Inventing Your Own Number System

Through the ages people have invented many different ways to name, write, and compute with numbers. Our current number system is based on place values corresponding to powers of ten. In principle, place values could correspond to any sequence of numbers. For example, the places could have values corresponding to the sequence of square numbers, triangular numbers, multiples of six, Fibonacci numbers, prime numbers, or factorials.

The Roman numeral system does not use place values, but the position of numerals does matter when determining the number represented. Tally marks are a simple system, but representing large numbers requires many strokes.

In our number system, symbols for digits and the positions they are located combine to represent the value of the number. It is possible to create a system where symbols stand for operations rather than values. For example, the system might always start at a default number and use symbols to stand for operations such as doubling, adding one, taking the reciprocal, dividing by ten, squaring, negating, or any other specific operations.

Create your own number system. What symbols will you use for your numbers? How will your system work? Demonstrate how your system could be used to perform some of the following functions.

- Count from 0 up to 100
- Compare the sizes of numbers
- Add and subtract whole numbers
- Multiply and divide whole numbers
- Represent fractional values
- Represent irrational numbers (such as π)

What are some of the advantages of your system compared with other systems? What are some of the disadvantages?

If you met aliens that had developed their own number system, how might their mathematics be similar to ours and how might it be different? Make a list of some math facts and procedures that you have learned. Which items on the list would probably be the same no matter what number system was used? Which facts and procedures would depend on the number system?