Adding fractions in mixed number form

Carefully read the following methods, and make sure you understand the examples:

- Method 1: Convert all mixed numbers to top-heavy (improper) fractions, then use your usual method for adding (find a common denominator, then add numerators).
- Method 2: Write each mixed number separately as whole number plus fraction, then add the whole numbers separately, add the fractions separately then combine.

Eg:

\[
\frac{3}{5} + \frac{7}{10}
\]

Using method 1:
Converting to top-heavy fractions:

\[
3 \frac{2}{5} = 1 \frac{7}{5} \quad \text{and} \quad 4 \frac{7}{10} = 4 \frac{7}{10}
\]

Finding a common denominator and adding:

\[
\frac{17}{5} + \frac{47}{10} = \frac{34}{10} + \frac{47}{10} = \frac{81}{10}
\]

Using method 2:
Splitting whole number and fraction parts:

\[
3 \frac{2}{5} + 4 \frac{7}{10} = 3 + \frac{2}{5} + 4 + \frac{7}{10}
\]

Adding the whole numbers and the fractions separately:

\[
3 + 4 = 7 \quad \text{and} \quad \frac{2}{5} + \frac{7}{10} = \frac{4}{10} + \frac{7}{10} = \frac{11}{10} = 1 + \frac{1}{10}
\]

Adding the two parts back together at the end:

\[
7 + 1 + \frac{1}{10} = 8 + \frac{1}{10} = \frac{81}{10}
\]

Note that \(\frac{81}{10}\) and \(8 \frac{1}{10}\) are just different ways of writing the same number (It’s also 8.1).

1. Use **method 1** to answer the following questions. You may leave your answer as a top-heavy fraction, but you should simplify as far as possible.

\[
2 \frac{3}{25} + 1 \frac{3}{10} = \]

\[
2 \frac{3}{4} + 3 \frac{2}{5} = \]

2. Use **method 2** to answer the following questions. You should leave your answer in mixed number form. The fraction part should be fully simplified.

\[
6 \frac{1}{4} + 7 \frac{2}{7} = \]

\[
20 \frac{5}{6} + 34 \frac{4}{9} = \]
**Mixed Numbers**

You can use any method you like to answer these.

*If the fraction part of your answer is top-heavy, you will need to turn it into a mixed number.*

Eg: \(5 \frac{4}{3}\) is not a sensible form, so convert to \(6 \frac{1}{3}\).

1. \(5 \frac{3}{25} + 6 \frac{3}{10} = \)
2. \(2 \frac{3}{4} + 5 \frac{2}{5} = \)
3. \(1 \frac{10}{30} + 5 \frac{3}{6} = \)
4. \(3 \frac{3}{4} + 4 \frac{10}{14} = \)
5. \(1 \frac{3}{6} + 9 \frac{7}{12} = \)

Challenge:
\(4 \frac{1}{3} - 2 \frac{3}{4} = \)

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\(4 \frac{1}{3} - 2 \frac{3}{4} = \)
Adding fractions in mixed number form SOLUTIONS

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- **Method 2**: Write each mixed number separately as whole number plus fraction, then add the whole numbers separately, add the fractions separately then combine.

Eg:

\[
\frac{3}{5} + \frac{7}{10}
\]

**Using method 1**: 

*Converting to top-heavy fractions:*

\[
\frac{3}{5} = \frac{17}{5} \quad \text{and} \quad \frac{7}{10} = \frac{47}{10}
\]

*Finding a common denominator and adding:*

\[
\frac{17}{5} + \frac{47}{10} = \frac{34}{10} + \frac{47}{10} = 8\frac{1}{10}
\]

**Using method 2**: 

*Splitting whole number and fraction parts:*

\[
\frac{3}{5} + \frac{7}{10} = 3 + \frac{2}{5} + 4 + \frac{7}{10}
\]

*Adding the whole numbers and the fractions separately:*

\[
3 + 4 = 7 \quad \text{and} \quad \frac{2}{5} + \frac{7}{10} = \frac{11}{10} = 1 + \frac{1}{10}
\]

*Adding the two parts back together at the end:*

\[
7 + 1 + \frac{1}{10} = 8 + \frac{1}{10} = 8\frac{1}{10}
\]

Note that \(\frac{81}{10}\) and \(8\frac{1}{10}\) are just different ways of writing the same number (It’s also 8.1).

