

Ratio Language and Equivalent Ratios

Grade 6 math · Lesson · Standards: 6.RP.A.1, 6.RP.A.3a

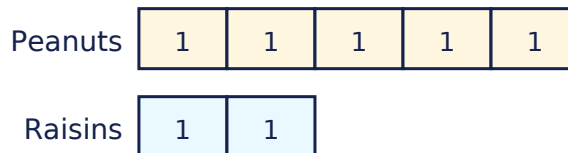
Quick answer: A ratio compares two quantities in a set order and can be written $a : b$, a to b , or a fraction. Equivalent ratios come from multiplying or dividing both terms by the same nonzero number. Ratio tables and tape diagrams organize that work and help compare ratios.

Standards: 6.RP.A.1, 6.RP.A.3a · **Level:** Grade 6

What is a ratio and how is it written?

Ratio

A **ratio** compares two quantities in a set order. The ratio of peanuts to raisins in a trail mix with 5 cups of peanuts and 2 cups of raisins can be written **5 : 2**, **5 to 2**, or $\frac{5}{2}$.

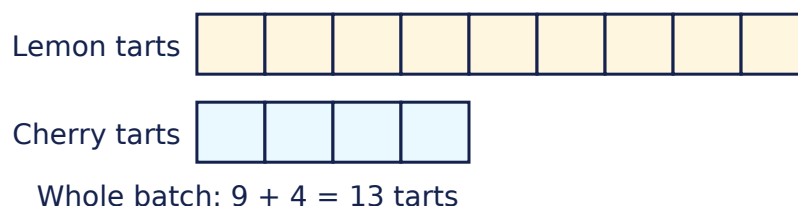


Trail mix: 5 cups of peanuts for every 2 cups of raisins.

Order matters: the ratio of raisins to peanuts is $2 : 5$, a different statement. Each term needs a label, such as “5 cups of peanuts to 2 cups of raisins.”

Is a ratio part-to-part or part-to-whole?

A part-to-part ratio compares two groups. A part-to-whole ratio compares one group with everything.



Part-to-part is $9 : 4$. Part-to-whole is $9 : 13$.

Type	Compares	Batch of 9 lemon and 4 cherry tarts
Part-to-part	lemon to cherry	$9 : 4$
Part-to-whole	cherry to all tarts	$4 : 13$

How do you find equivalent ratios?

Equivalent ratios

Multiply or divide *both* terms by the same nonzero number. The new ratio describes the same relationship.

$$3 : 5 = (3 \times 4) : (5 \times 4) = 12 : 20$$

A ratio is in **simplest form** when the two terms share no common factor except 1. For example, 18 : 30 divides by 6 to give 3 : 5.

How do you use a ratio table to solve a problem?

Method

1. Write the given ratio as the first column of a table, with labels.
2. Find the number that turns the known term into the term you have.
3. Multiply the other term by that same number.
4. Read the answer and check that the ratio still matches.

Worked example

A paint mix uses 3 quarts of teal for every 5 quarts of white. How much white goes with 21 quarts of teal?

Since $21 \div 3 = 7$, multiply the white by 7: $5 \times 7 = 35$.

Answer: **35 quarts of white.**

	Start	Scaled	Scaled again
Teal (qt)	3	9	21
White (qt)	5	15	35

Multiplying both rows by the same number keeps the ratio 3 : 5.

Common mistake

Adding the same number to both terms does not keep a ratio. Turning 3 : 5 into 6 : 8 by adding 3 changes the mix.

Mathbot's tip

Label every number before you compare. A ratio such as 5 : 2 means nothing until you know

which quantity each number counts.

Key points to remember

- A ratio is written $a : b$, a to b , or a/b , and order matters.
- Part-to-part ratios compare two groups; part-to-whole ratios compare one group with the total.
- Equivalent ratios multiply or divide both terms by the same number.
- Never add the same number to both terms to keep a ratio.
- Ratio tables, tape diagrams and double number lines show equivalent ratios.

Ratio Language and Equivalent Ratios: frequently asked questions

What is a ratio in math?

A ratio is a comparison of two quantities, such as 5 cups of peanuts to 2 cups of raisins. It can be written $5 : 2$, 5 to 2, or $5/2$.

Does the order of a ratio matter?

Yes. The ratio of peanuts to raisins is $5 : 2$, but raisins to peanuts is $2 : 5$. Always say which quantity comes first.

What is the difference between part-to-part and part-to-whole?

Part-to-part compares two groups, like lemon tarts to cherry tarts. Part-to-whole compares one group to everything, like cherry tarts to all tarts.

How do you check if two ratios are equivalent?

Find one number that multiplies both terms of the first ratio to give the second. You can also simplify both ratios and see whether they match.

How does a tape diagram help with ratios?

A tape diagram draws each quantity as equal blocks. Counting blocks gives the ratio, and dividing a total by the number of blocks gives the value of one block.