# NUMBERS NUMBERS EVERYWHERE[1]
By Gary Clendenen

Did a sheepherder living 3000 years ago know how many sheep he had? Of course, people have used numbers for thousands of years. Although ancient peoples understood the concept of 'nothing,' they did not use zero to represent nothing until the year 458 when Indian mathematicians created that symbol. Before that, people sometimes used a bank space to represent 'nothing'.

Is 0 a number?

How many years has it been since 0 came into use in India?
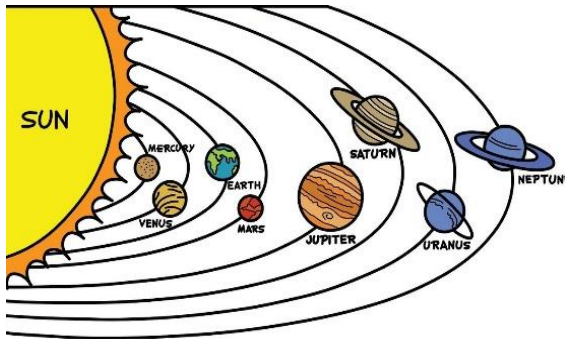
As civilizations developed, people found that there was always a need for yet a larger number. For example, it may only be 64 miles from Santa Fe to Albuquerque and 1982 miles from Santa Fe to New York, but the distance from the earth to the sun is about 93,000,000 miles. And some planets are much further from the sun than the earth.

List the planets that are further from the sun than the earth.

Stars are even much further away than the planets with the closest star (Alpha Centauri) being more than 25,000,000,000,000 (25 trillion) miles from earth. Another example of a large number is the estimate that there are 17,000,000,000,000,000 (seventeen quadrillion) flies (yes, the insect) on earth.

**Is there a largest number? Use your imagination to answer this.**

The idea of negative numbers was recognized by the Chinese as early as 100 BC. A negative number is a number that is less than 0. For example, water freezes at 32° Fahrenheit or 0° Celsius depending on which system of measurement that is used. But there are temperatures far below 0. The record low temperature was recorded in Antarctica where it reached -135.8° F in August 2010. Burrrrrr!

Then there are fractions and decimals. For example, you can eat one-half of an apple or 1/3rd of an orange, or you can buy something that requires the use of decimal numbers.

If you buy something that costs $8.16, what is the change from a $10 bill?

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[1] Suggested Grades: 5 - 6 Skills: Number line, positive and negative integers, fractions, decimals and mixed numbers

About 1700, John Wallis invented the number line to represent EVERY number. He put a 0 at one location on a number line with positive numbers to the right of 0 and negative numbers to the left. The arrow at the far right indicates that the numbers go on forever, or that there is no largest number. Similarly, the arrow at the far left indicates that the numbers get smaller forever. As an example, -5 is smaller than -2.
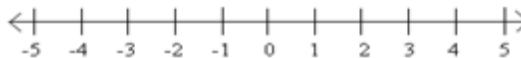
**Use your pencil and put a dot at +3. Add 2 to this by moving 2 numbers to the right of +3.**

Use your pencil to put a dot at -1. Subtract 4 from this number by moving 4 numbers to the left of -1.

Put a dot at +2 on the following number line. Then subtract 9 from it by moving 9 places to the left to find 2 – 9.
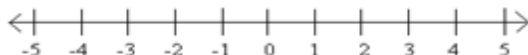
Oops, the number line does not go far enough to the left, does it? Can you fix that on the number line above? So what does 2 - 9 equal? Is the negative sign important in your answer?

Where do fractions and decimals go on a number line? Place a dot for 0.1, 1/3 and ½ on the following number line.

0   0.1   0.2   0.3   0.4   0.5   0.6   0.7   0.8   0.9   1
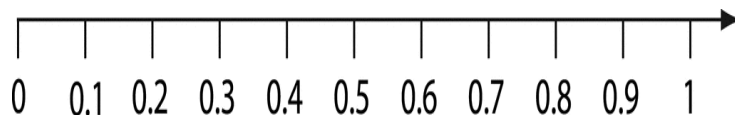
Now place a dot on the number line for 0.5. Is 0.5 the same thing as ½?

Put a dot on the following number line for 4 ½.

0   1   2   3   4   5   6   7

Now find 4 ½ - 3 ½ by starting at 4 ½ and then moving to the left 3 ½ places.

Draw a number line and use dots to show –5 3/4 , -1/3, 0.8, 1 4/5 and 4 1/3. Label each dot by writing the number just above the line.