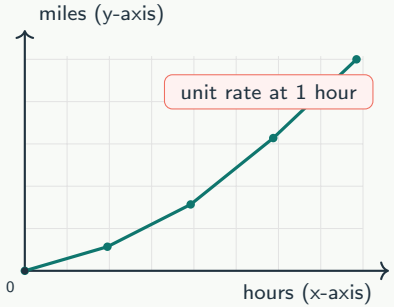
Ratios and Proportions: Unit Rates and Word Problems? Explore

Focus

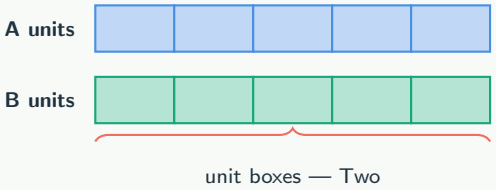
Read and write ratios and equivalent ratios in simplest form.



Main idea

A ratio compares two quantities by division and can be written as a:b, a to b, or a/b.

- Read and write ratios and equivalent ratios in simplest form.
- Compute unit rates from ratios and real situations.
- Set up and solve proportions using tables and cross-multiplication.



Key Words To Know

? Explore

ratio.

A ratio compares two quantities by division; it can be written a:b.

equivalent ratio.

An equivalent ratio is a scaled copy of a ratio found by.

unit rate.

A unit rate tells how much of the first quantity corresponds to.

proportion.

A proportion states that two ratios are equal; use it to find.

Check the foundation

- Can divide whole numbers and decimals accurately (needed for unit rate calculations).
- Can simplify fractions by common factors (needed to simplify ratios).
- Can read and label quantities in a short word problem (needed to set up ratios).

Check the foundation

A bag holds 6 red marbles and 4 blue marbles. What is the ratio of red to blue? Write it in simplest form and explain how you simplified.

Optional hint

Try one small step first, then explain your thinking.

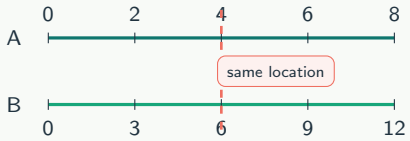
Understand: A ratio compares two

? Explore

Main idea

Connect each core idea or process to its role in Ratios and proportions.

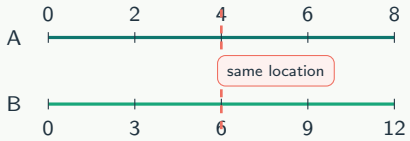
A ratio compares two quantities by division and can be written as a:b, a to b, or a/b.



Connect The Quantities

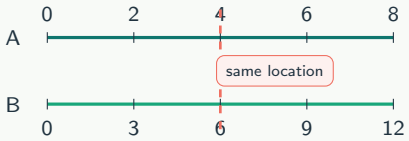
? Explore

Equivalent ratios are produced by multiplying or dividing both parts by the same nonzero number; this keeps the same relationship while changing scale.



Understand: A unit rate expresses ? Explore

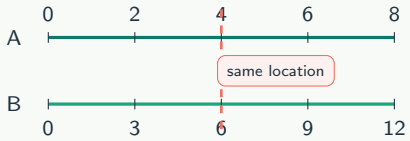
A unit rate expresses how much of the first quantity matches exactly one unit of the second (for example, miles per one hour or dollars per one item) and is found by dividing the first number by the second.



Connect The Quantities

? Explore

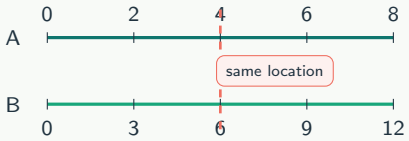
A proportion states that two ratios are equal; solve proportions with tables that scale both parts or by cross-multiplying ($a/b = c/d$ to $ad = bc$) and solving the resulting equation.



Understand: In word problems label

? Explore

In word problems, label the quantities clearly, decide whether a unit rate or a scaled proportion is required, create a short visual (tape diagram or table) when unsure, and always include correct units in the final answer.



