Decomposing Fractions

Explore ideas and representations

Name _____ **Date** _____ **Score** _____ / 8

QUICK REVIEW

A fraction can be split into several sums, not only unit fractions. $\frac{11}{12} = \frac{5}{12} + \frac{6}{12} = \frac{3}{12} + \frac{8}{12}$. Both pairs have numerator sum 11. Reversing the order does not make a new grouping.

Worked example

Show two different ways to decompose $\frac{7}{9}$ into two positive ninths.

1. Split the numerator: $7 = 2 + 5$.
2. The first sum, $\frac{2}{9} + \frac{5}{9}$, is $\frac{7}{9}$.
3. Choose a different pair: $1 + 6 = 7$. The second sum, $\frac{1}{9} + \frac{6}{9}$, is also $\frac{7}{9}$.
Answer: $\frac{2}{9} + \frac{5}{9}$ and $\frac{1}{9} + \frac{6}{9}$.

Practice Problems

Show your thinking.

1. Split $\frac{7}{10}$ into $\frac{3}{10}$ plus another fraction; show a second split.

2. Decompose $\frac{5}{8}$ into two positive eighths in two ways.

3. Write two different two-part sums for $\frac{8}{9}$.

4. Split the shaded amount into a group of 2 parts and the rest; give another split.



5. Fix this split: $\frac{6}{7} = \frac{2}{7} + \frac{3}{7}$.

6. Write $\frac{7}{12}$ as three positive fractions in twelfths, with at least two different numerators.

7. Explain whether $\frac{2}{8} + \frac{5}{8}$ and $\frac{3}{8} + \frac{4}{8}$ name the same total.

8. A full meter is split into $\frac{3}{8}$ m and another part. Find the other part and a different eighths split.

Answer Key

1. $\frac{3}{10} + \frac{4}{10}$ and $\frac{1}{10} + \frac{6}{10}$.
2. $\frac{2}{8} + \frac{3}{8}$ and $\frac{1}{8} + \frac{4}{8}$.
3. $\frac{3}{9} + \frac{5}{9}$ and $\frac{1}{9} + \frac{7}{9}$.
4. $\frac{2}{7} + \frac{4}{7}$ and $\frac{1}{7} + \frac{5}{7}$.
5. For example, $\frac{6}{7} = \frac{2}{7} + \frac{4}{7}$.
6. For example, $\frac{1}{12} + \frac{2}{12} + \frac{4}{12}$.
7. Yes; both total $\frac{7}{8}$.
8. $\frac{5}{8}$ m; another split is $\frac{2}{8}$ m and $\frac{6}{8}$ m.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. Split the numerator: $7 = 3 + 4$.
2. The first sum, $\frac{3}{10} + \frac{4}{10}$, is $\frac{7}{10}$.
3. Choose a different pair: $1 + 6 = 7$. The second sum, $\frac{1}{10} + \frac{6}{10}$, is also $\frac{7}{10}$.

Problem 2

1. Split the numerator: $5 = 2 + 3$.
2. The first sum, $\frac{2}{8} + \frac{3}{8}$, is $\frac{5}{8}$.
3. Choose a different pair: $1 + 4 = 5$. The second sum, $\frac{1}{8} + \frac{4}{8}$, is also $\frac{5}{8}$.

Problem 3

1. Split the numerator: $8 = 3 + 5$.
2. The first sum, $\frac{3}{9} + \frac{5}{9}$, is $\frac{8}{9}$.
3. Choose a different pair: $1 + 7 = 8$. The second sum, $\frac{1}{9} + \frac{7}{9}$, is also $\frac{8}{9}$.

Problem 4

1. Split the numerator: $6 = 2 + 4$.
2. The first sum, $\frac{2}{7} + \frac{4}{7}$, is $\frac{6}{7}$.
3. Choose a different pair: $1 + 5 = 6$. The second sum, $\frac{1}{7} + \frac{5}{7}$, is also $\frac{6}{7}$.

Problem 5

1. The stated numerators add to $2 + 3 = 5$, not 6.
2. The missing numerator after 2 is $6 - 2 = 4$.
3. $\frac{2}{7} + \frac{4}{7} = \frac{6}{7}$ checks the correction.

Problem 6

1. Choose numerator counts 1 and 2.
2. The remaining count is $7 - 1 - 2 = 4$.
3. $1 + 2 + 4 = 7$, so the three fractions total $\frac{7}{12}$.

Problem 7

1. The first numerator sum is $2 + 5 = 7$.
2. The second is $3 + 4 = 7$.
3. Both count 7 eighths, despite different groups.

Problem 8

1. 1 m is $\frac{8}{8}$ m.
2. $\frac{8}{8} - \frac{3}{8} = \frac{5}{8}$, so the other part is $\frac{5}{8}$ m.
3. $2 + 6 = 8$, so $\frac{2}{8}$ m plus $\frac{6}{8}$ m also makes 1 m.

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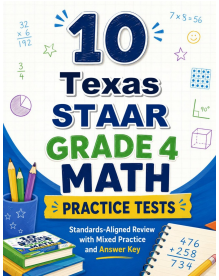

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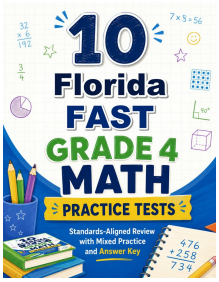

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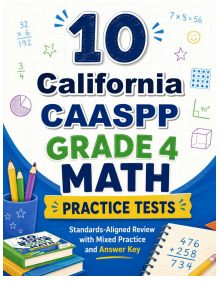

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