

Grade 6 · Unit Rates · Lesson

Common Core 6.RP.A.2, 6.RP.A.3b · mathovore.fr

A rate is a ratio that compares two quantities with different units, like 150 miles in 3 hours. A unit rate is a rate whose second quantity is 1, found by dividing, so 150 miles in 3 hours is 50 miles per hour. Unit rates solve unit price, constant speed, and better-buy problems.

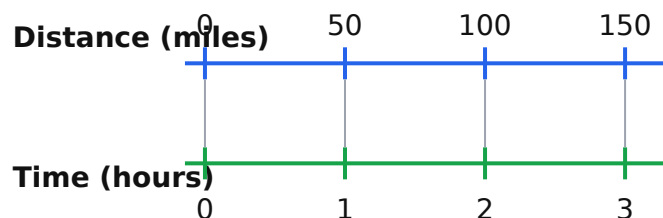
Grade 6 Common Core: 6.RP.A.2 · 6.RP.A.3b

Key facts:

- A rate compares two quantities with different units; a unit rate has a second quantity of 1.
- Find a unit rate by dividing the first quantity by the second.
- A unit price is a unit rate that gives cost per item or per unit of measure.
- The better buy is the option with the lower unit price when the units match.
- At constant speed, distance equals rate times time.

What is a rate?

A rate is a ratio that compares two quantities with different units. Driving 150 miles in 3 hours is a rate. So is paying \$6 for 4 pounds of apples. Rates are often written with the word *per*, *for each*, or *for every*.



The rate 150 miles in 3 hours is the same as 50 miles in 1 hour.

What is a unit rate?

Unit rate

A **unit rate** is a rate with a second quantity of 1. To find it, divide the first quantity by the second: $\text{unit rate} = \frac{a}{b}$ means a per 1 unit of b .

The rate "150 miles in 3 hours" has the unit rate $150 \div 3 = 50$ miles per hour. A **unit price** is a unit rate that gives the cost of one item or one unit of measure, such as dollars per pound.

Situation	Rate	Unit rate
Road trip	150 miles in 3 hours	50 miles per hour
Farmers market	\$6 for 4 pounds	\$1.50 per pound
Typing	180 words in 4 minutes	45 words per minute

○

Apples

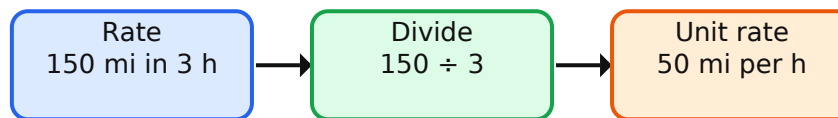
\$6 for 4 pounds

\$1.50 per pound

A price tag: the rate and its unit price.

How do you find a unit rate?

1. Write the two quantities in the order the problem names them.
2. Divide the first quantity by the second.
3. Write the answer with a rate unit, such as miles per hour or dollars per ounce.
4. Check by multiplying: unit rate $\times$ second quantity should equal the first quantity.



Three steps from a rate to a unit rate.

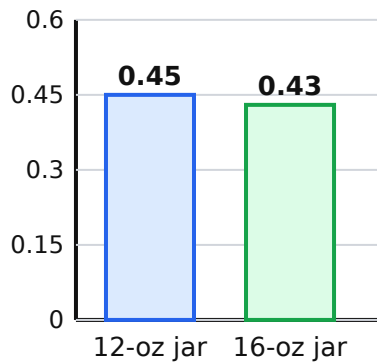
Example. A 12-ounce box of cereal costs \$3.60. Find the price per ounce.

$$\frac{\$3.60}{12 \text{ oz}} = \$0.30 \text{ per ounce}$$

Check: $12 \times 0.30 = 3.60$.

How do you use unit rates to compare prices or speeds?

To find a **better buy**, compute the unit price of each option and choose the lower price per unit. A 16-ounce jar for \$6.88 costs \$0.43 per ounce. A 12-ounce jar for \$5.40 costs \$0.45 per ounce, so the larger jar is the better buy.



Price per ounce: the 16-ounce jar costs less per ounce.

A unit rate also solves problems with constant speed. If a train travels at 60 miles per hour, then distance equals rate times time:

$$d = 60 \times t$$

In 2.5 hours, the train travels $60 \times 2.5 = 150$ miles. To find the time for 210 miles, divide: $210 \div 60 = 3.5$ hours.

Always compare unit rates that use the same units. Mixing ounces and pounds, or minutes and hours, leads to wrong conclusions.

Unit Rates: frequently asked questions

What is the difference between a rate and a unit rate?

A rate compares two quantities with different units, like 150 miles in 3 hours. A unit rate is a rate whose second quantity is 1, like 50 miles per hour.

How do you find a unit price?

Divide the total cost by the number of items or units. If 5 pounds of grapes cost \$9.75, the unit price is \$9.75 divided by 5, which is \$1.95 per pound.

How do you decide which product is the better buy?

Find the unit price of each option using the same unit, then choose the smallest unit price. The package with the lowest price total is not always the better buy.

How do you use a unit rate to find distance?

Multiply the speed by the time. At a constant speed of 45 miles per hour, a trip of 4 hours covers 45 times 4, which is 180 miles.

Can a unit rate be a decimal or a fraction?

Yes. A faucet that fills 15 gallons in 6 minutes has a unit rate of 2.5 gallons per minute. Unit rates are often not whole numbers.