Combination :- التوافيق

وهي عملية اختيار r من الأشياء من أصل n من الأشياء بحيث أن الترتيب لا يؤثر في النتيجة .

i.e $C_r^n = \frac{n!}{r!(n-r)!}$

1. $C_0^n = 1$ 2. $C_1^n = n$ 3. $C_n^n = 1$

4. $C_r^n = C_{n-r}^n$ i.e $C_3^{10} = C_7^{10}$

Examples :-

1. $C_0^4 = 1$ 2. $C_1^4 = 4$ 3. $C_2^4 = 6$ 4. $C_3^4 = 4$
5. $C_4^4 = 1$

Then

$$C_0^n + C_1^n + C_2^n + \cdots + C_n^n = 2^n$$

$$C_1^n + C_2^n + C_3^n + \cdots + C_n^n = 2^n - 1$$

Examples :- 1. In how many ways you can select 4 men, 6 women from 6 men, 14 women?

Sol :-

$$C_4^6 \cdot C_6^{14}$$

2. In how many ways can choose 3 Red 5 white balls from urn Contain 10 Red 15 white 6 Green balls?

Sol

$$C_3^{10} * C_5^{15} * C_0^6$$

Example. If $p(A) = 0.6$, $p(A \cup B) = 0.7$

$p(B^c) = 0.7$, A, B are indep ?

Sol/

$\therefore p(B) = 1 - p(B^c) = 1 - 0.7 = 0.3$

$\therefore p(B) = 0.3$

and

$p(A \cup B) = p(A) + p(B) - p(A \cap B)$

$0.7 = 0.6 + 0.3 - p(A \cap B)$

$\therefore p(A \cap B) = 0.2$

To prove A and B are indep then

$p(A \cap B) = p(A) \cdot p(B)$

$= (0.6) * (0.3)$

$= 0.18$

then $0.2 \neq 0.18$

$\therefore$ A and B are dep.

Exs:- Probability of a man Lived 10 years after = 0.35 and probability of his wife Lived the same period = 0.50 ind the prob. in each case:

1. They Lived together the same period ?
2. The man lived and his wife dead in the seme period?
3. the wife lived and her husband ded in the seme period?
4. They dead together the same period?
5. at Least one of them lived in the same period?