Topic: Fundamentals of probability, Mutually Exclusive Events, Independent Events:

1) Let A and B are two events of such that they are independent and P(A)=0.5, and P(B)=0.4. Find P(AUB), P(A’B), P(AB’), P(A’B’).

P(A)=0.5

P(B)=0.4

Let’s

P(AUB)=P(A)+P(B)-P(AB)=>0.5+0.4-(0.5\*0.4)=>0.9-0.2=>0.7

2) Define sample space and sample points.

In probability theory, the sample space of an experiment or random trial is the set of all possible outcomes or results of that experiment. Each outcome or result is called a sample point.

For example, if you toss a coin, the sample space is {heads, tails}. If you roll a dice, the sample space is {1,2,3,4,5,6}. If you pick a card from a deck of cards, the sample space is {ace of hearts, 2 of hearts, 3 of hearts, ..., queen of spades, king of spades}.

3) A person Shoot At the target until it hits the target write down the appropriate sample space for the following events

a) He requires 3 attempts to hit the target.

(YYN), (YNY), (NYY)

b) Less than 6 attempts are required to hit the target.

(Y),(YY),(YYY),(YYYY),(YYYYY),(YYYYYY)

c) He hits the target.

(Y),(YN),(YYN),(YYYN)……..

d) he never hits the target

(N),(NN),(NNN),(NNNN),….

Topic: Permutation and combination

4) Give the formula for nC1 , nC0, nCn.

nC1=1

nC0=0

nCn=n

5) Show that nCr = nC(n-r).

nC(n-r)

= n! / (n-r)!(n-(n-r))!

= n! / (n-r)!r!

= n! / r!(n-r)!

= nCr

6) Give definition of Permutation and combination and state its formulas.

Permutation: A permutation is an arrangement of objects in a specific order. In other words, a permutation is a way of selecting and arranging objects from a set of distinct objects.

nPr = n!/(n-r)!

Combination: A combination is a selection of objects from a set of distinct objects where the order does not matter. In other words, a combination is a way of selecting objects from a set without arranging them in a specific order.

nCr = n!/(r!(n-r)!)

7) Four cards are drawn from the well shuffled pack of 52 playing cards what is the probability that it contains.

4 cards are drawn the pack of 52=52C4

1. 2 red cards and 2 black

* 26C2 \* 26C2 /52C4 =>((26\*25\*24!/2!\*24!)\* (26\*25\*24!/2!\*24!))/52\*51\*50\*49\*48!/4!\*48!

=>(325\*325)/270725 =>0.39015

1. One card of each suit

=>(13C1 \* 13C1 \* 13C1  \* 13C1 )/52C4

=> 28,561/270725

=> 0.1054

c) All cards of the same suit.

=>(13C4 + 13C4 + 13C4  + 13C4 )/52C4

=>2860/270725 = 0.0105

d) One king

=> 13C4 /48C3

4 king cards and 48 not king cards

4C1 \* 48C3

8) In the experiment of tossing 3 coins simultaneously obtain the probability of occurrence of

Solution:(HHH, HHT, HTH, THH, TTH, TTT, THT, HTT)

a) Two heads = 3/8

b) At most two heads = 7/8

c) At least two heads = 4/8

d) No head = 1/8

9) In how many ways can we select a committee of 4 men and 7 women from the group of 6 men and 10 women?

6C4 = 15

10C7 = 120

=15\*120=1800 ways

10) A committee of 3 gents and 2 ladies wants to sit in a row for a photograph. What is the probability that the two ladies should occupy extreme corners of the place?

Solution:

3P3 =3!/(3-3)! = 6

2P2 =2!/(2-2)! = 2

2\*6 = 12 ways

Total = 5P5 = 5!(5-5)! =120

Probability = 12!/5!

11) For the following statements justify whether the statements are true or not? a) P(A)=0.8, P(B)=0.7, P(AUB)=0.3

Solution: False

Topic: Bayes Theorem:

P(A|B)= P(B|A).P(A)

12) Bag I contains 4 books of Math and 6 books of stat. bag II contains 2 books of math and 4 books of Stat. Whereas bag III has 1 book on Math and 5 on Stat. One bag is selected at random.

P(A)= 1/3

P(B)= (1/3\*4/10)+(1/3\*2/6)+(1/3\*1/6) = 3/10

1. From that one book is taken out and it is found of math. What is the probability that bag I is selected or chosen?

=(4/10\*1/3)/(3/10) = 4/9