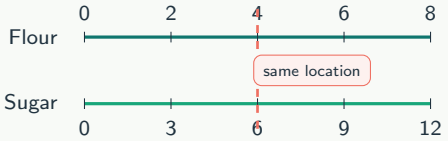
Quantity	x1	x2	x3	x4
Flour	2	4	6	8
Sugar	3	6	9	12

Interpret the model

Equivalent ratios multiply both quantities by the same scale factor.

Double Number Line

? Explore



Interpret the model

A double number line lines up matching values from two quantities.

Main idea

Use equivalent fractions to find an unknown value.

1. Write the known ratio.
2. Match the unknown value in the same position.
3. Solve and check the scale factor.

First view

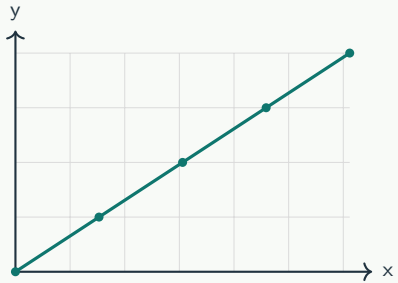
- original sugar.
- original flour.
- scale factor.

Second view

- Table.
- Left.
- Column.

Proportions On A Graph

? Explore



Read the line from left to right and describe how the rate changes.

Interpret the model

A proportional relationship makes a straight line through the origin.

Find The Unit Rate

? Explore

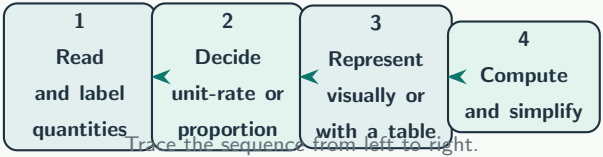
Quantity	Given rate	Unit rate
Distance	120 miles	60 miles
Time	2 hours	1 hour

Interpret the model

A unit rate tells how much of one quantity corresponds to exactly 1 of another quantity.

Example: Problem: A recipe needs ? Explore

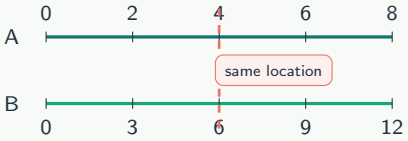
1. Identify the quantities or evidence connected to Ratios and proportions.
2. Problem: A recipe needs 3 cups of flour for every 4 cups of sugar.
3. Apply the relationship and show each intermediate step.



Example: 2 Find unit rate

? Explore

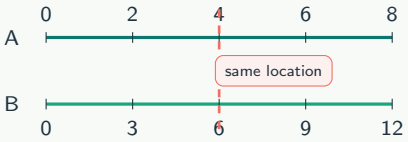
1. Identify the quantities or evidence connected to Ratios and proportions.
2. 2 Find unit rate flour per 1 cup sugar by dividing flour by sugar: 3 / 4 =.
3. Apply the relationship and show each intermediate step.



Example: Final answers: a 75

? Explore

1. Final answers: (a) 7.5 cups flour.
2. (b) 0.75 cups flour per 1 cup sugar.



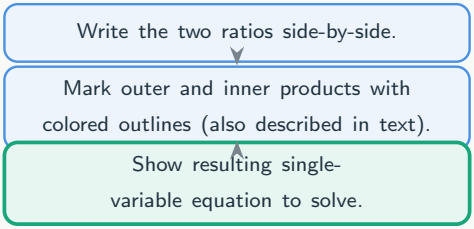
Big idea: ratios compare two quantities

? Explore

Main idea

Big idea: ratios compare two quantities.

A ratio compares how many of one thing there are compared to another, written as 3:2, 3 to 2, or $3/2$. Ratios are unitless comparisons but use units when the quantities are different (for example, miles : hours).



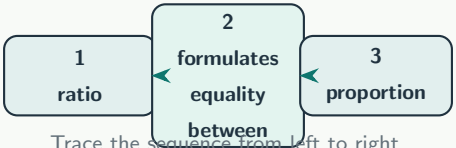
Visualizing ratios with tape diagrams

? Explore

Main idea

Visualizing ratios with tape diagrams.

