Chapter 10 Important Formulas

Gaussian Formula:

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

Sum of 1st n squares:

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

Finding the binomial coefficient of a specific term: $\displaystyle {}_nC_r = \frac{n!}{(n-r)!\,r!}$

Finding the specific term in binomial expansion of $(a+b)^n$: $\; t_{r+1} = {}_nC_r (a)^{n-r}(b)^r$

Finding the nth term of an Arithmetic sequence : $a_n = a_1 + d(n-1)$

The sum of the first n terms of an Arithmetic Series: (Partial Sum):

$$S_n = \frac{n}{2}\left(a_1 + a_n \right) \quad \text{where } a_1 = \text{first term and } a_n = \text{last term}$$

$$\text{OR}$$

$$S_n = \frac{n}{2}\left[2a_1 + d(n-1) \right] \quad \text{Use when you don't know the last term!!.}$$

Finding the nth term of a Geometric sequence: $a_n = a_1 (r)^{n-1}$

The sum of the first n terms of a Geometric Series: (Partial Sum):

$$S_n = \frac{a_1\left(1 - r^n \right)}{1-r}$$

The infinite sum of a Geometric Series: $\displaystyle S = \frac{a_1}{1-r}$ where the $|r| < 1$