

Add fractions and mixed numbers

Notes and guidance

In this small step, children combine knowledge of adding two or more fractions with their understanding of mixed numbers to add fractions and mixed numbers.

Children start by adding fractions to whole numbers and, when this is secure, add mixed numbers and fractions. Bar models and number lines are useful tools to illustrate this process. Number lines are especially helpful when crossing a whole. Children look at two methods: partitioning the fraction to add to the next whole number, then adding the remaining fraction to the whole number, and adding the fractions separately, then adding the total to the whole number.

Things to look out for

- Children may add the whole number to the numerator, for example $1\frac{3}{10} + \frac{1}{10} = \frac{4}{10} + \frac{1}{10} = \frac{5}{10}$
- Children should be encouraged to start with the mixed number, especially when using a number line.
- Children may not convert improper fractions to mixed numbers when crossing a whole, for example writing $1\frac{6}{5}$

Key questions

- Are the denominators the same? Why is this important?
- How is adding two fractions different from adding a fraction and a whole number? How is it different from adding a fraction and a mixed number?
- Do you prefer to use a bar model or a number line? Why?
- How could you partition the fraction to help you work out the answer?
- Do you have an improper fraction in your answer? How should you write the mixed number?

Possible sentence stems

- If the denominators are the same, to add the fractions I need to add the _____
- I can partition _____ into _____ and _____

National Curriculum links

- Add and subtract fractions with the same denominator

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Key learning

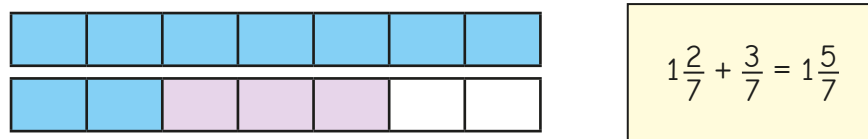
- Draw bar models to show the calculations.

$$\frac{2}{5} + \frac{2}{5} = \frac{4}{5}$$

$$1 + \frac{2}{5} = 1\frac{2}{5}$$

$$\frac{2}{5} + 2 = 2\frac{2}{5}$$

- Tommy uses a bar model to work out this addition.



Use bar models to work out the additions.

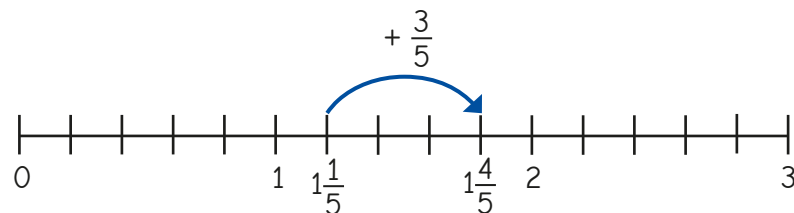
$$1\frac{3}{7} + \frac{3}{7}$$

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

$$2\frac{3}{10} + \frac{6}{10}$$

$$\frac{7}{10} + 3\frac{1}{10}$$

- Amir uses a number line to add fractions.



What calculation is Amir working out? What is the answer?

- Use number lines to work out the additions.

$$2\frac{2}{5} + \frac{2}{5}$$

$$2\frac{1}{10} + \frac{6}{10}$$

$$1\frac{4}{5} + \frac{3}{5}$$

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

$$2\frac{3}{5} + \frac{2}{5}$$

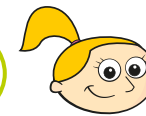
$$6\frac{4}{6} + \frac{5}{6}$$

- Amir and Eva are working out $1\frac{7}{9} + \frac{5}{9}$



Amir

I will add the fractions first.



Eva

I will partition $\frac{5}{9}$ to make it easier to add.

$$\frac{7}{9} + \frac{5}{9} = \frac{12}{9} = 1\frac{3}{9}$$

$$1\frac{3}{9} + 1 = 2\frac{3}{9}$$

$$1\frac{7}{9} + \frac{2}{9} = 1\frac{9}{9} = 2$$

$$2 + \frac{3}{9} = 2\frac{3}{9}$$

Use your preferred method to work out the additions.

$$1\frac{7}{9} + \frac{8}{9}$$

$$\frac{3}{9} + 1\frac{8}{9}$$

$$2\frac{4}{5} + \frac{3}{5}$$

$$\frac{6}{10} + 7\frac{7}{10}$$

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Reasoning and problem solving

Tommy works out an addition.

$$4\frac{3}{5} + \frac{2}{5} = 4\frac{5}{5}$$

Do you agree with Tommy?

Explain your answer.

No

Whitney is working out $1\frac{2}{5} + \frac{1}{5}$



$$1\frac{2}{5} + \frac{1}{5} = \frac{4}{5}$$

What mistake has she made?

Work out the correct answer.

$1\frac{3}{5}$

A mixed number and two different fractions have a total of $3\frac{3}{8}$

- The mixed number is greater than 1
- All the denominators are 8
- The sum of the two fractions is $\frac{5}{8}$

Complete the number sentence.

$$\frac{\square}{\square} + \frac{\square}{\square} + \frac{\square}{\square} = 3\frac{3}{8}$$

mixed number: $2\frac{6}{8}$

fractions: $\frac{3}{8} + \frac{2}{8}$
or $\frac{4}{8} + \frac{1}{8}$

What is the missing digit?

$$6\frac{3}{10} + \frac{\square}{10} = 7$$

What would change if the answer to the calculation was 8?

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