

## What Does the Word “Per” Mean?

Here are some examples of measurements of density we have used so far:

3 beans *per* square inch

5 foxes *per* square mile

200 people *per* square mile.

Notice that “per” is used in all of these measurements. The word “per” means “for each,” so the phrases above could also be written like this:

3 beans *for each* square inch

5 foxes *for each* square mile

200 people *for each* square mile

When you first spread out the 54 beans on the grid paper, there were 3 beans *for each* square inch. In the state park example, after the new foxes were born in the spring, there were 5 foxes *for each* square mile in the state park. *Per* is just a faster way to say *for each*.

We use *per* a lot when we talk about driving.

Question: How fast was the car moving?

Answer: 65 miles *per* hour. This means the car went 65 miles *for each* hour of driving.

Question: How much did the gas cost?

Answer: \$3.00 *per* gallon. This means you have to pay \$3.00 *for each* gallon of gas you put in your car.

Question: What is your car’s gas mileage?

Answer: 25 miles *per* gallon. This means your car travels 25 miles *for each* gallon in the tank.



**Note:** People often say “a” or “an” instead of “per.” They might say “65 miles **an** hour,” “3 dollars **a** gallon” or “25 miles **a** gallon.” When used this way, the words “a” and “an” also mean *for each*.

Each of the answers above use a *rate* to compare two quantities. A rate compares two related quantities. The rate, “65 miles per hour,” is the same thing as saying, “65 miles for each 1 hour.” For each 1 hour that passes, the car travels 65 miles.

The rates for driving speed, cost and gas mileage above can be written in many ways:

<b>speed</b>	<b>cost</b>	<b>gas mileage</b>
<i>65 miles per hour</i>	<i>\$3.00 per gallon</i>	<i>25 miles per gallon</i>
<i>65 miles/hour</i>	<i>3 dollars/gallon</i>	<i>25 miles/gallon</i>
<i>65 mph</i>	<i>\$3.00/gallon</i>	<i>25 mpg</i>

The slash symbol / also means “per” or “for each.” *65 miles/hour* is another way to write “65 miles per hour.”

1) Complete the following tables.

Rate: *65 Miles/Hour*

<b>Hours Driving</b>	<b>Distance Traveled</b>
1	<i>65 miles/1 hour</i>
2	<i>130 miles/2 hours</i>
3	
5	
10	

Rate: *\$3.00/gallon*      *25 miles/gallon*

<b>Number of Gallons</b>	<b>Cost</b>	<b>Gas Mileage</b>
1	<i>\$3.00/1 gallon</i>	<i>25 miles/1 gallon</i>
2	<i>\$6.00/2 gallons</i>	
3		
5		
10		

A rate like 25 miles/gallon is called a *unit rate* because it connects 25 miles to 1 gallon. This answers the question, “How many miles can you drive on 1 gallon of gas?” The speed 65 miles/hour is also a unit rate since it answers the question, “How far did the car travel in 1 hour?” Unit rates answer the question, “How much (or how many) for 1?”

You can make a unit rate from other kinds of rates. For example, if you were told oranges cost \$2 for 4 oranges, you could figure out that the unit rate is \$.50 for 1 orange, which can be written as \$.50/orange. This answers the question, “How much money is it for 1 orange?”

2) Complete the following tables.

How many miles for 1 hour?                          45     mph

Hours Driving	Distance Traveled
1	
2	
3	135 miles/3 hours
5	
10	

How much for 1 gallon?                      \_\_\_\_\_ /gallon                      \_\_\_\_\_ mpg

Number of Gallons	Cost	Gas Mileage
1		
2	\$5.40/2 gallons	
3		
5		90 miles/5 gallons
10		

3) Look up the words *per diem* and *percent*. What these words mean?