



Adding and subtracting fractions

Key focus

Fractions with the SAME denominator add or subtract directly: combine the numerators and keep the denominator unchanged. Fractions with DIFFERENT denominators must first be rewritten as equivalent fractions sharing a common denominator, then combined the same way. Simplify the result where the numerator and denominator share a common factor. This LO draws directly on Equivalent Fractions and Simplifying Fractions (LO2-LO3).

Suggested teaching sequence

1. Show the add/subtract bar: one tape cut into the common denominator's equal parts, with the first fraction solid and the second hatched (for adding), or the removed part hatched inside a dashed outline (for subtracting).
2. Establish the rule for like denominators: add or subtract the numerators only, keeping the denominator the same.
3. Introduce unlike denominators: find a common denominator (a shared multiple of both), convert each fraction to an equivalent fraction over it, then apply the like-denominator rule.
4. Practise choosing an efficient common denominator (the lowest common multiple) rather than always multiplying the two denominators together.
5. Always check whether the answer simplifies.
6. Extend to mixed numbers: convert to improper fractions, or combine whole-number and fraction parts separately, taking care when a subtraction needs regrouping.
7. Apply the skill to missing-value, comparison, error-check, and word-problem contexts, so the calculation serves a purpose beyond direct practice.

Core examples to model

- Like denominators, bar model: $\frac{1}{4} + \frac{2}{4} = \frac{3}{4}$.
- Like denominators, subtract: $\frac{7}{8} - \frac{3}{8} = \frac{4}{8} = \frac{1}{2}$.
- Unlike denominators: $\frac{1}{2} + \frac{1}{4} = \frac{2}{4} + \frac{1}{4} = \frac{3}{4}$.
- Mixed numbers: $1\frac{1}{4} + \frac{2}{3} = 1\frac{3}{12} + \frac{8}{12} = 1\frac{11}{12}$.
- Error check: $\frac{2}{3} + \frac{1}{6} = \frac{4}{6} + \frac{1}{6} = \frac{5}{6}$, NOT $\frac{3}{9}$ (adding denominators is not valid).

Watch for

- Adding or subtracting the denominators as well as the numerators (e.g. treating $\frac{2}{3} + \frac{1}{6}$ as $\frac{2+1}{3+6}$).
- Converting only one fraction to the common denominator and leaving the other unchanged.

- Forgetting to simplify an answer whose numerator and denominator share a common factor.
- With mixed numbers, forgetting to regroup when the fraction part being subtracted is larger than the fraction part available.

Checks for understanding

- Can students add and subtract fractions with the same denominator directly?
- Can they find a common denominator and convert fractions with different denominators before combining?
- Can they simplify a result where possible?
- Can they use a bar model to justify an addition or subtraction of like-denominator fractions?
- Can they apply the skill to a missing-value, comparison, or word-problem context, and explain why a common mistake (e.g. adding denominators) is wrong?