APs & GPs

AP	Arithmetic Progression	add common difference	$a+(n-1)d$
GP	Geometric Progression	multiply common ratio	ar^{n-1}

APs

nth term

$$u_n = a+(n-1)d$$ a = 1st term, d = difference

sum to nth term

$$S_n = \tfrac{1}{2}n[2a+(n-1)d] \qquad S_n = \frac{n}{2}(a+l)$$

$$\sum(u_n + v_n) = \sum u_n + \sum v_n$$

$$\sum(ku_n) = k\sum u_n$$ (constant multipliers go outside)

GPs

nth term

$$u_n = ar^{n-1}$$ a = 1st term, r = ratio

sum to nth term

$$S_n = \frac{a(1-r^n)}{1-r} \qquad S_n = a\left(\frac{r^n-1}{r-1}\right)$$

If $-1<r<1$, then

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

FM – Series

$$\sum_{1}^{n} r = \frac{n(n+1)}{2}$$

$$\sum_{1}^{n} r^2 = \frac{n(n+1)(2n+1)}{6}$$

$$\sum_{1}^{n} r^3 = \frac{n^2(n+1)^2}{4}$$

$$\sum (u_n + v_n) = \sum u_n + \sum v_n$$

$$\sum (ku_n) = k\sum u_n$$ (constant multipliers go outside)