CALCULATORGOAT / WORKED EXAMPLE

Ratios and Proportions Example

A ratio compares quantities by division; a proportion states that two ratios are equal. Proportional reasoning is ancient and has no single inventor. Euclid's Elements, Book V, gave a systematic treatment of proportion based on ideas associated with Eudoxus. Equivalent ratios remain equal because multiplying both terms by the same nonzero scale factor leaves their quotient unchanged. This is why a recipe can be enlarged while preserving its ingredient balance.

Example

A recipe uses 3 parts flour to 2 parts sugar. If flour increases from 300 g to 450 g, how much sugar is needed?

original flour / original sugar = new flour / new sugar

Step-by-step solution

STEP 1

Write the original ratio

The flour-to-sugar order is 3:2. The given amounts 300:200 have the same ratio.

300 / 200 = 3 / 2

STEP 2

Find the scale factor

Divide the new flour amount by the original flour amount.

450 / 300 = 1.5

STEP 3

Scale the sugar equally

Multiply the original sugar amount by the same factor.

200 x 1.5 = 300 g

STEP 4

Verify the proportion

Both the original and scaled ratios reduce to 3:2.

300:200 = 450:300 = 3:2

ANSWER

Use 300 g of sugar

450 g flour : 300 g sugar simplifies to 3:2, so the recipe balance is preserved.

Use this worked example to review the method, then try a similar problem on your own.