

Unit Rates and Better Buys

Grade 6 math · Lesson · Standards: 6.RP.A.2, 6.RP.A.3b

Quick answer: A rate compares two quantities with different units, and a unit rate tells how much of one quantity goes with exactly 1 of the other, like 14 miles per hour. Divide to find it, then use it to compare prices, find the faster speed, or solve constant-speed problems.

Standards: 6.RP.A.2, 6.RP.A.3b · **Level:** Grade 6

What is a rate, and what is a unit rate?

Rate and unit rate

A **rate** compares two quantities with different units, such as 42 miles in 3 hours. A **unit rate** is a rate with 1 in the second part, such as 14 miles per 1 hour. Rate words include *per*, *for each*, *every* and *each*.

How do you find a unit rate?

Divide the first quantity by the second. The word after “per” tells you which quantity is the divisor.

Method

1. Identify what you want “per” one of.
2. Divide the other quantity by that one.
3. Write the answer with both units, such as miles per hour.

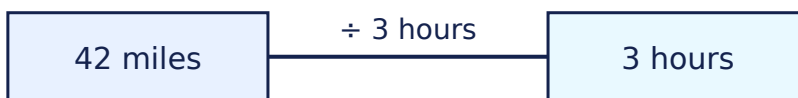
Worked example

A cyclist rides 42 miles in 3 hours. How fast is that per hour?

$42 \div 3 = 14$, so the unit rate is **14 miles per hour**.



Dividing 42 miles by 3 hours gives 14 miles in 1 hour.



$$42 \div 3 = 14 \text{ miles per hour}$$

A unit rate is the quantity for 1 unit of the second measure.

Every rate has two unit rates. The same ride is also $\frac{1}{14}$ hour per mile, because $3 \div 42 = \frac{1}{14}$.

How do you find the better buy?

Find the unit price of each size, then pick the lowest price per unit.

12 oz	20 oz
\$3.60	\$5.80

The larger size is the better buy by one cent per ounce.

Size	Total price	Unit price
12 oz	\$3.60	$\$3.60 \div 12 = \$0.30 \text{ per oz}$
20 oz	\$5.80	$\$5.80 \div 20 = \$0.29 \text{ per oz}$

How do you use a unit rate to solve problems?

Constant speed

At a constant rate, total = unit rate $\times$ amount. For speed, **distance = speed $\times$ time**.

$$64 \text{ miles per hour} \times 2.5 \text{ hours} = 160 \text{ miles}$$

To find a time, divide: $160 \text{ miles} \div 64 \text{ miles per hour} = 2.5 \text{ hours}$.

Common mistake

Dividing in the wrong order flips the rate. For 42 miles in 3 hours, $3 \div 42$ is hours per mile, not miles per hour.

Mathbot's tip

Say the rate out loud with the word "per." If the sentence sounds right, such as 14 miles per hour, the division was set up correctly.

Key points to remember

- A rate compares different units, such as miles and hours.
- A unit rate has 1 in the second part, such as \$0.30 per ounce.
- Divide the first quantity by the second to find the rate.
- The lower unit price is the better buy.
- At constant speed, distance = speed $\times$ time.

Unit Rates and Better Buys: frequently asked questions

What is a unit rate?

A unit rate compares a quantity to exactly one unit of another quantity, such as 14 miles per 1 hour. You find it by dividing.

How is a rate different from a ratio?

A rate is a ratio whose two quantities have different units, such as dollars and pounds. Ratios can also compare quantities with the same unit.

How do you find unit price?

Divide the total cost by the number of units. If 12 ounces cost \$3.60, then $3.60 \div 12$ gives \$0.30 per ounce.

How do you compare two prices fairly?

Find the unit price of each item and compare those numbers. The item with the lower unit price costs less for the same amount.

How do you find distance from a speed?

Multiply the speed by the time. A bus at 48 miles per hour for 3.5 hours goes $48 \times 3.5 = 168$ miles.