MATHEMATICS · GRADES 4-6

Subtracting fractions with unlike denominators

Difficulty level: Intermediate

Mathematics: Grades 4-6

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Overview of the concept

This is how you work out what is left when the pieces are different sizes, like comparing how much of two different pizzas remains, by first cutting them into matching pieces. You cannot subtract pieces of different sizes directly, because a third is not the same size as a quarter. Cutting both into the same smaller pieces makes them comparable, and then the subtraction is straightforward. That is how you compare leftovers, portions, or measurements that were cut into different sized parts.



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Rule

Subtracting fractions with unlike denominators: first rewrite both fractions with a common denominator, then subtract the numerators and keep the denominator.

You cannot subtract pieces of different sizes directly.

Worked examples

EXAMPLE 1

Q Work out $\frac{5}{6} - \frac{1}{4}$.

SOLUTION

This is a subtraction with unlike denominators, so the one rule to remember is: make the pieces the same size first, then subtract the tops. Do not subtract the bottoms, they only tell you the size of the pieces.

The denominators are 6 and 4, and the smallest number both divide into is 12: $\frac{5}{6} = \frac{10}{12}$ and $\frac{1}{4} = \frac{3}{12}$.

Now the pieces match, so subtract the tops: $10 - 3 = 7$, keeping 12 underneath: $\frac{7}{12}$.

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EXAMPLE 2

Q Mia has $\frac{2}{3}$ of a pizza left. She eats $\frac{1}{6}$ of the whole pizza. How much pizza is left?

SOLUTION

This is the same question type in a story: the pieces are different sizes, so cut them to match before you subtract.

Thirds cut into sixths: $\frac{2}{3} = \frac{4}{6}$, and $\frac{1}{6}$ stays as it is.

Now subtract: 4 – 1 = 3 sixths, $\frac{3}{6}$, which simplifies to $\frac{1}{2}$ of a pizza left.

Practice questions

1 Work out $\frac{3}{4} - \frac{1}{2}$

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2 Work out $\frac{5}{6} - \frac{1}{3}$. Give your answer in its simplest form.

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3 Find the missing number $\frac{7}{8} - ? = \frac{1}{2}$

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4 Sam has $\frac{4}{5}$ of a chocolate bar. He gives away $\frac{1}{10}$ of the whole bar. How much of the bar does he have left?

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5 A jug is $\frac{2}{3}$ full of juice. Then $\frac{1}{6}$ of a jug is poured out. How full is the jug now?

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6 Which of these equals $\frac{2}{3} - \frac{1}{4}$: $\frac{5}{12}$, $\frac{7}{12}$, or $\frac{1}{3}$?

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7 Tom says $\frac{3}{4} - \frac{1}{2} = \frac{2}{2} = 1$. What did Tom do wrong, and what is the correct answer?

A. He subtracted the denominators too; the answer is $\frac{1}{4}$

B. He subtracted the numerators; the answer is $\frac{1}{2}$

C. He added the fractions; the answer is $\frac{5}{4}$

D. He forgot to simplify; the answer is $\frac{2}{4}$

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8 Work out $\frac{11}{12} - \frac{2}{3}$. Give your answer in its simplest form.

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9 A ribbon is $\frac{7}{8}$ m long. $\frac{1}{4}$ m is cut off. How much ribbon is left?

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10 Work out $\frac{5}{6} - \frac{1}{4}$.

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ANSWER KEY

1. $\frac{1}{4}$

2. $\frac{1}{2}$

3. $\frac{3}{8}$

4. $\frac{7}{10}$

5. $\frac{1}{2}$

6. $\frac{5}{12}$

7. He subtracted the denominators too; the answer is $\frac{1}{4}$

8. $\frac{1}{4}$

9. $\frac{5}{8}$

10. $\frac{7}{12}$

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