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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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