A tape diagram helps compare sizes visually and supports finding unit amounts by grouping or splitting equal parts.



Trace the sequence from left to right.

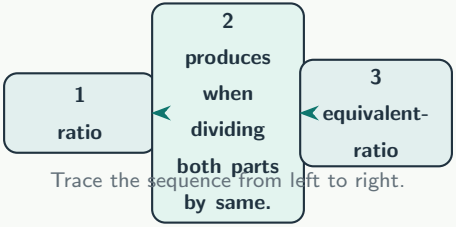
Unit rate: amount per one

? Explore

Main idea

Unit rate: amount per one.

A unit rate tells how much of one quantity matches one unit of the other (for example, miles per hour or price per item). Convert a ratio to a unit rate by dividing: if 9 miles in 3 hours, divide 9 / 3 = 3 miles per 1 hour. Unit rates let you compare choices directly.



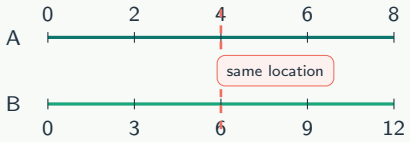
Trace the sequence from left to right.

Your turn

How would you use Ratios and proportions to explain or solve a new example?

Optional hint

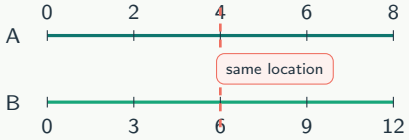
Start with the main relationship from Ratios and proportions, then justify one step.



Main idea

Word problems and strategy.

Read what the problem compares and label the two quantities. Choose whether to make a unit rate, set equivalent ratios in a table, or use cross-multiplication. Always check units and whether the question asks for per-1-unit or a scaled amount, then write a short sentence answer with units.



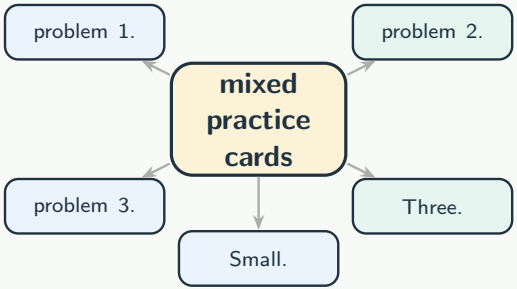
Practice summary and check

Your turn

How would you use Ratios and proportions to explain or solve a new example?

Optional hint

Start with the main relationship from Ratios and proportions, then justify one step.



Practice: Simplify the ratio 18:24

? Explore

Your turn

Simplify the ratio 18:24.

Optional hint

divide both numbers by the same common factor.

Ratios And Proportions — Given

Practice: A cyclist rides 45

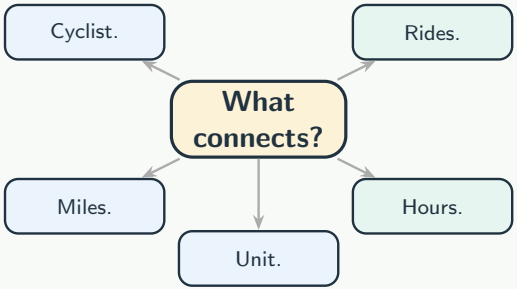
? Explore

Your turn

A cyclist rides 45 miles in 3 hours. What is the unit rate in miles per hour?

Optional hint

divide distance by time.



Practice: If 5 apples cost

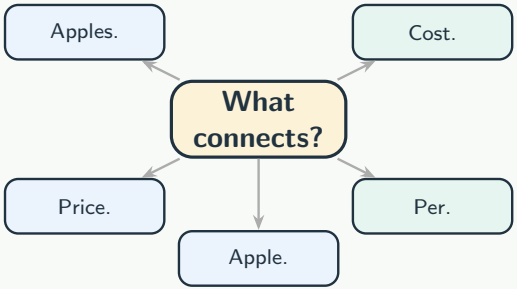
? Explore

Your turn

If 5 apples cost $7.50, what is the price per apple?