1. Use **method 1** to answer the following questions. You may leave your answer as a top-heavy fraction, but you should simplify as far as possible.

\[
\begin{align*}
2 \frac{3}{25} + 1 \frac{3}{10} & = \frac{53}{25} + \frac{13}{10} = \frac{212}{100} + \frac{130}{100} = \frac{342}{100} = 17\frac{1}{50} \\
2 \frac{3}{4} + 3 \frac{2}{5} & = \frac{11}{4} + \frac{17}{5} = \frac{55}{20} + \frac{68}{20} = 12\frac{3}{20}
\end{align*}
\]

2. Use **method 2** to answer the following questions. You should leave your answer in mixed number form. The fraction part should be fully simplified.

\[
\begin{align*}
6 \frac{1}{4} + 7 \frac{2}{7} & = (6 + 7) + \left(\frac{1}{4} + \frac{2}{7}\right) = (13) + \left(\frac{7}{28} + \frac{8}{28}\right) = (13) + \left(\frac{15}{28}\right) = 13\frac{15}{28} \\
20 \frac{5}{6} + 34 \frac{4}{9} & = (20 + 34) + \left(\frac{5}{6} + \frac{4}{9}\right) = 54 + \left(\frac{15}{18} + \frac{12}{18}\right) = 54 + \left(\frac{27}{18}\right) \\
& = 54 + \left(\frac{3}{2}\right) = 54 + \left(1 + \frac{1}{2}\right) = 55\frac{1}{2}
\end{align*}
\]
Mixed Numbers SOLUTIONS
You can use any method you like to answer these.
If the fraction part of your answer is top-heavy, you will need to turn it into a mixed number.
Eg: $\frac{4}{3}$ is not a sensible form, so convert to $6\frac{1}{3}$.
1) $5\frac{3}{25} + 6\frac{3}{10} = 11 + \frac{6}{50} + \frac{15}{50} = 11\frac{21}{50}$
2) $2\frac{3}{4} + 5\frac{2}{5} = 7 + \frac{15}{20} + \frac{8}{20} = 7 + \frac{23}{20} = 8\frac{3}{20}$
3) $1\frac{10}{30} + 5\frac{3}{6} = 6 + \frac{2}{6} + \frac{3}{6} = 6\frac{5}{6}$
4) $3\frac{3}{4} + 4\frac{10}{14} = 7 + \frac{21}{28} + \frac{20}{28} = 7 + \frac{41}{28} = 8\frac{13}{28}$
5) $1\frac{3}{6} + 9\frac{7}{12} = 10 + \frac{6}{12} + \frac{7}{12} = 10 + \frac{13}{12} = 11\frac{1}{12}$
Challenge:
$\frac{1}{3} - \frac{3}{4} = (4 + \frac{1}{3}) - (2 + \frac{3}{4}) = 2 + (\frac{1}{3} - \frac{3}{4})$
$= 2 + \left(\frac{4}{12} - \frac{9}{12}\right) = 2 - \frac{5}{12} = 1\frac{7}{12}$

Mixed Numbers SOLUTIONS
You can use any method you like to answer these.
If the fraction part of your answer is top-heavy, you will need to turn it into a mixed number.
Eg: $\frac{5}{3}$ is not a sensible form, so convert to $6\frac{1}{3}$.
1) $5\frac{3}{25} + 6\frac{3}{10} = 11 + \frac{6}{50} + \frac{15}{50} = 11\frac{21}{50}$
2) $2\frac{3}{4} + 5\frac{2}{5} = 7 + \frac{15}{20} + \frac{8}{20} = 7 + \frac{23}{20} = 8\frac{3}{20}$
3) $1\frac{10}{30} + 5\frac{3}{6} = 6 + \frac{2}{6} + \frac{3}{6} = 6\frac{5}{6}$
4) $3\frac{3}{4} + 4\frac{10}{14} = 7 + \frac{21}{28} + \frac{20}{28} = 7 + \frac{41}{28} = 8\frac{13}{28}$
5) $1\frac{3}{6} + 9\frac{7}{12} = 10 + \frac{6}{12} + \frac{7}{12} = 10 + \frac{13}{12} = 11\frac{1}{12}$
Challenge:
$\frac{1}{3} - \frac{3}{4} = (4 + \frac{1}{3}) - (2 + \frac{3}{4}) = 2 + (\frac{1}{3} - \frac{3}{4})$
$= 2 + \left(\frac{4}{12} - \frac{9}{12}\right) = 2 - \frac{5}{12} = 1\frac{7}{12}$