The Language of Population Density

How Math is Written

In learning mathematics, knowing how to write your answer is important so that other people understand what you mean. Mathematics *notation* is the way in which mathematicians write to communication with other mathematicians. Learning this kind of notation is like learning a new language, but it's helpful so that you understand other people and they will understand you.

In this notation for writing distance measurements, $'$ means *feet* and $''$ means *inches*. Look at the example below:

$$4''$$

This means 4 inches, like the width of the grid below.

What's the area of this grid?
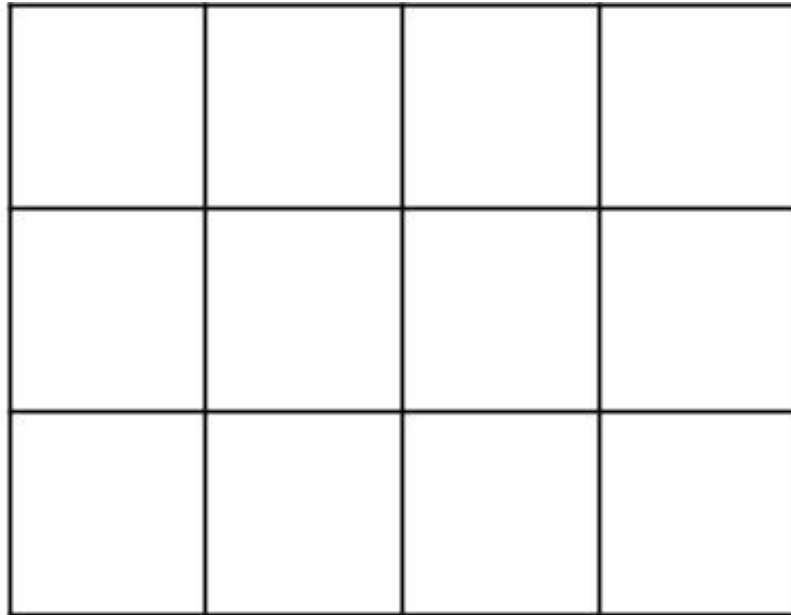
1) Make sure you know the difference between ' and ". For example, what's the difference between 10' and 10"? Can you think of two things in the real world with these measurements?

10' _____   10" _____

As you know, area is the size of a flat surface, measured in square units. When you write an area measurement, you can use any of the following ways of saying the area of the grid on the previous page:
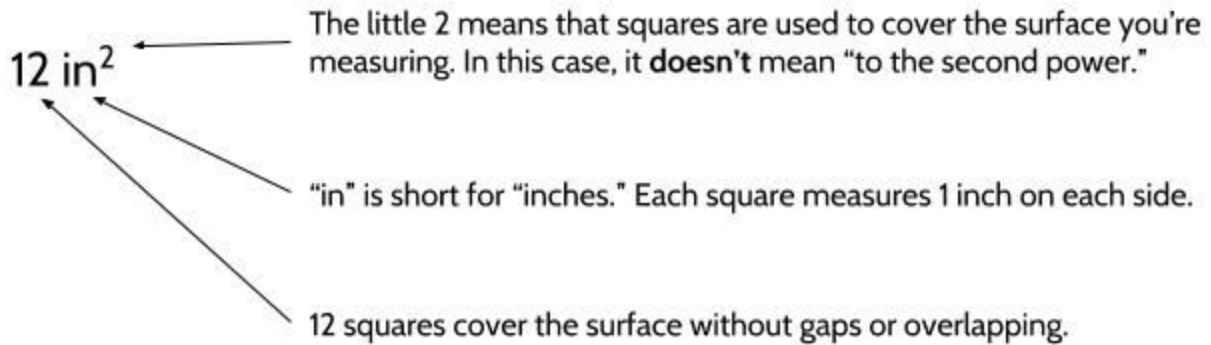
| 12 square inches | 12 sq. in. | 12 in^2 |

Note: ' and " are normally used for regular feet and inches, not square feet and inches.

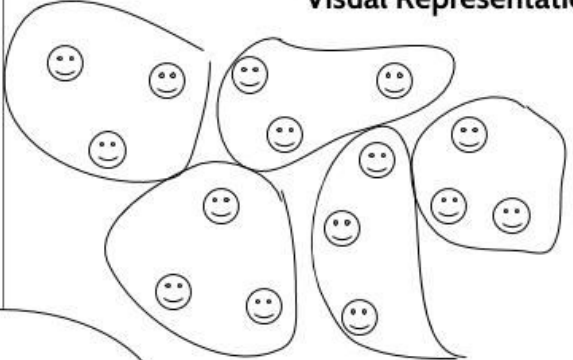When you see a measurement like **12 in²**, this is what it means:

12 in^2

The little 2 means that squares are used to cover the surface you're measuring. In this case, it **doesn't** mean "to the second power."

"in" is short for "inches." Each square measures 1 inch on each side.

12 squares cover the surface without gaps or overlapping.

