Adding and Subtracting Fractions

Section 1 — Same denominators: just count the parts

When the denominators are the same, the parts are already the same size — so adding fractions is just counting.

Worked example. $2/5 + 1/5$

Two fifths and one more fifth makes **three fifths**: $2/5 + 1/5 = 3/5$.

The denominator names the part (fifths). We are not adding fifths to fifths to get tenths — the name of the part never changes.

Never add the denominators! $2/5 + 1/5 = 3/10$ is wrong — $3/10$ is *smaller* than what we started with.

Q1. $3/8 + 4/8 =$ _____

Q2. $5/6 - 2/6 =$ _____

Q3. $4/10 + 3/10 =$ _____

Q4. $7/9 - 4/9 =$ _____ Now write your answer in simplest form: _____

Section 2 — Equivalence warm-up: renaming fractions

Before we can add fractions with different denominators, we need to rename one of them. Remember: whatever you multiply the bottom by, you must multiply the top by too.

Worked example. Rename $2/3$ as sixths.

$3 \times 2 = 6$, so multiply the top by 2 as well: $2/3 = (2\times2)/(3\times2) = 4/6$.

Check on the fraction wall: two thirds covers exactly the same length as four sixths.

Q5. Complete the table by renaming each fraction. The first row is done for you: $1/2 = 2/4$.

Fraction	New denominator	What did you multiply by?	Equivalent fraction
1/2			
1/3			
3/4			
2/5			

Use these new denominators, in order: quarters, sixths, eighths, tenths.

Q6. Circle the pairs of denominators that are **related** (one is a multiple of the other):

$(3, 6)$ $(4, 6)$ $(2, 8)$ $(5, 10)$ $(4, 10)$ $(3, 12)$

Section 3 — Related denominators: rename, then count

Follow the three steps for every question: **SAME? → RENAME → COUNT & SIMPLIFY**. You must show the renaming step — a bare answer doesn't show the mathematics.

Worked example. $1/3 + 1/6$

1. **Same?** No — thirds and sixths.
2. **Rename.** 6 is a multiple of 3, so rename the third: $1/3 = 2/6$.
3. **Count & simplify.** $2/6 + 1/6 = 3/6 = 1/2$.

Always rename the fraction with the *smaller* denominator — its parts get cut into smaller matching pieces.

Q7. *1/2 + 1/4*

Renaming step: _____ Answer: _____

Q8. *2/3 + 1/6*

Renaming step: _____ Answer: _____

Q9. *7/8 - 1/4*

Renaming step: _____ Answer: _____

Q10. *9/10 - 2/5* *(give your answer in simplest form)*

Renaming step: _____ Answer: _____

Q11. *5/12 + 1/3*

Renaming step: _____ Answer: _____

Q12. Ali says *1/2 + 1/4 = 2/6*. Explain what Ali did wrong, and use the fraction wall or a diagram to prove the correct answer.

Section 4 — Past one whole: mixed numbers

Sometimes the answer is bigger than one whole. Write these answers as a **mixed number**.

Worked example. *3/4 + 1/2*

1. Rename: *1/2 = 2/4*.
2. Count: *3/4 + 2/4 = 5/4*.
3. *5/4* is an improper fraction — four quarters make one whole, with one quarter left over: *5/4 = 1 1/4*.

Q13. *5/6 + 1/2* = _____ (mixed number: _____)

Q14. *7/8 + 1/4* = _____ (mixed number: _____)

Q15. *1 1/6 - 2/3* *Hint: rename 1 1/6 as 7/6 first.*

Working:

Answer: _____

Section 5 — Worded problems

For each problem: decide whether to add or subtract, show your renaming step and working, and answer in a full sentence that fits the story.

Drawing a bar model of the whole (the pizza, the ribbon, the water bottle) makes it much easier to see whether the parts are being put together or taken away.

Q16. Mia ate *1/4* of a pizza and her brother ate *3/8* of the same pizza. What fraction of the pizza has been eaten altogether?

Q17. A water bottle is $5/6$ full. Jack drinks $1/3$ of the bottle. What fraction of the bottle is left?

Q18. Priya has run $7/10$ of a cross-country course. Her friend has run $1/2$ of it. How much further along the course is Priya than her friend?

Q19. A recipe uses $1/2$ a cup of white sugar and $3/4$ of a cup of brown sugar. How much sugar is that in total? Give your answer as a mixed number.

Section 6 — Challenge

Optional extension — for when Sections 1–5 are finished and checked.

Q20. Three fractions this time: $1/2 + 1/4 + 1/8$. Rename everything as eighths first.

Working:

Answer: _____

Q21. Find the missing fraction: $?/6 + 1/3 = 5/6$ Missing fraction: _____

Q22. Find the missing fraction: $9/10 - ? = 2/5$ Missing fraction: _____

Q23. Write your own worded problem whose answer is exactly $1\frac{1}{4}$. It must use two fractions with related denominators. Then solve it to prove it works.