

Simplifying ratios: divide every part by the same number

A ratio compares quantities of the same kind: 2 : 5, read 'two to five'; order matters and the units cancel. Equivalent ratios are multiples of each other (2 : 5 = 4 : 10 = 20 : 50). Simplest form: divide every part by the highest common factor until nothing bigger than 1 divides them all. 12 : 18, HCF 6 → 2 : 3.

Case	Do first	Example	Simplest form
Whole numbers	divide by the HCF	12 : 18 (÷ 6)	2 : 3
Different units	convert to the same (smaller) unit, drop the units	1 m : 40 cm → 100 : 40	5 : 2
		2 h : 45 min → 120 : 45	8 : 3
		£2 : 50p → 200 : 50	4 : 1
Decimals	multiply every part to whole numbers	1.5 : 2 (x 2) → 3 : 4	3 : 4
		0.3 : 0.45 (x 100) → 30 : 45	2 : 3
Fractions	multiply by the lowest common denominator	$\frac{1}{2} : \frac{1}{3}$ (x 6)	3 : 2
		$\frac{3}{4} : 1\frac{1}{2}$ (x 4) → 3 : 6	1 : 2
Three parts	divide ALL three by the HCF	12 : 18 : 30 (÷ 6)	2 : 3 : 5
	a number dividing only two parts is not common	4 : 6 : 9	already simplest
Form 1 : n	divide both by the first part (decimals allowed)	4 : 10 (÷ 4)	1 : 2.5
	map scale	2 cm : 5 km → 2 : 500,000	1 : 250,000

Ratios and fractions

[] A ratio a : b splits a whole into a + b parts: in 2 : 3 the shares are $\frac{2}{5}$ and $\frac{3}{5}$ of the whole (NOT $\frac{2}{3}$)

[] Share £40 in 2 : 3 : 5 parts of £8: £16 and £24. Simplify first; the shares do not change

[] 2 : 3 also means the first is $\frac{2}{3}$ of the second, and the second is $1\frac{1}{2}$ times the first

From

sciencewithshobha.com/blog/simplifying-ratios-how-to-simplify-a-ratio-step-by-step-with-units-decimals-fractions-and-three-part-ratios-worked-examples-and-practice/ · 1-on-1 online maths, KS2 to A level, Grades 3 to 12, free 30-minute first class.

Worked examples, the mistakes, and a practice set

Ratio	Step	Simplest form
15 : 25	$\div 5$	3 : 5
36 : 48	$\div 12$	3 : 4
14 : 35	$\div 7$	2 : 5
45 : 30	$\div 15$	3 : 2 (order kept)
500 g : 2 kg	500 : 2,000, $\div 500$	1 : 4
25 min : 1 h	25 : 60, $\div 5$	5 : 12
1.2 : 0.8	$\times 10 \rightarrow 12 : 8, \div 4$	3 : 2
0.5 : 2.5	$\times 2$	1 : 5
$\frac{2}{3} : \frac{1}{4}$	$\times 12$	8 : 3
$1\frac{1}{2} : 2\frac{1}{4}$	$\times 4 \rightarrow 6 : 9, \div 3$	2 : 3
16 : 24 : 40	$\div 8$	2 : 3 : 5
6 : 15 in the form 1 : n	$\div 6$	1 : 2.5

Mistakes

- [] Only one part divided; the order swapped (45 : 30 is 3 : 2)
- [] Different units left in (1 m : 40 cm is not 1 : 40); stopping at 6 : 9
- [] 1 : 2.5 given for 'simplest form' (2 : 5), or 2 : 5 for 'the form 1 : n' (1 : 2.5)
- [] A fraction made from the two ratio numbers (2 : 3 is $\frac{2}{5}$ and $\frac{3}{5}$, not $\frac{2}{3}$)

Curriculum	Where
England	Year 6 simple ratio; KS3 simplify, units, divide in a ratio; GCSE 1 : n, three parts, ratio to fraction, with algebra
Australia	Year 7 simple ratios; Year 8 simplify, equivalent ratios, rates
US	Grade 6 6.RP.1 and 6.RP.3 ratio language and tables; Grade 7 proportional relationships
CBSE	Class 6 Ratio and Proportion; Class 7-8 comparing quantities

Practice

- Simplify 24 : 36, 18 : 45 and 56 : 21.
- Simplify 2 m : 75 cm, 3 hours : 20 minutes and £1.50 : 60p.
- Simplify 1.6 : 2.4 and 0.75 : 2.
- Simplify $\frac{3}{5} : \frac{2}{5}$ and $2\frac{1}{2} : 1\frac{1}{4}$.
- Simplify 20 : 30 : 50 and 9 : 12 : 21.
- Write 8 : 20 in the form 1 : n and 20 : 8 in the form n : 1. Then share £84 in the ratio 8 : 20.
- A recipe uses 300 g flour to 200 g sugar. Ratio of flour to sugar in simplest form? What fraction of the mixture is sugar?
- Simplify 0.2 : 0.05 : 1.

Answers

1. 2 : 3; 2 : 5; 8 : 3. 2. 200 : 75 = 8 : 3; 180 : 20 = 9 : 1; 150 : 60 = 5 : 2. 3. 16 : 24 = 2 : 3; 75 : 200 = 3 : 8. 4. 3 : 2; 10 : 5 = 2 : 1. 5. 2 : 3 : 5; 3 : 4 : 7. 6. 1 : 2.5; 2.5 : 1; 28 parts of £3: £24 and £60. 7. 3 : 2; sugar is $\frac{2}{5}$ of the mixture. 8. $\times 100 \rightarrow 20 : 5 : 100, \div 5 \rightarrow 4 : 1 : 20$.