



1. Mixed Fractions to Improper Fractions

To convert a mixed fraction to a improper fraction:

1. Rewrite any negative symbols in front.
2. Multiply the denominator times the whole number and add this to the numerator; this becomes the new numerator.
3. Copy the old denominator.

Examples

Convert the following mixed fractions to improper fractions

a) $5\frac{3}{4}$
 $= \frac{23}{4}$

b) $2\frac{4}{5}$
 $= \frac{14}{5}$

c) $-3\frac{1}{7}$
 $= -\frac{22}{7}$

d) $-9\frac{2}{7}$ ← mixed fraction
 $= -\frac{65}{7}$ ← improper fraction

2. Simplifying Fractions

To simplify a fraction, divide both top and bottom by a common multiple.

Examples

a) $\frac{27 \div 3}{36 \div 3}$
 $= \frac{9 \div 3}{12 \div 3}$
 $= \frac{3}{4}$

b) $\frac{12 \div 4}{8 \div 4}$
 $= \frac{3}{2}$

c) $-\frac{42 \div 6}{48 \div 6}$
 $= -\frac{7}{8}$

3. Adding/Subtracting Fractions

To add/subtract two fractions:

1. Rewrite each fraction with a common denominator
2. Add/subtract numerators
3. Copy denominator

Examples

$$\begin{aligned} \text{a) } & \frac{7 \times 2}{7 \times 5} + \frac{1 \times 5}{7 \times 5} \\ & = \frac{14}{35} + \frac{5}{35} \\ & = \frac{19}{35} \end{aligned}$$

$$\begin{aligned} \text{b) } & 1\frac{3}{4} + \frac{2}{8} \\ & = 2 \times \frac{7}{4} + \frac{2}{8} \\ & = \frac{14}{8} + \frac{2}{8} \end{aligned} \quad \begin{aligned} & \rightarrow = \frac{16}{8} \\ & = 2 \end{aligned}$$

$$\begin{aligned} \text{c) } & \frac{2 \times 5}{2 \times 3} - \frac{1 \times 3}{2 \times 3} \\ & = \frac{10}{6} - \frac{3}{6} \\ & = \frac{7}{6} \end{aligned}$$

$$\begin{aligned} \text{d) } & \frac{8 \times 2}{8 \times 3} - \frac{7 \times 3}{8 \times 3} \\ & = \frac{-16}{24} - \frac{21}{24} \\ & = -\frac{37}{24} \end{aligned}$$

$$-\frac{1}{2} = -\frac{1}{2} = \frac{1}{-2}$$

An alternative method can be used by multiplying across.

Examples



$$\begin{aligned} \text{a) } & \frac{4}{6} - \frac{1}{2} \\ & = \frac{8-6}{12} \\ & = \frac{2}{12} \\ & = \frac{1}{6} \end{aligned}$$

$$\begin{aligned} \text{b) } & \frac{1}{3} + \frac{7}{8} \\ & = \frac{8+21}{24} \\ & = \frac{29}{24} \end{aligned}$$

$$\begin{aligned} \text{c) } & -\frac{1}{8} + \frac{2}{3} \\ & = \frac{-3+16}{24} \\ & = \frac{13}{24} \end{aligned}$$

Fraction Practice

1. Convert the following mixed fractions to improper fractions.

$$\begin{aligned} \text{a) } 3\frac{5}{6} &= \frac{23}{6} \\ &= \frac{6 \times 3 + 5}{6} \end{aligned}$$

$$\begin{aligned} \text{b) } -6\frac{2}{3} &= -\frac{20}{3} \end{aligned}$$

$$\begin{aligned} \text{c) } 1\frac{3}{7} &= \frac{10}{7} \end{aligned}$$

2. Simplify the following fractions.

$$\begin{aligned} \text{a) } \frac{14 \div 7}{35 \div 7} &= \frac{2}{5} \end{aligned}$$

$$\begin{aligned} \text{b) } -\frac{12 \div 6}{18 \div 6} &= -\frac{2}{3} \end{aligned}$$

$$\begin{aligned} \text{c) } \frac{320 \div 10}{400 \div 10} &= \frac{32 \div 4}{40 \div 4} = \frac{8 \div 2}{10 \div 2} = \frac{4}{5} \end{aligned}$$

3. Add/Subtract the fractions; reduce your answer if possible.

$$\begin{aligned} \text{a) } \frac{2 \times 2}{2 \times 5} - \frac{1 \times 5}{2 \times 5} &= \frac{4}{10} - \frac{5}{10} \\ &= -\frac{1}{10} \end{aligned}$$

$$\begin{aligned} \text{b) } \frac{3}{7} + \frac{2}{3} &= \frac{9+14}{21} \\ &= \frac{23}{21} \end{aligned}$$

$$\begin{aligned} \text{c) } -\frac{7}{6} - \frac{2}{5} &= \frac{-35}{30} - \frac{12}{30} = -\frac{47}{30} \end{aligned}$$

$$\begin{aligned} \text{d) } \frac{3}{5} + \frac{2}{7} &= \frac{21}{35} + \frac{10}{35} = \frac{31}{35} \end{aligned}$$

$$\begin{aligned} \text{e) } \frac{2}{3} + \left(-\frac{1}{5}\right) &= \frac{2}{3} - \frac{1}{5} = \frac{10}{15} - \frac{3}{15} = \frac{7}{15} \end{aligned}$$

$$\begin{aligned} \text{f) } \frac{1}{2} + 2\frac{1}{2} &= \frac{1}{2} + \frac{5}{2} = \frac{6}{2} = 3 \end{aligned}$$

$$\begin{aligned} \text{g) } 2\frac{3}{5} - 1\frac{1}{2} &= \frac{13}{5} - \frac{3}{2} = \frac{26}{10} - \frac{15}{10} = \frac{11}{10} \end{aligned}$$

$$\begin{aligned} \text{h) } 2 - \frac{3}{5} &= \frac{10}{5} - \frac{3}{5} = \frac{7}{5} \end{aligned}$$

$$\begin{aligned} \text{i) } \frac{1}{3} + \frac{5}{6} - \frac{1}{2} &= \frac{2}{6} + \frac{5}{6} - \frac{3}{6} = \frac{4}{6} = \frac{2}{3} \end{aligned}$$

Answers: 1a) $\frac{23}{6}$ b) $-\frac{20}{3}$ c) $\frac{10}{7}$ 2a) $\frac{2}{5}$ b) $-\frac{2}{3}$ c) $\frac{4}{5}$

3a) $-\frac{1}{10}$ b) $\frac{23}{21}$ c) $-\frac{47}{30}$ d) $\frac{31}{35}$ e) $\frac{7}{15}$ f) 3 g) $\frac{11}{10}$ h) $\frac{7}{5}$ i) $\frac{2}{3}$