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Q1.

Solution.

where s={ (1,1),(1,2),(1,3),(1,4),(1,5),(1,6),(1,7),(1,8),

(2,1),(2,2),(2,3),(2,4),(2,5),(2,6),(2,7),(2,8)

(3,1),(3,2),(3,3),(3,4),(3,5),(3,6),(3,7),(3,8),

(4,1),(4,2),(4,3),(4,4),(4,5),(4,6),(4,7),(4,8),

(5,1),(5,2),(5,3),(5,4),(5,5),(5,6),(5,7),(5,8),

(6,1),(6,2),(6,3),(6,4),(6,5),(6,6),(6,7),(6,8),

(7,1),(7,2),(7,3),(7,4),(7,5),(7,6),(7,7),(7,8),

(8,1),(8,2),(8,3),(8,4),(8,5),(8,6),(8,7),(8,8)}.

Let A = { the sum is 7}, B ={ the sum is even} , c = { the sum is greater than 8} and D = { the two dice had the same outcomes}. Then

A = {(1,6),(2,5),(3,4),(4,3),(5,2),(6,1),(4,3)},

B = {(1,1),(1,3),(1,5),(2,2),(1,7),(2,2),(2,4),(2,6),(2,8),(3,1),(3,3),(3,5),(3,7),(4,2),(4,4),(4,6),(4,8),(5,1),(5,3),(5,5),(5,7),(6,2),(6,4),(6,6),(6,8),(7,1),(7,3),(7,5),(7,7),(8,2),(8,4),(8,6),(8,8)}.

C =
{(1,8),(2,7),(2,8),(3,6),(3,7),(3,8),(4,5),(4,6),(4,7),(4,8),(5,4),)(5,5),(5,6),(5,7),(5,8),(6,3),(6,4),(6,5),(6,6),)(6,7),)(6,8),(7,2)(7,3),(7,4),)(7,5),(7,6),(7,7),(7,8),(8,1),(8,2),(8,3),(8,5),(8,6),(8,7),(8,8)}

D -= { (1,1),(2,2),(3,3),(4,4),(5,5),(6,6),(7,7),(8,8)}.

A⋂B = {}

A⋂C = {}

A⋂D = {}

P(A) = 6/64 , p(B) = 32/64

P(C) = 36/64 , P(D) = 8/64

P(A⋂B) = 0 ,P (A⋂C) =0 , P(A⋂D) =0

Hence

P(A/B) = PA⋂B/P(B)=0 * 32/64

P(A/B) = 0.

P(A/C) = PA⋂C/P(C)=0 * 36/64

P(A/C) = 0.

$P(A/D) = PA \cap D/P(D) = 0 * 8/64$

$P(A/D) = 0.$

ANS.

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Q2.

SOLUTION.

Now we find

P(sum greater than 7)

P(sum less than 7)

P(sum Exactly equal to 7)

1	1	2	3	4	5	6
2	2	3	4	5	6	7
3	3	4	5	6	7	8
4	4	5	6	7	8	9
5	5	6	7	8	9	10
6	6	7	8	9	10	11
7	7	8	9	10	11	12

Total sum = 6/36=1/6

Favrurable outcomes/possible outcomes

P(sum greater than 7)= 15/36

P(sum less than 7) = 10/36 = 5/18

P(sum Exactly equal to 7) = 6/36 = 1/6 ANS.

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Q3.

Solution.

Given that p= 2/3 n=8

- q = 1-p
- put values in q
- = 1- 2/3
- Q= 1/3

Now find x denotes the number of games won by A then

(1) P(x=4)

(8) $(2/3)^{4}$ **(1/3)4**

4

= 1120/8561

= 0.1707

(2) (p x>- 4)

- 1 –(x<4)

- = 1- Σ3 (8/x)(2/3)x(1/3)8-x

  X=0

= 1 –[(1/3)8 + 8 (2/3)(1/3)7 + 28(2/3)2 (1/3)6+56(2/3)3(1/3)5]

= 1- 1/6561[1 +16+112448]

= 1- 577/6561

= 6561-577/6561

= 5984/6561

0.9121

(3)

P (3<-x<-6)

Σ

X=3 (8) (2/3)x(1/3)8-x

X

=(8/3)(2/3)3(1/3)5(8/4)(2/3)4(1/3)4+(8/5)(2/3)5(1/3)3+(8/6)(2/3)6(1/3)2

= 8/ 3^{8} [56+140+224+224]

= 8* 664/6561 = 5152/6561= **0.7852** ANS.

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Q5.

ANS.

Derive Binomial distribution:

A **binomial distribution** can be thought of as simply the probability of a SUCCESS or FAILURE outcome in an experiment or survey that is repeated multiple times. The **binomial** is a type of **distribution** that has two possible outcomes.

Now we find mean and variance of binomial distribution.

Mean

n =5

p = 60

q = 40

we know that mean formula

$\mu_x = np$

put values in Mean formula

= 5(60)

$\mu_x = 300$

now find variance of the above mean value

$\mu_x = np$

put values

= 5(60)

= 300

variance formula

$\mu_x{}^2 = npq$

put values

= 5(60)(40)

$\mu_x{}^2 = 12000$

now taking variance square

$\mu_x = \sqrt{npq}$

$= \sqrt{12000}$

$\mu_x{}^2 = 109.5445$

ANS.

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Q6.

ANS.

Differentiate between Bi-nominal frequency distribution and Bi-nominal distribution:

Bi-nominal frequency distribution

- If the binominal probability distribution is multiplied by N the numbers of experiments or sets.
- The resulting distribution is known as binominal frequency distribution.
- X is numbers of success and N is a numbers of experiments.
- Formula
- $N\ (n)\ p^x q^{n-x}$

Bi-nominal distribution:

- Binomial distribution summarizes the number of trials, or observations when each trial has the same probability of attaining one particular value. ...

- When $p = 0.5$, the **distribution** is symmetric around the mean. When $p > 0.5$, the **distribution** is skewed to the left. When $p < 0.5$, the **distribution** is skewed to the right.

Formula

$\mu_x = np$

$\mu_x{}^2 = npq$

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Q7.

PROBLEM SOLUTION.

In this problem, you were asked to:

- Find the CV for each data set

In order to do this, we only need to plug the **sample** standard deviation and mean of each data set into the formula given above.

Measure	**Data Set A**	B	C	D
Coefficient of Variation	CV= 3/45*100 CV = 6.7	CV =11/60*100 CV=18.3	CV= 5/30*1OO CV= 10	CV= 15/25*100 CV= 60

In this case, the data set with the lowest CV is data set A, followed by C, D and D. Meaning, set A has the lowest variation amongst these data sets.

ANS.

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