

امثال (11) ←

Some useful mathematical formulas

If (n) is a positive integer number, then :-

$$(a+b)^n = \sum_{r=0}^n C_r^n a^r b^{n-r} \rightarrow (\text{Binomial's Law})$$

$$= \underbrace{C_0^n}_{=1} a^0 b^{n-0} + C_1^n a^1 b^{n-1} + C_2^n a^2 b^{n-2} + \dots + C_n^n a^n b^{n-n}$$

$$= b^n + n a b^{n-1} + \frac{n(n-1)}{2!} a^2 b^{n-2} + \frac{n(n-1)(n-2)}{3!} a^3 b^{n-3} + \dots + a^n$$

EX: (1) if $n=2$, find $(a+b)^n$

$$(a+b)^2 = \sum_{r=0}^2 C_r^2 a^r b^{2-r}$$

$$= C_0^2 a^0 b^{2-0} + C_1^2 a^1 b^{2-1} + C_2^2 a^2 b^{2-2}$$

$$= b^2 + 2ab + a^2$$

EX: Prove that: $\sum_{i=0}^n C_i^n 2^i$

Sol By using Binomial Law: $(a+b)^n = \sum_{i=0}^n C_i^n a^i b^{n-i}$

$$\therefore \sum_{i=0}^n C_i^n 2^i = (2+1)^n = \sum_{i=0}^n C_i^n 2^i 1^{n-i} = \sum_{i=0}^n C_i^n 2^i$$

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Ch-2-Probability Theory

Some Basic Concepts of Probability

Definitions

- 1- Random experiment : It means any operation which yields different outcomes under a given set of conditions.
- 2- Sample space : In any random experiment, the sample space is defined as the collection of all possible outcomes. and denoted by S .
- 3- (Sample point) = elementary event . It's every single outcome.
- 4- Even : It's a set of sample points in S (Sample space).
- 5- Probability : $P(A) = \frac{n(A)}{n(S)}$
s.t : $n(A)$: no. of outcomes of A .
 $n(S)$: no. of outcomes of S .