

Grade 6 · Ratios and Ratio Language · Lesson

Common Core 6.RP.A.1, 6.RP.A.3a · mathovore.fr

A ratio is a comparison of two quantities that shows how much of one there is for a given amount of the other. It can be written as a to b , $a:b$, or $\frac{a}{b}$. Equivalent ratios come from multiplying or dividing both quantities by the same nonzero number, so 2:3, 4:6, and 6:9 all describe one relationship.

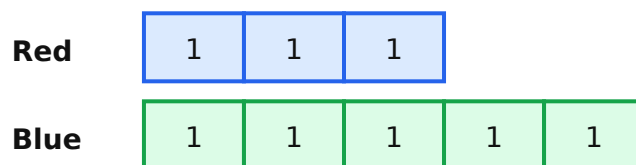
Grade 6 Common Core: 6.RP.A.1 · 6.RP.A.3a

Key facts:

- A ratio compares two quantities and can be written a to b , $a:b$, or $\frac{a}{b}$.
- Order matters: 3:5 and 5:3 are different ratios.
- Part-to-part ratios compare groups; part-to-whole ratios compare a group to the total.
- Equivalent ratios come from multiplying or dividing both terms by the same nonzero number.
- Ratio tables, tape diagrams, and double number lines organize equivalent ratios.

What is a ratio?

A ratio compares two quantities. Suppose a bag holds 3 red marbles and 5 blue marbles. The ratio of red marbles to blue marbles is 3 to 5. Order matters: the ratio of blue to red is 5 to 3, which is a different ratio.



A bag with 3 red and 5 blue marbles: the ratio of red to blue is 3 to 5.

Ratio notation

A ratio of a to b can be written three ways: a **to** b , $a:b$, or $\frac{a}{b}$. The quantity named first goes first.

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

A homeroom has 12 girls and 13 boys. The ratio of girls to boys, 12:13, is a **part-to-part** ratio. The ratio of girls to all students, 12:25, is a **part-to-whole** ratio. The whole is found by adding the parts: $12+13=25$.

How do you find equivalent ratios?

Equivalent ratios describe the same relationship. Multiply or divide both numbers by the same nonzero number. Starting from 2:3:

Operation	Result
Multiply both by 2	4:6
Multiply both by 3	6:9
Multiply both by 5	10:15

Juice	2	4	6	10
Water	3	6	9	15

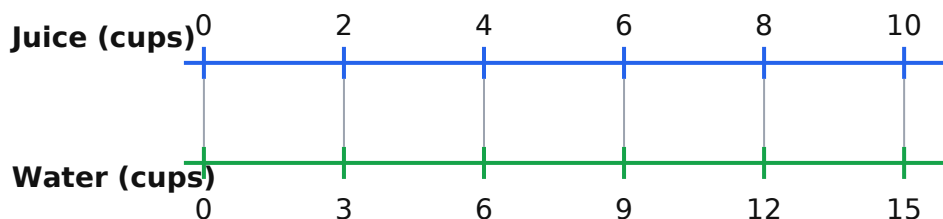
Equivalent ratios in a ratio table: 2:3, 4:6, 6:9, and 10:15.

Adding the same number to both parts does *not* give an equivalent ratio. The ratio 2:3 is not equivalent to 5:6.

How do you solve a ratio problem with a table or tape diagram?

A ratio table lists equivalent ratios in columns. A tape diagram draws each quantity as a row of equal-size units.

1. Write the given ratio as the first column of the table.
2. Find the number you must multiply by to reach the known value.
3. Multiply the other quantity by the same number.
4. Write the answer with its units.

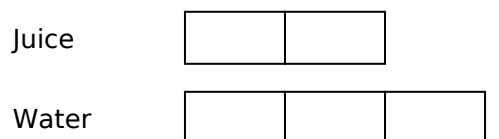


A double number line: 2 cups of juice go with 3 cups of water, 10 with 15.

Example. Maya makes punch with 2 cups of juice for every 3 cups of sparkling water. How much juice goes with 15 cups of sparkling water?

Juice (cups)	2	10
Sparkling water (cups)	3	15

Since $3 \times 5 = 15$, multiply the juice by 5 too: $2 \times 5 = 10$. Maya needs 10 cups of juice.



Each unit is the same size

A tape diagram showing the ratio 2 to 3.

Ratios and Ratio Language: frequently asked questions

What are three ways to write a ratio?

A ratio of 4 to 9 can be written as 4 to 9, as 4:9, or as the fraction $\frac{4}{9}$. All three say the same thing, and the first quantity always comes first.

Does the order of numbers in a ratio matter?

Yes. If a class has 10 boys and 14 girls, the ratio of boys to girls is 10:14, but the ratio of girls to boys is 14:10. Reversing the order changes the meaning.

How can you tell if two ratios are equivalent?

Check whether one ratio can be turned into the other by multiplying or dividing both numbers by the same nonzero number. For example, 6:8 and 9:12 are equivalent because both simplify to 3:4.

What is a part-to-whole ratio?

A part-to-whole ratio compares one group to the entire set. With 7 red and 5 blue pens, the ratio of red pens to all pens is 7:12.

When is a double number line useful?

A double number line shows two quantities with matching tick marks, so equivalent ratios line up. It works well for recipes and prices because each tick shows one pair of values that share the same ratio.