5 fifths, 6 sixths, and so on.

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

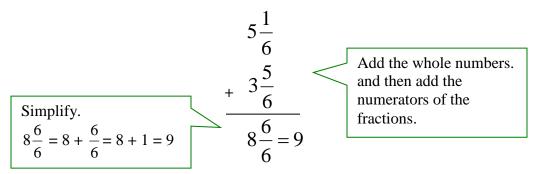| 1											
$\frac{1}{2}$						$\frac{1}{2}$					
$\frac{1}{3}$				$\frac{1}{3}$				$\frac{1}{3}$			
$\frac{1}{4}$			$\frac{1}{4}$			$\frac{1}{4}$			$\frac{1}{4}$		
$\frac{1}{5}$		$\frac{1}{5}$		$\frac{1}{5}$		$\frac{1}{5}$		$\frac{1}{5}$			
$\frac{1}{6}$		$\frac{1}{6}$		$\frac{1}{6}$		$\frac{1}{6}$		$\frac{1}{6}$		$\frac{1}{6}$	
$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$	$\frac{1}{8}$				
$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$	$\frac{1}{9}$			
$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$	$\frac{1}{10}$		
$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$	$\frac{1}{12}$

Adding Mixed Fractions with Like Denominators Using Fraction Bars

Study the two addition problems below. To add mixed fractions with the same denominator, add the fractions and the whole numbers. When needed, simplify the fraction and combine it with the whole number.

$$2\frac{3}{4}$$

$$+1\frac{1}{4}$$

$$\left(3\frac{4}{4} = 3 + 1 = 4\right)$$

$$3\frac{4}{4} = 4$$

These fraction bars show that after adding, you have $\frac{4}{4}$ which makes one whole.

| 1 |
| 1 |

| $\frac{1}{4}$ | $\frac{1}{4}$ | $\frac{1}{4}$ |

| 1 |
| 1 |
| 1 |

| $\frac{1}{4}$ | $\frac{1}{4}$ | $\frac{1}{4}$ | $\frac{1}{4}$ |

$+$

| 1 |

| $\frac{1}{4}$ |

4

These fraction bars show that $2 + \frac{3}{8}$ is

$$2$$

$$+ \frac{3}{8}$$

$$2\frac{3}{8}$$

| 1 |
| 1 |

$+$

| $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ |

| 1 |
| 1 |

| $\frac{1}{8}$ | $\frac{1}{8}$ | $\frac{1}{8}$ |

$2\frac{3}{8}$

Adding Mixinators

Example 1: Find 5 1/6 + 3 5/6. Simplify, if necessary.

$$5\dfrac{1}{6}$$

$$+\quad 3\dfrac{5}{6}$$

Add the whole numbers. and then add the numerators of the fractions.

Simplify.
$$8\dfrac{6}{6} = 8 + \dfrac{6}{6} = 8 + 1 = 9$$

$$8\dfrac{6}{6} = 9$$

Thus, 5 1/6 + 3 5/6 = 9.

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

$$(5\dfrac{1}{6} \approx 5),\ (3\dfrac{5}{6} \approx 4) \qquad 5 + 4 = 9$$

Example 2: Find 3/4 + 8. Simplify, if necessary.

$$\dfrac{3}{4}$$

$$+\,8$$

$$8\dfrac{3}{4}$$

Just bring down the 8 since $8 + 0 = 8$ and bring down the $\dfrac{3}{4}$ since $\dfrac{3}{4} + 0 = \dfrac{3}{4}$.

Thus, 3/4 + 8 = 8 3/4.

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

$$(\dfrac{3}{4} \approx 1),\ (8 \text{ stays as } 8) \qquad 1 + 8 = 9 \quad 9 \text{ is close to the actual answer, } 8\dfrac{3}{4}.$$
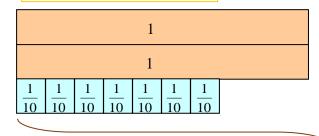
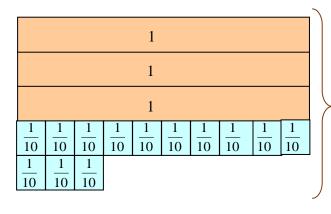# Adding Mixed Fractions with Unlike Denominators Using Fraction Bars

$$2\frac{7}{10} = \quad 2\frac{7}{10}$$

$$+ 1\frac{3}{5} = \quad 1\frac{6}{10}$$

$$\overline{\qquad\qquad}$$

$$3\frac{13}{10} = 4\frac{3}{10}$$

$$(3\frac{13}{10} = 3 + \frac{10}{10} + \frac{3}{10} = 3 + 1 + \frac{3}{10} = 4\frac{3}{10})$$

Adding Mixed Fractions with Unlike Denominators

Find $3\frac{7}{9} + 2\frac{2}{3}$

Find LCD for 3 & 9.

List multiples of 9
$9 = \{\textbf{9}, 18, 27...\}$
List multiples of 3
$3 = \{3, 6, \textbf{9}, 12...\}$

LCD is the first common factor in both sets.
LCM = **9**

$$3\frac{7}{9} = 3\frac{7}{9}$$
$$+ \quad 2\frac{2}{3} = 2\frac{6}{9}$$
$$\overline{}$$
$$5\frac{13}{9} = 6\frac{4}{9}$$

$\frac{2}{3} \times \frac{3}{3} = \frac{6}{9}$ or say 3 divides into 9, 3 times, 2 x 3 = 6.

$\mathbf{5\frac{13}{9}} = \mathbf{5} + \frac{9}{9} + \frac{4}{9} = \mathbf{5 + 1} + \frac{4}{9} = \mathbf{6\frac{4}{9}}$

or

$$\frac{13}{9} = 9\overline{)13} \begin{array}{c} 1 \\ 13 \\ \underline{9} \\ 4 \end{array} = 1\frac{4}{9}$$

thus,

$$\mathbf{5}\,\frac{13}{9} = \mathbf{5} + 1\frac{4}{9} = \mathbf{6\frac{4}{9}}$$

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

$$(3\frac{7}{9} \approx 4), \ (2\frac{2}{3} \approx 3)$$

$4 + 3 = 7$ which is close to the actual answer, $6\frac{4}{9}$.