Optional hint

divide total price by number of apples.



Practice: Find x: 4/7 x/28

? Explore

Your turn

Find x: $4/7 = x/28$.

Optional hint

use equivalent ratios or cross-multiply.

Practice: A recipe uses 2

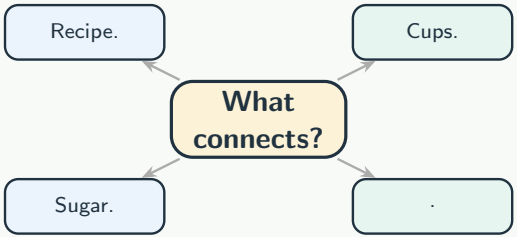
? Explore

Your turn

A recipe uses 2 cups sugar for every 5 cups flour. How many cups sugar are needed for 15 cups flour?

Optional hint

scale the ratio to match 15 cups flour.

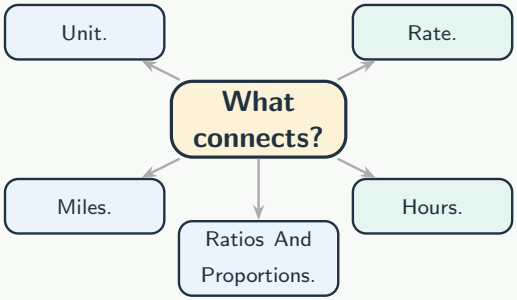


Your turn

Which is the unit rate: 8 miles in 2 hours or 12 miles in 3 hours?

Optional hint

compute miles per 1 hour for both.



Common Mistake To Avoid

? Explore

Common mistake

Do not multiply only one quantity in a ratio.

Why it is wrong

Equivalent ratios need the same scale factor on both quantities.

Better reasoning

Mistakes become easier to catch when you know what to look.

First view

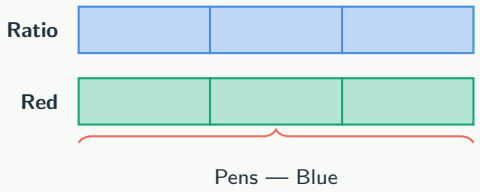
- incorrect.
- correct.
- Two.

Second view

- Examples.
- Left.
- Shows.

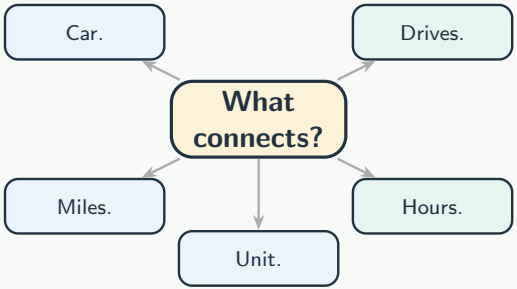
Knowledge check

What is the ratio of 6 red pens to 9 blue pens?



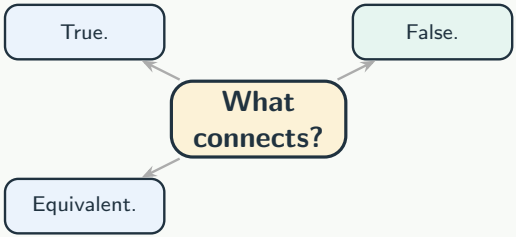
Knowledge check

If a car drives 120 miles in 2 hours, what is the unit rate in miles per hour?



Knowledge check

True or false: 4:6 and 6:9 are equivalent ratios.



Takeaways

- Read and write ratios and equivalent ratios in simplest form.
- Compute unit rates from ratios and real situations.
- Set up and solve proportions using tables and cross-multiplication.
- Translate word problems into ratios or proportions and answer with correct units.

Retrieve without notes

What relationship from this lesson would you use first, and why?

Recommended Next Session

? Explore

Use your evidence

Bring your quiz results, incorrect problems, and any practiceQuestions they struggled.

Next action

What should we practice next?