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Ratio and Proportion Cheat Sheet

Most ratio problems need one move: find the value of one part, then multiply.

Write and simplify

`red : blue = 12 : 8`	**Order matters** 12 red and 8 blue beads: red to blue is 12 : 8, but blue to red is 8 : 12.
`12 : 8 = 3 : 2 · 40 cm : 2 m = 1 : 5`	**Simplify by the HCF** Divide every part by the highest common factor. Use the same units first.
`3 : 2 → red is 3/5, blue is 2/5`	**Ratio vs fraction** A ratio compares part to part. A fraction compares part to whole: add the parts for the total.

Share in a ratio

`EUR 100 and EUR 250`	**Total parts, one part, multiply** Share EUR 350 in the ratio 2 : 5. There are 7 parts, and one part is EUR 50.
`8 kg, 24 kg and 40 kg`	**Three-part ratios** Share 72 kg in the ratio 1 : 3 : 5. There are 9 parts of 8 kg each.
`girls = 5 × 5 = 25`	**When you know one share** Boys to girls is 4 : 5 and there are 20 boys. One part is 20 ÷ 4 = 5.

Rates and best buys

`150 ÷ 2.5 = 60 km/h`	**Unit rate: how much for one** Divide by the quantity you want one of. 150 km in 2.5 hours is an average of 60 km/h.
`GBP 0.48 vs GBP 0.46: 750 g wins`	**Compare the same amount** 500 g of rice for GBP 2.40 or 750 g for GBP 3.45? Compare the price of 100 g.

Direct proportion

`25 × 18 = 450 g`	**The unitary method** 250 g of flour makes 10 biscuits. Find one biscuit (25 g), then multiply for 18.
`USD 4.50 ÷ 3 = USD 7.50 ÷ 5 = 1.50`	**Test for proportion** The ratio stays the same: y = kx, and the graph is a straight line through (0, 0). A fixed charge breaks it.

Scale drawings and maps

`350 ÷ 50 = 7 cm`	**Plan scale 1 : 50** 1 cm on the plan is 50 cm in real life. A 3.5 m wall is 350 cm, so it is drawn 7 cm long.
`4 cm × 25,000 = 100,000 cm = 1 km`	**Map scale 1 : 25,000** Multiply the map length by 25,000, then convert units: 100 cm = 1 m and 1,000 m = 1 km.

Multiply, never add

Equivalent ratios come from multiplying both parts by the same number: 2 : 3 becomes 4 : 6, not 4 : 5. Adding the same amount to both parts changes the ratio.

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