CUBES AND CUBE ROOTS

SUM OF NUMBERS

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The sum of first 'n' natural numbers.

$1 + 2 + 3 + ... + n = \frac{n(n+1)}{2}$

Ex.1 Find sum of first 6 natural numbers.

Sol. $n = 6 \ \therefore \ \text{Sum} = \frac{6(6+1)}{2} = 3 \times 7 = 21$

Ex.2 Find sum of $10 + 11 + ... + 20$.

Sol. $\because$ Sum of 1 to 20 is

$\frac{20(20+1)}{2} = 10 \times 21 = 210$

And sum of 1 to 9 is $\frac{9(9+1)}{2} = \frac{9 \times 10}{2} = 45$

$\therefore \ 10 + 11 + ... + 20 = 210 - 45 = 165$

The sum of Square of first 'n' natural numbers.

$1^2 + 2^2 + 3^2 + ... + n^2 = \frac{n(n+1)(2n+1)}{6}$

Ex.3 Find sum of squares of first five natural numbers.

Sol. $1^2 + 2^2 + 3^2 + 4^2 + 5^2 \ \therefore \ n = 5$

$\therefore \ \text{sum} = \frac{5(5+1)(10+1)}{6} = 55$

The sum of cube of first 'n' natural numbers.

$$1^3 + 2^3 + 3^3 + 4^3 + \ldots\ldots\ldots + n^3 = \left[\frac{n(n+1)}{2}\right]^2$$

Ex.4 Find sum of cube of first five natural numbers.

Sol. $1^3 + 2^3 + \ldots\ldots\ldots + 5^3 \quad \therefore \ n = 5$

$$\therefore \text{ sum} = \left[\frac{5(5+1)^2}{2}\right]^2 = (5 \times 3)^2 = 225$$