Chapter 6

Squares & Square Roots

A number with ‘n’ digits has either (2n - 1) or 2n digits in square

Example:

1) 1 – digit number has ‘1’ or ‘2’ digits in its square i.e., $3^2 = 9$, $7^2 = 49$.

2) 2 – digit number has ‘3’ or ‘4’ digits in its square i.e., $11^2 = 121$,

$50^2 = 2500$

- The square of a natural number ‘n’ is equal to the sum of the first ‘n’ odd numbers.

Example:

$1^2 = 1 \times 1 = 1 \Rightarrow$ The first odd number.

$2^2 = 2 \times 2 = 4 = 1 + 3 \Rightarrow$ The sum of the first 2 odd numbers.

$3^2 = 3 \times 3 = 9 = 1 + 3 + 5 \Rightarrow$ The sum of the first 3 odd numbers.

Note:

The sum of first ‘n’ odd natural numbers is n^2.

- The square of any odd number can be expressed as the sum of two consecutive natural numbers.

Note:

In general, for any odd number m,

$$m^2 = \left[\frac{m^2 - 1}{2} + \frac{m^2 + 1}{2}\right]$$

Example:

$3^2 = 9 = 4 + 5$ $\left(Q\frac{3^2-1}{2}+\frac{3^2+1}{2}\right)$

$5^2 = 25 = 12 + 13$ $\left(Q\frac{5^2-1}{2}+\frac{5^2+1}{2}\right)$

$7^2 = 49 = 24 + 25$ $\left(Q\frac{7^2-1}{2}+\frac{7^2+1}{2}\right)$