

# Adding and Subtracting Fractions

Make the denominators match, then add or subtract only the numerators. Three examples, every step shown.

## 1 Same denominator

Work out  $5/12 + 11/12$ .

1. The denominators already match: both are twelfths.
2. Add the numerators only:  $5 + 11 = 16$ , giving  $16/12$ .
3. Simplify: the HCF of 16 and 12 is 4, so  $16/12 = 4/3$ .
4.  $4/3$  is improper:  $4 \div 3 = 1$  remainder 1, so  $4/3 = 1 \frac{1}{3}$ .

ANSWER **1 and  $1/3$  (or  $4/3$ )**

## 2 Different denominators

Work out  $5/6 - 1/4$ .

1. Lowest common multiple of 6 and 4: multiples of 6 are 6, 12...; of 4 are 4, 8, 12... So use 12.
2. Rename:  $5/6 = 10/12$  ( $\times 2$  top and bottom) and  $1/4 = 3/12$  ( $\times 3$  top and bottom).
3. Subtract the numerators:  $10 - 3 = 7$ , giving  $7/12$ .
4. 7 and 12 share no factor except 1, so  $7/12$  is fully simplified.
5. Using 24 also works:  $20/24 - 6/24 = 14/24 = 7/12$ , but needs more simplifying.

ANSWER  **$7/12$**

## 3 Mixed numbers

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

1. Make improper fractions:  $3 \frac{1}{4} = 13/4$  ( $3 \times 4 + 1$ ) and  $1 \frac{2}{3} = 5/3$  ( $1 \times 3 + 2$ ).
2. The LCM of 4 and 3 is 12:  $13/4 = 39/12$  and  $5/3 = 20/12$ .
3. Subtract the numerators:  $39 - 20 = 19$ , giving  $19/12$ .
4. Back to a mixed number:  $19 \div 12 = 1$  remainder 7, so  $1 \frac{7}{12}$ .
5. Check with decimals:  $3.25 - 1.67 \approx 1.58$ , and  $1 \frac{7}{12} \approx 1.58$ .

ANSWER **1 and  $7/12$**



## Estimate first

Before you start, guess roughly how big the answer should be.  $5/6$  is between  $3/4$  and 1, so  $5/6 - 1/4$  is between  $1/2$  and  $3/4$ .  $7/12$  is about 0.58, so it fits. An answer far from your estimate means a slip.

NEXT IN THE SERIES

**4. Multiplying and Dividing Fractions**