

title

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1 Prerequisite Terms for Understanding This Document

- WHOLE NUMBER
- PROPER FRACTION
- REAL NUMBER
- $[x]$

1.1 WHOLE NUMBER

A WHOLE NUMBER is a number like 0, 1, 2, 3, 10, 308, ... i.e the numbers used for counting.

1.2 REAL NUMBER

A PROPER FRACTION is a fraction whose numerator which musn't be zero is less than the denominator. e.g $\frac{4}{11}$

2 Finding the Decimal Representation of Powers of Real Numbers

When going about finding the decimal representation of the square of a real number like π it is helpful to express the number as a sum of a WHOLE NUMBER and a real number from 0 to 1 i.e on the set (0,1).

Suppose we have a number X. If $X = n + x$ where n is the whole part of X and x is the number on the set (0,1) then

$$X^2 = (n + x)^2 = n^2 + 2nx + x^2$$

To calculate $2nx$ to some specific number of decimal places is straightforward.

Calculating x^2 to a specified number of decimal places is more involved.

For an example, let $X = 6.873416873640587613458072364\dots$

In this case we have $n = 6$ and $x = 0.873468736405876\dots$

The meaning of 0.873468736405876 is

$$8 \frac{7}{10^1 + \frac{7}{10^2} + \frac{3}{10^3} + \frac{4}{10^4} + \frac{6}{10^5}}$$