MIND MAP

SEQUENCE AND SERIES

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Arithmetic Progression
⇓
Common difference

Calci
$a_n = a + (n-1)d$

- $a_2 = ?$ $a_4 = ?$ $a_n =$ or general A.P. a and d Calci
- Sum of 3 terms, 4 terms, 5 terms: $a-d, a, a+d$ or GBC
- A.M
  - Single → $\frac{a+b}{2}$
  - More than One → $d = \frac{b-a}{n+1}$, n = No of A.M's or Calci

Calci
$S_n = \frac{n}{2}[2a+(n-1)d]$
or
$S_n = \frac{n}{2}[a+a_n]$

Geometric Progression
⇓
Common Ratio

Calci
$a_n = ar^{n-1}$

- $a_2 = ?$ $a_4 = ?$ $a_n =$ or General G.P. a or r. GBC Calci
- Product of 3 terms, 4 terms: $\frac{a}{r}, a, ar$ or GBC
- G.M
  - Single → $\sqrt{ab}$
  - More than One → $r = \left(\frac{b}{a}\right)^{\frac{1}{n+1}}$, n = No of G.M's or Calci.

Calci
$S_n = \frac{a(r^n-1)}{r-1}$

$S_\infty = \frac{a}{1-r}$ $r<1$

⇒ Sum of n A.M's = n · Single A.M. = $n \cdot \frac{(a+b)}{2}$

Product of n G.M's = $(\text{Single GM})^n = (ab)^{n/2}$

Some Important Formulae

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

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

$1^3+2^3+3^3+\cdots+n^3 = \left(\frac{n(n+1)}{2}\right)^2$

$1+3+5+\cdots+ = n^2$

$2+4+6+\cdots+ = n(n+1)$

$S_n = Pn^2 + Qn$
⇓
$a = P+Q$
$d = 2P$

$a_n = Pn + Q$
⇓
$a = P+Q$
$d = P$