Fraction as Sum of Unit Fractions

Spot mistakes, reason, and work backward

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

QUICK REVIEW

A unit fraction has numerator 1. The fraction $\frac{3}{5}$ is three copies of $\frac{1}{5}$: $\frac{1}{5}+\frac{1}{5}+\frac{1}{5}=\frac{3}{5}$. The denominator stays 5 because the piece size stays one fifth.

Worked example

Write $\frac{3}{10}$ as a sum using only unit fractions.

1. One equal part is $\frac{1}{10}$.

2. Count 3 such parts: $\frac{1}{10}+\frac{1}{10}+\frac{1}{10}=\frac{3}{10}$.

3. The numerator sum is $1+1+1=3$; the denominator remains 10.

Answer: $\frac{1}{10}+\frac{1}{10}+\frac{1}{10}=\frac{3}{10}$.

Practice Problems

Show your thinking.

1. A student uses two terms $\frac{1}{3}+\frac{1}{3}$ to show $\frac{4}{3}$. Repair the sum using only thirds.

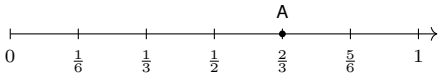
2. Three equal unit fractions total $\frac{3}{8}$. What is each unit fraction?

3. Show $\frac{7}{10}$ with a unit-fraction sum, not a product.

4. Use unit fractions to show a length of $1\frac{1}{4}$ m.

5. Complete $\frac{1}{7}+\frac{1}{7}+\square+\frac{1}{7}=\frac{4}{7}$ with a unit fraction.

6. Write a unit-fraction sum for the distance from 0 to A.



7. Do five unit fractions always total $\frac{5}{5}$? Use fifths and eighths to explain.

8. A craft uses three pieces each $\frac{1}{12}$ m. Show their combined length as a sum.

Answer Key

1. $\frac{1}{3}+\frac{1}{3}+\frac{1}{3}+\frac{1}{3}=\frac{4}{3}$.
2. $\frac{1}{8}$.
3. $\frac{1}{10}+\frac{1}{10}+\frac{1}{10}+\frac{1}{10}+\frac{1}{10}+\frac{1}{10}+\frac{1}{10}=\frac{7}{10}$.
4. $(\frac{1}{4}+\frac{1}{4}+\frac{1}{4}+\frac{1}{4}+\frac{1}{4})$ m $=\frac{5}{4}$ m.
5. $\frac{1}{7}$.
6. $\frac{1}{6}+\frac{1}{6}+\frac{1}{6}+\frac{1}{6}=\frac{4}{6}$.
7. No; the unit-fraction size matters.
8. $(\frac{1}{12}+\frac{1}{12}+\frac{1}{12})$ m $=\frac{3}{12}$ m.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. Two thirds total only $\frac{2}{3}$.
2. The numerator 4 requires four $\frac{1}{3}$ terms.
3. Four terms sum to $\frac{4}{3}=1\frac{1}{3}$.

Problem 2

1. The sum counts 3 equal parts out of 8.
2. Each one part is $\frac{1}{8}$.
3. $\frac{1}{8}+\frac{1}{8}+\frac{1}{8}=\frac{3}{8}$ checks the parts.

Problem 3

1. One equal part is $\frac{1}{10}$.
2. Count 7 such parts: $\frac{1}{10}+\frac{1}{10}+\frac{1}{10}+\frac{1}{10}+\frac{1}{10}+\frac{1}{10}+\frac{1}{10}=\frac{7}{10}$.
3. The numerator sum is $1+1+1+1+1+1+1=7$; the denominator remains 10.

Problem 4

1. One equal part is $\frac{1}{4}$ m.
2. Count 5 such parts: $(\frac{1}{4}+\frac{1}{4}+\frac{1}{4}+\frac{1}{4}+\frac{1}{4})$ m $=\frac{5}{4}$ m.
3. The numerator sum is $1+1+1+1+1=5$; the denominator remains 4.

Problem 5

1. The three shown terms total $\frac{3}{7}$.
2. The missing part is $\frac{4}{7}-\frac{3}{7}=\frac{1}{7}$.
3. Four copies of $\frac{1}{7}$ total $\frac{4}{7}$.

Problem 6

1. The unit is cut into 6 equal intervals.
2. A is 4 intervals from zero.
3. Four copies of $\frac{1}{6}$ total $\frac{4}{6}=\frac{2}{3}$.

Problem 7

1. Five fifths total $5\times\frac{1}{5}=1$.
2. Five eighths total $5\times\frac{1}{8}=\frac{5}{8}$.
3. The sums differ because $\frac{1}{5}>\frac{1}{8}$.

Problem 8

1. One equal part is $\frac{1}{12}$ m.
2. Count 3 such parts: $(\frac{1}{12}+\frac{1}{12}+\frac{1}{12})$ m $=\frac{3}{12}$ m.
3. The numerator sum is $1+1+1=3$; the denominator remains 12.

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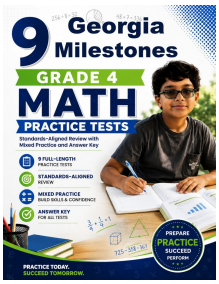

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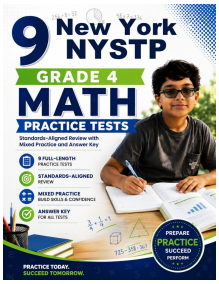

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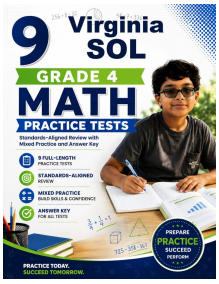

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