Subtracting Fractions with Unlike Denominators

Subtracting Fractions with Unlike Denominators: Apply, Compare, and Design

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

QUICK REVIEW

Subtract equal-sized parts. For $\frac{5}{6} - \frac{1}{4}$, write $\frac{10}{12} - \frac{3}{12} = \frac{7}{12}$. Keep the denominator. Check by adding the difference to the subtracted fraction: $\frac{7}{12} + \frac{1}{4} = \frac{5}{6}$.

Worked example

Calculate $\frac{7}{8} - \frac{1}{6}$. Show the place-value or fraction calculation.

1. A common denominator is 24: $\frac{7}{8} = \frac{21}{24}$ and $\frac{1}{6} = \frac{4}{24}$.
2. $\frac{7}{8} - \frac{1}{6} = \frac{21-4}{24} = \frac{17}{24}$.
3. Simplify to $\frac{17}{24}$; check $\frac{17}{24} + \frac{1}{6} = \frac{7}{8}$.

Answer: $\frac{17}{24}$.

Practice Problems

Show your thinking.

1. A strip is 1 m long. A piece of $\frac{1}{3}$ m is removed. How much remains?

2. Choose the missing amount so this plan totals $\frac{41}{60}$: $\frac{13}{12} - \square$. Write the completed equation.

3. Plan A uses $\frac{9}{8} - \frac{1}{4}$ units. Plan B uses $\frac{9}{8} - \frac{5}{12}$ units. Which produces the larger amount, and by how much?

4. Each of two containers holds $\frac{21}{20} - \frac{1}{2}$ L. Another $\frac{1}{4}$ L is added to their combined contents. Find the final volume.

5. Choose the missing amount so this plan totals $\frac{19}{24}$: $\frac{7}{6} - \square$. Write the completed equation.

6. Complete the two-output table for the rule: input $-\frac{1}{6}$. Inputs are $\frac{11}{12}$ and $\frac{11}{6}$. Compare the outputs.

Input	Output
$\frac{11}{12}$	
$\frac{11}{6}$	

7. Use an inverse operation to verify a proposed result of $\frac{3}{4}$ for $\frac{23}{20} - \frac{2}{5}$. Show both computations.

8. A student writes $\frac{37}{36} - \frac{1}{3} = \frac{43}{36}$. Correct the result and check it.

Answer Key

1. $\frac{2}{3}$ m.
2. $\frac{2}{5}$; $\frac{13}{12} - \frac{2}{5} = \frac{41}{60}$.
3. Plan A by $\frac{1}{6}$ units.
4. $\frac{27}{20}$ L.
5. $\frac{3}{8}$; $\frac{7}{6} - \frac{3}{8} = \frac{19}{24}$.
6. Outputs $\frac{3}{4}$ and $\frac{5}{3}$; second minus first is $\frac{11}{12}$.
7. The result $\frac{3}{4}$ is correct.
8. $\frac{25}{36}$, not $\frac{43}{36}$.

Step-by-Step Solutions

Follow each calculation, then check your own work.

Problem 1

1. The quantities call for $1 - \frac{1}{3}$; the result is measured in m.
2. A common denominator is 3: $1 = \frac{3}{3}$ and $\frac{1}{3} = \frac{1}{3}$.
3. $1 - \frac{1}{3} = \frac{3-1}{3} = \frac{2}{3}$.
4. Simplify to $\frac{2}{3}$; check $\frac{2}{3} + \frac{1}{3} = 1$.

Problem 2

1. A common denominator is 60: $\frac{13}{12} = \frac{65}{60}$ and $\frac{2}{5} = \frac{24}{60}$.
2. $\frac{13}{12} - \frac{2}{5} = \frac{65-24}{60} = \frac{41}{60}$.
3. Simplify to $\frac{41}{60}$; check $\frac{41}{60} + \frac{2}{5} = \frac{13}{12}$.
4. Using $\frac{2}{5}$ in the plan gives exactly $\frac{41}{60}$.