2) Fill in the missing boxes in this table.

|		
10 square inches →	10 sq. in.	10 in^2
5 square feet →		
→		9 in^2
→	7.5 sq. mi.	
1/2 square foot →		
25 square meters →		
→		12 cm^2

Using Graphic Organizers to Learn Vocabulary

In order to learn math vocabulary, we need practice using it in different ways. In this activity, you will choose a few words from this packet that you want to practice, then you will complete a graphic organizer for each word. Look at the sample for the word *quotient* below.

To complete the graphic organizer, you will choose a word and then answer four questions:
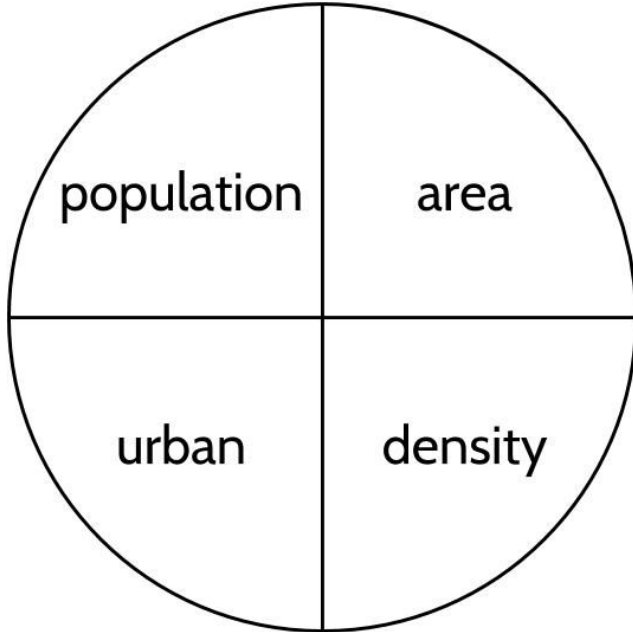
- What is the definition of the word? You can look at the vocabulary review on page 82 for help. Try to write the definition in your own words to really make the word yours.

- Make a visual representation. You can make a drawing or diagram that will help you remember what the word means.

- What are some examples of the word you're studying? Below you can see that there are examples of *quotients*, which are the answers to division problems.

- What are some non-examples of this word? These are things that are **not** the word you're studying. For example, 24 is **not** the quotient of 4 divided by 6.
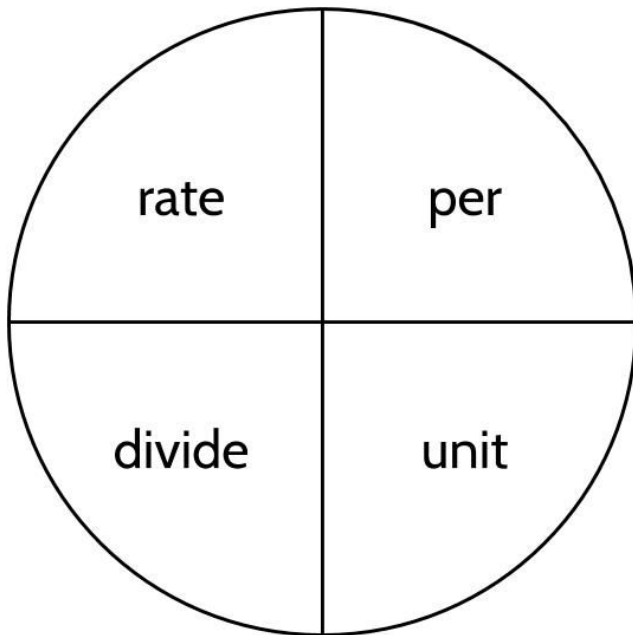

What is it?

A quotient is the result of dividing one number by another. It is the answer to a division question.

Visual Representation

quotient

What are some examples?

15 divided by 3 equals **5**

$66 \div 6 = $ **11**

$63/18 = $ **3.5**

5, 11 and 3.5 are quotients in these calculations.

population $\div$ area = **density**

What are some non-examples?

4 times 6 equals 24

$18 + 5 = 23$

$17 - 2.5 = 14.5$

$3.5 \times 18 = 63$

What is it?

What are some examples?

