

Mixed Numbers & Improper Fractions

IMPROPER FRACTIONS INTO MIXED NUMBERS

1. Divide the numerator by the denominator.
2. After completing the division (step 1), the quotient becomes the whole number, the remainder becomes the numerator, and the divisor remains the denominator.

MIXED NUMBERS INTO IMPROPER FRACTIONS

1. Multiply the whole number by the denominator.
2. Add the numerator to the product of the whole number and the denominator (completed in step 1).
3. The denominator of the improper fraction is the same denominator as it was in the mixed number.

Examples

$$\textcircled{1} \quad \frac{28}{9} = 9 \overline{)28} \begin{array}{r} 3 \\ -27 \\ \hline 1 \end{array} R1 = 3\frac{1}{9}$$

$$\textcircled{2} \quad \frac{35}{8} = 4\frac{3}{8}$$

$$\textcircled{3} \quad 7\frac{1}{4} = \frac{29}{4}$$

$$\textcircled{4} \quad 9\frac{11}{12} = \frac{119}{12}$$

$$\textcircled{5} \quad 5\frac{7}{8} =$$

$$\textcircled{6} \quad \frac{19}{2}$$

$$\textcircled{7} \quad 10\frac{13}{18}$$

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3. The denominator of the improper fraction is the same denominator as it was in the mixed number.

Examples

$$\textcircled{1} \quad \frac{28}{9} = 9 \overline{)28} \begin{array}{r} 3 \\ \underline{-27} \\ 1 \end{array} = 3 \frac{1}{9}$$

$$\textcircled{2} \quad \frac{35}{8} = 8 \overline{)35} \begin{array}{r} 4 \\ \underline{-32} \\ 3 \end{array} = 4 \frac{3}{8}$$

$$\textcircled{3} \quad 7 \frac{1}{4} = \frac{28}{4} + \frac{1}{4} = \frac{29}{4}$$

$$\textcircled{4} \quad 9 \frac{11}{12} = \frac{108}{12} + \frac{11}{12} = \frac{119}{12}$$

$$\textcircled{5} \quad 5 \frac{7}{8} = \frac{47}{8}$$

$$\textcircled{6} \quad \frac{19}{2}$$

$$\textcircled{7} \quad 10 \frac{13}{18}$$

$$1 \frac{5}{6} = \frac{11}{6}$$

ADDING MIXED NUMBERS

$$2\frac{1}{8} + 3\frac{5}{6}$$

1. Find a common denominator.

$$6: 6, 12, 18, \textcircled{24}, 30, 36, 42, \textcircled{48} \quad \text{LCD: } \underline{24}$$

$$8: 8, 16, \textcircled{24}, 32, 40, \textcircled{48}$$

2. Write equivalent fractions for the original fractions using the common denominator.

$$\frac{1 \times 3}{8 \times 3} = \frac{3}{24} \qquad \frac{5 \times 4}{6 \times 4} = \frac{20}{24}$$

3. Add the fractions first. Then, add the mixed numbers.

$$\begin{array}{r} 2\frac{1}{8} = 2\frac{3}{24} \\ + 3\frac{5}{6} = 3\frac{20}{24} \\ \hline 5\frac{23}{24} \end{array}$$

4. Make sure that your answer is in simplest form.

Adding and Subtracting Fractions and Mixed Numbers Notes

$$\begin{array}{r} 7 \frac{4}{5} \\ + 3 \frac{1}{3} \\ \hline 10 \frac{17}{15} = 11 \frac{2}{15} \end{array}$$

$$\begin{array}{r} 7 \frac{2}{6} \\ + 4 \frac{5}{9} \\ \hline 11 \frac{16}{18} = 11 \frac{8}{9} \end{array}$$

SUBTRACTING MIXED NUMBERS

$$5\frac{4}{5} - 2\frac{1}{3}$$

1. Find a common denominator.

$$3: 3, 6, 9, 12, 15, 18, 21, 24, 27, 30$$

$$5: 5, 10, 15, 20, 25, 30$$

LCM: 15

2. Write equivalent fractions for the original fractions using the common denominator.

$$\frac{4 \times 3}{5 \times 3} = \frac{12}{15}$$

$$\frac{1 \times 5}{3 \times 5} = \frac{5}{15}$$

3. Subtract the fractions first. Then, subtract the whole numbers. **SOMETIMES YOU MUST REGROUP OR TURN THE MIXED NUMBERS INTO IMPROPER FRACTIONS BEFORE SUBTRACTING.**

$$5\frac{4}{5} = 5\frac{12}{15}$$

$$-2\frac{1}{3} = 2\frac{5}{15}$$

$$3\frac{7}{15}$$

4. Make sure that your answer is in simplest form.

$$7\frac{1}{4} - 3\frac{7}{8}$$

Regrouping

$$\begin{array}{r}
 7\frac{1}{4} \underset{\times 2}{=} \boxed{7}\frac{2}{8} = 6\frac{8}{8} + \frac{2}{8} = 6\frac{10}{8} \\
 - 3\frac{7}{8} = 3\frac{7}{8} \longrightarrow 3\frac{7}{8} \\
 \hline
 3\frac{3}{8}
 \end{array}$$

Using Improper Fractions

$$\begin{array}{r}
 7\frac{1}{4} \underset{\times 2}{=} 7\frac{2}{8} = \frac{58}{8} \\
 - 3\frac{7}{8} = \frac{31}{8} \\
 \hline
 \frac{27}{8} = 3\frac{3}{8}
 \end{array}$$

$$\begin{array}{r}
 3 \text{ R } 3 \\
 8 \overline{) 27} \\
 \underline{-24} \\
 3
 \end{array}$$

$$10\frac{1}{2} - 5\frac{4}{7}$$

Regrouping

$$\begin{array}{r}
 10\frac{1}{2} \overset{\times 7}{=} \boxed{10}\frac{7}{14} \overset{\times 7}{=} 9\frac{14}{14} + \frac{7}{14} = 9\frac{21}{14} \\
 - 5\frac{4}{7} \overset{\times 2}{=} 5\frac{8}{14} \overset{\times 2}{=} \phantom{9\frac{21}{14}} \rightarrow 5\frac{8}{14} \\
 \hline
 4\frac{13}{14}
 \end{array}$$

Using Improper Fractions

$$\begin{array}{r}
 10\frac{1}{2} = 10\frac{7}{14} = \frac{140}{14} + \frac{7}{14} = \frac{147}{14} \\
 - 5\frac{4}{7} = 5\frac{8}{14} = \frac{78}{14} \\
 \hline
 \frac{69}{14} = 4\frac{13}{14}
 \end{array}$$

$$\begin{array}{r}
 4 \text{ R}13 \\
 14 \overline{)69} \\
 \underline{-56} \\
 13
 \end{array}$$