

Learning Goals

1. To understand how to change a mixed number to an improper fraction.
2. To understand how to change an improper fraction to a mixed number.
3. To review how to add and subtract fractions with common denominators and without common denominators.

1.1- Adding and Subtracting Mixed Numbers

Changing a Mixed Number to an Improper Fraction

1. Multiply the denominator by the whole number.
2. Add the numerator. This becomes the new numerator for the improper fraction. The denominator stays the same.

A handwritten diagram of the mixed number $3 \frac{1}{5}$. The whole number '3' is written in green. The fraction $\frac{1}{5}$ is written in blue. A blue arrow points from the text 'whole number' to the '3'. A blue arrow points from the text 'numerator' to the '1'. A blue arrow points from the text 'denominator' to the '5'.

Example

$$5\frac{7}{12} = \frac{67}{12}$$

Changing an Improper Fraction to a Mixed Number

1. The denominator does not change.
2. Divide the numerator by the denominator.
3. Write down the whole number.
4. Multiply the remaining decimal by the denominator to get the new numerator.

Example

$$\frac{78}{11} =$$

$$7 \frac{1}{11}$$

Steps to Adding and Subtracting Mixed Numbers

1. Change mixed number to improper fraction.
2. Find a common denominator.
3. Evaluate (add or subtract) and reduce to lowest terms.
4. Change improper fraction back to mixed number.

Example One

Evaluate.

a) $5\frac{3}{4} + 2\frac{1}{3}$

1. Change to improper fractions.

$$\frac{23 \times 3}{4 \times 3} + \frac{7 \times 4}{3 \times 4}$$

2. Find a common denominator

$$\frac{69}{12} + \frac{28}{12}$$

3. Add numerators. Leave denominators alone!

$$\frac{69 + 28}{12} = \frac{97}{12}$$

4. Change back to a mixed number.

$$\frac{97}{12} = 8\frac{1}{12}$$

b) $8\frac{1}{12} - 4\frac{3}{5}$

1. Change to improper fractions.

$$\frac{97 \times 5}{12 \times 5} - \frac{23 \times 12}{5 \times 12}$$

2. Find a common denominator.

$$\frac{485}{60} - \frac{276}{60}$$

3. Subtract

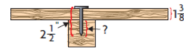
$$\frac{485 - 276}{60} = \frac{209}{60}$$

4. Change back to a mixed number.

$$3\frac{29}{60}$$

Example Two

If a $2\frac{1}{2}$ in. nail is hammered through a board $1\frac{3}{8}$ in. thick and into a support beam, how far into the support beam does the nail extend?



Solution.

1. Decide whether to add or subtract.

$$2\frac{1}{2} - 1\frac{3}{8}$$

2. Change to improper fractions.

$$\frac{5 \times 4 + 11}{2 \times 4 + 8}$$

3. Find a common denominator.

$$\frac{20}{8} - \frac{11}{8}$$

4. Subtract

$$\frac{20-11}{8} = \frac{9}{8}$$

5. Change back to a mixed number.

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

Complete: p. 16 - 18 #5, 7 - 9, 13.