Visual Representation

What are some non-examples?
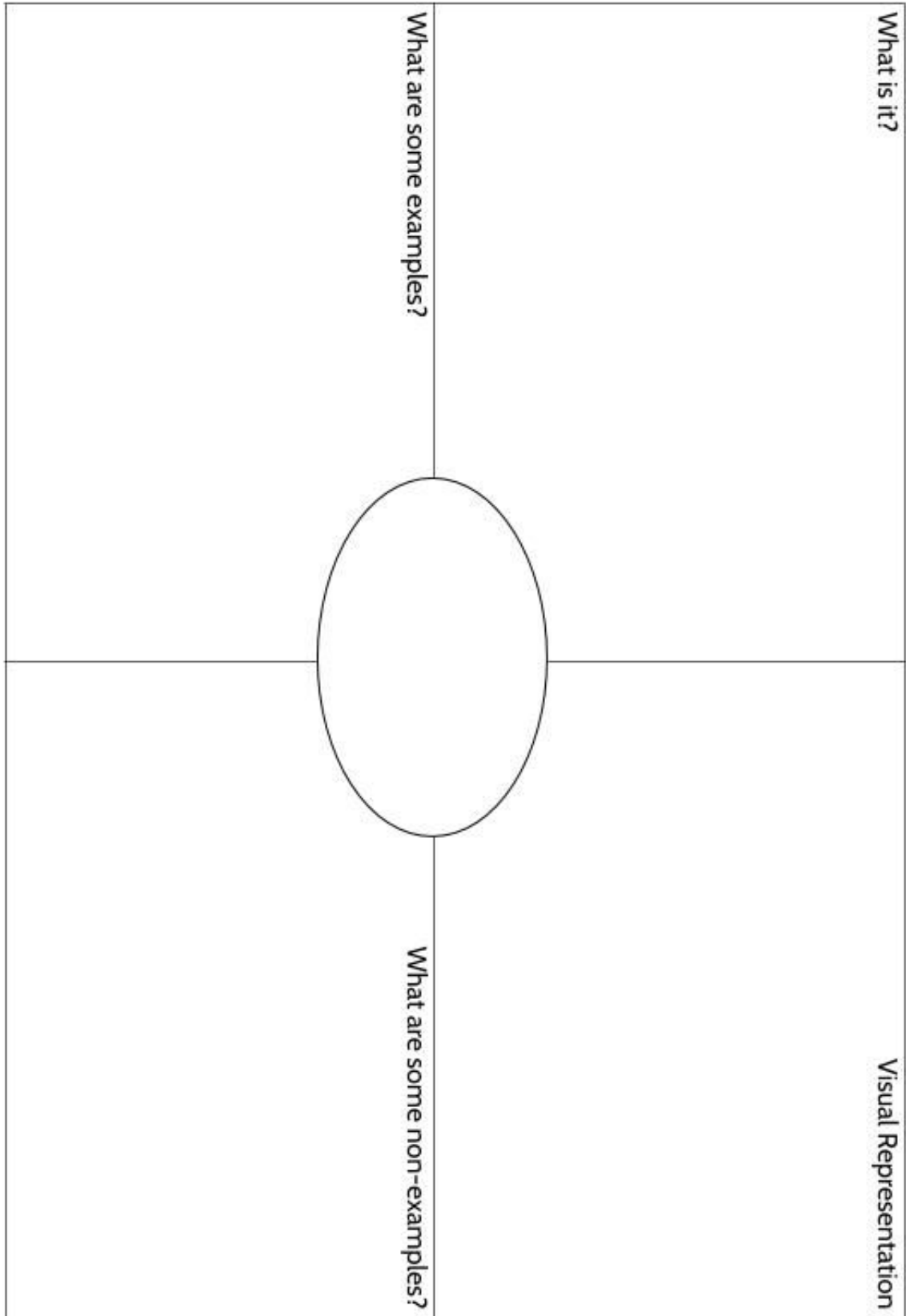
Concept Circle

3) Explain these words and the connections you see between them.

population | area

urban | density

_____

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_____

rate | per

divide | unit

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Fill in the Blanks

4) Use the words and numbers below to fill in the blanks in the article.

few   population   high   41 ppl/sq. mi.   21 million people
square miles   water   deserts   climate
crowded   lowest   per   area   distributed
~~population density~~   highest   48,000 people/mi²
271   rural   world's population   urban

The _____population density_____ of a country or a city or other place is a number that shows

how crowded that place is. It is calculated by dividing the _____ by the

_____ . For example, France has a population of 67,000,000 people and

an area of 247,368 square miles, so its population density is about

_____ people per square mile.

A number of factors can affect population density. _____ is one of

those factors. Greenland has a very low population density because it is very cold there, so not

many people want to live there. Other places with harsh weather conditions such as

_____ or mountainous areas usually also have low population density.

Many cities were built near rivers, because people need _____ for

their daily needs, so places near rivers often have a _____ population

density. People are not _____ equally around the world. In satellite

photos of Earth at night, you can see lights surrounding oceans, lakes and rivers. This shows

that most of the _____ lives near water.

Many _____ places, such as cities, have high population densities and

can be really _____ . Mexico City is an example. With a population of

about _____ people and an area of about 3,000

_____, the city has a population density of about 7,000

people/mi². Other places with large _____ areas can have very low

population densities. For example, the population density of Sonora, a northern state in

Mexico, is only about _____ because much of the state is made up of

mountains and deserts.

The country with the _____ population density in the world is

Monaco, with _____ . The whole country is less than 1 square mile!

It's called a city-state because the country is the city. The country with the _____

population density is Greenland, which has only 0.07 people _____ square mile.

Greenland is really big, but very _____ people live there because it's so

cold.

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Where You Live

5) Write a description of the place where you live. Use as many of the population density vocabulary words as you can. Look at page 82 for review.

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