

# Radio Maths Made Simple

## Basic Maths for RAE Students by Bill Sparks G8FBX

Part 1: decimals and indices

Most students taking the RAE course have had little reason for studying maths since their school days and in most cases have forgotten even their school maths. Accordingly they came up against the immediate problem of sorting out the elementary maths needed at the start of the course. These notes are an attempt to clear the air by providing a simple explanation of the maths necessary for the course. Initially the most important factor is an understanding of the decimal system.

point and also to show that the value indicated is less than 1, we normally write the fraction as 0.1. This means that the value shown is less than 1.0 but greater than '0'.

Referring back to the rectangle, we can further divide by another factor of 10. So that we are now dividing by  $10 \times 10$  or 100 which is generally shown as:

$$\frac{1}{100}$$

The method of indicating this by decimal notation is to put another 0 in front of the 1 but behind the decimal point:

$$\frac{1}{100} = .01$$

Further reference to the rectangle shows that the .01 rectangle can be divided by 10 and thus we are now dividing by  $10 \times 10 \times 10$  or:

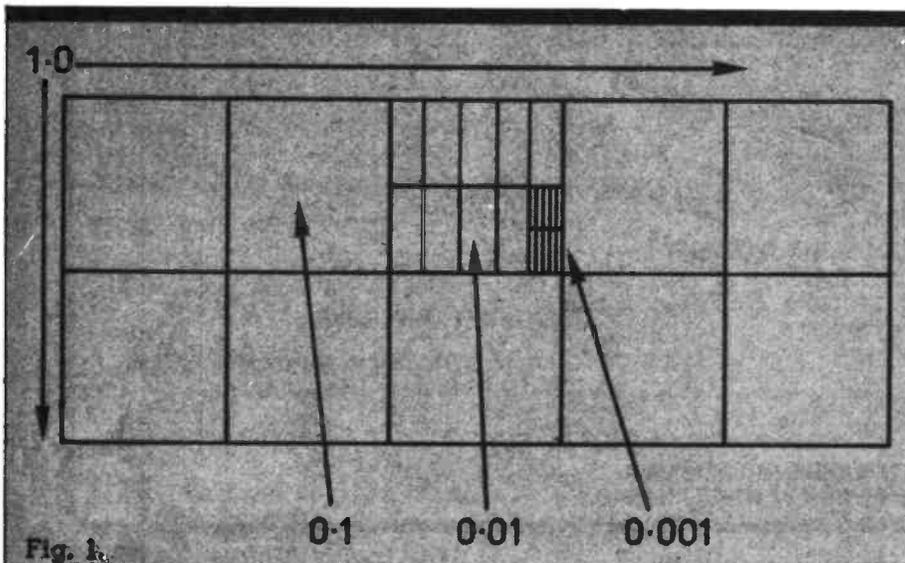
$$\frac{1}{1000}$$

The decimal notation for this value is .001. At this point a rather significant fact is displayed.

$$\begin{aligned} \frac{1}{10} &= 0.1 = (\text{no '0' in front of 1}) \\ \frac{1}{100} &= 0.01 = (\text{one '0' in front of 1}) \\ \frac{1}{1000} &= 0.001 = (\text{two '0's in front of 1}) \end{aligned}$$

The number of '0's in front of the 1 but after the decimal point is always one less than the '0's in the fraction thus:

$\frac{1}{1000}$  has three 0's in the fraction but only two in the decimal. The thing to remember is that the decimal point in itself always counts as a '0'. The number of '0's in the fraction below the line is called the denominator. The number above the line is called the numerator.



**The decimal point of it all**  
Consider the rectangle shown in Fig. 1. The main rectangle is shown as having a unit area of 1.0 and is made up of ten equal small rectangles. (shown as 0.1). Therefore each small rectangle is  $1/10$  th of the

large one. We show this  $1/10$  th as .1, where the point is called a decimal point and the Latin *deci* means  $1/10$  so by putting the point in front of the 1 we are indicating that we have divided the 1 by 10. To make certain of the position of the