Can I work out the whole, having been given the fraction?

Teaching guidance

Key vocabulary

fraction, numerator, denominator, unit fraction, whole, equivalent
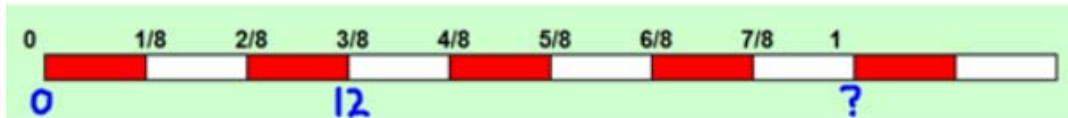
Models and images and resources

Fractions of a whole set

Use objects to model fractions of a whole set. Show two groups of cubes and explain that this shows $^2/_5$ of the whole set. Encourage children to use and extend this model to explain how they can work out the number of cubes in the whole set.
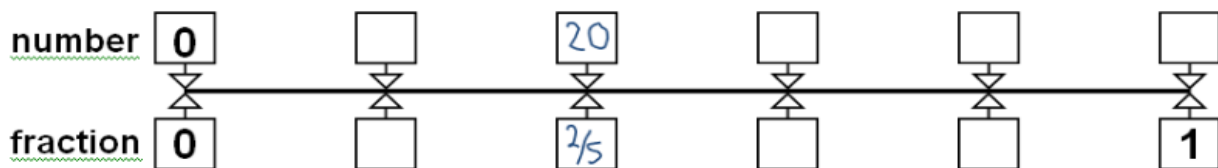

Counting stick or Counting stick with further options spreadsheet

Attach cards onto a counting stick to create a sequence of fractions. Show a given fraction of the whole. Ask children what other fractions they can find using this piece of information. Alternatively, annotate the spreadsheet Counting stick with further options.


Fraction number lines

Ask children to use given information to add details to the number line.

Masters of fraction number lines are provided in the Consolidation and practice section.
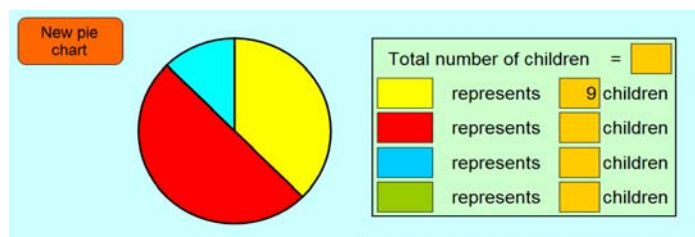

Diagrams

Model how to draw diagrams to show information given about the fraction of an amount and annotate these to find the whole. Encourage children to develop their own diagrams and explain their methods.

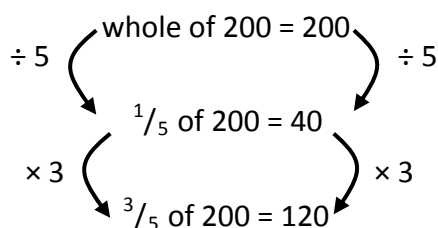$^2/_5$ of a number is 20. What is the number?
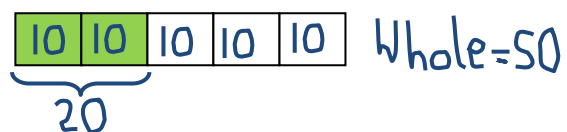
Pie chart spreadsheet

Reveal the number of children represented by one segment. Discuss what fraction of the pie chart represents these children. Use this to work out the total number of children.

Teaching tips

- Ensure that children are confident in reading and writing fractions, and in recognising fractions of amounts, shapes or objects. Clarify the role of the numerator and denominator of a fraction: in other words, the denominator tells you how many equal parts a whole is divided into; the numerator tells you how many of these equal parts are being considered.

- In mental and oral starters, count in fractional steps and place fractions on a number line. Use opportunities that arise to discuss equivalent forms of fractions:

  $0, \frac{1}{8}, \frac{2}{8}, \frac{3}{8}, \frac{4}{8}, \frac{5}{8}, \frac{6}{8}, \frac{7}{8}, \frac{8}{8}$ or $0, \frac{1}{8}, \frac{1}{4}, \frac{3}{8}, \frac{1}{2}, \frac{5}{8}, \frac{3}{4}, \frac{7}{8}, 1$

- Make sure that children have secure methods for finding fractions of amounts. For example, children should be able to explain how they would find $\frac{3}{5}$ of 200. Encourage them to explain each step involved:

$$\div 5 \overbrace{\qquad \text{whole of } 200 = 200 \qquad}^{} \div 5$$
$$\frac{1}{5} \text{ of } 200 = 40$$
$$\times 3 \qquad\qquad \times 3$$
$$\frac{3}{5} \text{ of } 200 = 120$$

- Ensure that children can continue patterns in fractions of amounts:

  $\frac{1}{5}$ of 200 = 40

  $\frac{2}{5}$ of 200 = 80
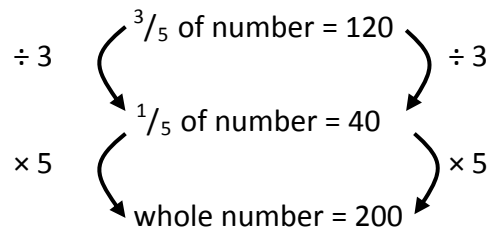
  $\frac{3}{5}$ of 200 = 120...

- Initially, give children unit fractions of an amount and ask them to tell you the whole:

  $\frac{1}{10}$ of a number is eight. What is the number?

  o Ensure that children can explain their reasoning. For example: $\frac{1}{10}$ of a number is eight, so $\frac{2}{10}$ of the number is 16, $\frac{3}{10}$ of the number is 24, and so on; the whole number is $\frac{10}{10}$, so it will be 10 × 8, that is, 80.

- When they are given a non-unit fraction and asked to find the whole, encourage children to find the unit fraction first. For example:

$$\frac{3}{5} \text{ of number} = 120$$

$\div 3$ $\quad\quad\quad\quad\quad$ $\div 3$

$$\frac{1}{5} \text{ of number} = 40$$

$\times 5$ $\quad\quad\quad\quad\quad$ $\times 5$

$$\text{whole number} = 200$$

- Encourage children to draw diagrams to show the fraction they are given and to annotate this to find the whole number.

- Use real-life contexts for problems, including those that involve approximation:

  o There are about 36 000 000 people aged 16 to 65 in the UK. This is roughly $\frac{3}{5}$ of the population. What is the approximate population of the UK?