Problem 3

1. A common denominator is 8: $\frac{9}{8} = \frac{9}{8}$ and $\frac{1}{4} = \frac{2}{8}$.
2. $\frac{9}{8} - \frac{1}{4} = \frac{9-2}{8} = \frac{7}{8}$.
3. Simplify to $\frac{7}{8}$; check $\frac{7}{8} + \frac{1}{4} = \frac{9}{8}$.
4. Plan B: $\frac{9}{8} - \frac{5}{12} = \frac{17}{24}$ units.
5. The difference in amounts is $\frac{1}{6}$ units.

Problem 4

1. A common denominator is 20: $\frac{21}{20} = \frac{21}{20}$ and $\frac{1}{2} = \frac{10}{20}$.
2. $\frac{21}{20} - \frac{1}{2} = \frac{21-10}{20} = \frac{11}{20}$.
3. Simplify to $\frac{11}{20}$; check $\frac{11}{20} + \frac{1}{2} = \frac{21}{20}$.
4. Two containers hold $2 \times \frac{11}{20} = \frac{11}{10}$ L.
5. After the addition: $\frac{11}{10} + \frac{1}{4} = \frac{27}{20}$ L.

Problem 5

1. A common denominator is 24: $\frac{7}{6} = \frac{28}{24}$ and $\frac{3}{8} = \frac{9}{24}$.
2. $\frac{7}{6} - \frac{3}{8} = \frac{28-9}{24} = \frac{19}{24}$.
3. Simplify to $\frac{19}{24}$; check $\frac{19}{24} + \frac{3}{8} = \frac{7}{6}$.
4. Using $\frac{3}{8}$ in the plan gives exactly $\frac{19}{24}$.

Problem 6

1. A common denominator is 12: $\frac{11}{12} = \frac{11}{12}$ and $\frac{1}{6} = \frac{2}{12}$.
2. $\frac{11}{12} - \frac{1}{6} = \frac{11-2}{12} = \frac{9}{12}$.
3. Simplify to $\frac{3}{4}$; check $\frac{3}{4} + \frac{1}{6} = \frac{11}{12}$.
4. Second output: $\frac{11}{6} - \frac{1}{6} = \frac{5}{3}$; difference $\frac{5}{3} - \frac{3}{4} = \frac{11}{12}$.

Problem 7

1. A common denominator is 20: $\frac{23}{20} = \frac{23}{20}$ and $\frac{2}{5} = \frac{8}{20}$.
2. $\frac{23}{20} - \frac{2}{5} = \frac{23-8}{20} = \frac{15}{20}$.
3. Simplify to $\frac{3}{4}$; check $\frac{3}{4} + \frac{2}{5} = \frac{23}{20}$.
4. Inverse check: $\frac{3}{4} + \frac{2}{5} = \frac{23}{20}$.

Problem 8

1. A common denominator is 36: $\frac{37}{36} = \frac{37}{36}$ and $\frac{1}{3} = \frac{12}{36}$.
2. $\frac{37}{36} - \frac{1}{3} = \frac{37-12}{36} = \frac{25}{36}$.
3. Simplify to $\frac{25}{36}$; check $\frac{25}{36} + \frac{1}{3} = \frac{37}{36}$.
4. The claimed value differs by $\frac{1}{2}$, so it fails the exact calculation.

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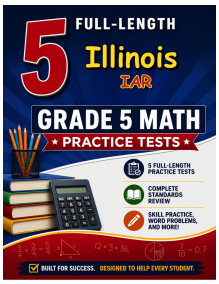

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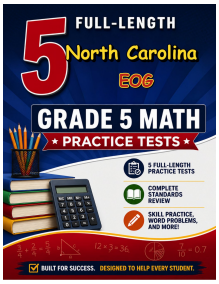

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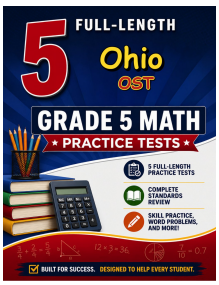

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