APTITUDE - BASIC ARITHMETIC

Sequence

A sequence represents numbers formed in succession and arranged in a fixed order defined by a certain rule.

Airthmetic Progression (A.P.)

It is a type of sequence where each number/term(except first term) differs from its preceding number by a constant. This constant is termed as common difference.

A.P. Terminologies

- First number is denoted as 'a'.

- Common difference is denoted as 'd'.

- n^{th} number is denoted as 'T_n'.

- Sum of n number is denoted as 'S_n'.

A.P. Examples

- 1, 3, 5, 7, ... is an A.P. where a = 1 and d = 3 - 1 = 2.

- 7, 5, 3, 1, - 1 ... is an A.P. where a = 7 and d = 5 - 7 = -2.

General term of A.P.

```
Tₙ = a + (n − 1)d
```

Where **a** is first term, **n** is count of terms and **d** is the difference between two terms.

Sum of n terms of A.P.

```
Sₙ = (n/2)[2a + (n − 1)d
```

Where **a** is first term, **n** is count of terms and **d** is the difference between two terms. There is another variation of the same formula:

```
Sₙ = (n/2)(a + l)
```

Where **a** is first term, **n** is count of terms, **l** is the last term.

Geometrical Progression, G.P.

It is a type of sequence where each number/term(except first term) bears a constant ratio from its preceding number. This constant is termed as common ratio.

G.P. Terminogies

- First number is denoted as 'a'.

- Common ratio is denoted as 'r'.

- n^{th} number is denoted as 'T_n'.

- Sum of n number is denoted as 'S_n'.

G.P. Examples

- 3, 9, 27, 81, ... is a G.P. where a = 3 and r = 9 / 3 = 3.

- 81, 27, 9, 3, 1 ... is a G.P. where a = 81 and r = 27 / 81 = (1/3).

General term of G.P.

```
T_n = ar^(n-1)
```

Where **a** is first term, **n** is count of terms, **r** is the common ratio

Sum of n terms of G.P.

```
S_n = a(1 - r^n)/(1 - r)
```

Where **a** is first term, **n** is count of terms, **r** is the common ratio and r < 1. There is another variation of the same formula:

```
S_n = a(r^n - 1)/(r - 1)
```

Where **a** is first term, **n** is count of terms, **r** is the common ratio and r > 1.

Arithmetic Mean

Airthmetic mean of two numbers a and b is:

```
Arithmetic Mean = (1/2)(a + b)
```

Geometric Mean

Geometric mean of two numbers a and b is

```
Geometric Mean = √ab
```

General Formulaes

```
1 + 2 + 3 + ... + n = (1/2)n(n+1)
```

```
1^2 + 2^2 + 3^2 + ... + n^2 = n(n+1)(2n+1)/6
```

```
1^3 + 2^3 + 3^3 + ... + n^3 = [(1/2)n(n+1)]^2
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