CO-1

HOME ASSIGNMENT 1

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TASK 1:-

(i)

a) Probability Ravi got a sum of 8:

The Possible Pairs(a,b) where sum = a+b = 8 are:-

(2,6), (3,5), (4,4), (5,3), (6,2)

Total:- 5.

Total outcomes when rolling two dice:- 6 x 6 = 36

Probability $P = \frac{\text{Favourable outcomes}}{\text{Total outcomes}} = \frac{5}{36} =$

b) The maximum sum from two dice:- (6+6)

It is impossible to get sum 13

$\therefore P = 0.$

c) less than (or) equal to 12:-

$P = \frac{36}{36} = 1$

d) got a sum of 7.

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

Total Pairs:- 6

Probability:-

$P = \frac{6}{36} = \frac{1}{36}$

e) Sum greather than 8:-

Possible:- 9, 10, 11, 12

9:- (3,6), (4,5), (5,4), (6,3) → 4 outcomes

10:- (4,6), (5,5), (6,4) → 3 outcomes

11:- (5,6), (6,5) → 2 outcomes

12:- (6,6) → 1 outcome

Total = 4+3+2+1 = 10

$$P = \frac{10}{36} = \frac{5}{18}$$

e) data dice - probabilities',
total-outcomes = 36';
prob-a = 5 / total-outcomes';
prob-b = 0 / total-outcomes';
prob-c = 36 / total-outcomes';
prob-d = 6 / total-outcomes';
probe-e = 10 / total-outcomes';

~~Print~~
Put "P(sum=8):" prob-a';
Put "P(sum=13):" prob-b';
Put "P(sum≤12):" prob-c';
Put "P(sum=7):" prob-d';
Put "P(sum>8):" prob-e

② Given

total NO. of People (NNN):- 100100100

NO. of People who like reading (RRR):- 454545

NO. of People who like cooking (CCC):- 303030

who like both reading & cooking (RnC):- 20

a) Probability that person like either reading or cooking:-

$$P(R \cup C) = P(R) + P(C) - P(R \cap C)$$

$$P(R \cup C) = \frac{R}{N} + \frac{C}{N} - \frac{R \cap C}{N}$$

$$= \frac{45}{100} + \frac{30}{100} - \frac{20}{100} = \frac{55}{100} = \boxed{0.55}$$

b) Probability that Person like neither reading or cooking:-

$$P(\text{Neither}) = 1 - P(R \cup C)$$

$$= 1 - 0.55$$

$$\boxed{= 0.45}$$

3) SAS CODE:-

```
data student_marks;
  input Course_Name $ Maximum_mark Obtained_marks;
  datalines;
math 100 85
Math 100 90
Mat
Physics 100 88
Physics 100 75
```

```
chemistry  100  80
chemistry  100  95
;
run;
proc print data=student_marks;
   title "marks obtained by students in different courses";
run;
```

(4) Discussion on SAS:-

SAS:- Statistical Analysis system.

Key features:- i) Data managment.
ii) Statistical Analysis
iii) Visualization
iv) Integration
v) Scalibility

Solving PSQT Problems using SAS:-

1) Define the problem
2) Prepare the Data
3) Analyze Data
4) Optimize solutions
5) Visualize Insights

SAS:- It is a powerful tool for data analytics, statistic analytics, & reporting. It is widely used in industries such as healthcare, finance, & retail for data managment, predictive modelling & visualization.

TASK-2:-

1. Given Data

StudentID	Pass Exam	Attend Review
1	Fail	yes
2	Pass	yes
3	Fail	NO
4	Pass	NO
5	Fail	yes
6	Pass	NO
7	Fail	yes
8	Pass	yes
9	Fail	NO
10	Pass	yes

Event A:- Students Pass the Exam:-

total students who Passed:- 6 (IDS 1,2,4,6,8,10)

total students:-10

$$P(A) = \frac{6}{10} = 0.6$$

Event B1:- Student attended Review sessions:-

Total students who attend Review sessions:- 5 (1,2,5,7,10)

$$P(B1) = \frac{5}{10} = 0.5$$

Event B2:-

Students who did not attend Review sessions:-

5(3,4,6,8,9)

$$P(B2) = \frac{5}{10} = 0.5$$

P(A|B1):-

Students who attend & Passed = 4 (1, 2, 8, 10)

Total who attend = 5

$$P(A|B1) = \frac{4}{5} = 0.8$$

P(A|B2):- Students who did not attend & Passed = 2 (4, 6)

Total who did not attend = 5

$$P(A|B_2) = \frac{2}{5} = 0.4$$

(2.) Given Data:-

Red Beads:- 8

Green Beads:- 6

Blue Beads = 14

Total Beads = 28 beads

i) $P(\text{Green}) = \frac{\text{No. of green beads}}{\text{Total}} = \frac{6}{28} = \frac{3}{14} \approx 0.214$

ii) $P(\text{Not Green}) = 1 - \frac{6}{28} = \frac{22}{28} = \frac{11}{14} \approx 0.786$

iii) $P(\text{Green or Blue}) = P(\text{Green} + \text{Blue})$

$= \frac{6}{28} + \frac{14}{28} = \frac{20}{28} \approx 0.714$

iv) P(Neither Red nor Green) =

$$P(\text{Blue}) = \frac{14}{28} = 0.5$$

v) Impossible Event.

Ex:- Drawing a bead that is both red & green at same time is impossible.

3) Probability that a new walker will meet producing quota let

$P(A)$ be probability that walker attends training program

$P(Quota|A)$ be probability that walker who attend the training program meets producing quota.

$P(\neg A)$ be probability that walker does not attend.

$P(Quota|\neg A)$ did not attend training program

Given

$P(A) = 0.80$

$P(Quota|A) = 0.83$

$P(\neg A) = 1 - P(\neg A) = 0.20$.

$P(Quota|\neg A) = 0.35$

$P(Quota) = P(A) \cdot P(Quota|A) + P(\neg A) \cdot P(Quota|\neg A)$

$\rightarrow P(Quota) = (0.80) \cdot (0.83) + (0.10) \cdot (0.35)$

$= 0.664 + 0.35$

$= 1.014$

(4) Given.

Average rate of email reception: $\lambda = 30$ emails per hour

Poision Probability mass function:-

$$P(X=k) = \frac{\lambda^k e^{-\lambda}}{k!}$$

where

λ is average no. of emails per hour (30)

k is no. of emails (25 for Part a, 35 for Part b)

a) Probability of reciving exactly 25 emails:-

$$P(x=25) = \frac{30^{25} e^{-30}}{25!}$$

b) reciving more than 35

To calculate, we sum the probabilities of reciving 36, 37, 38 ... so on. Alternatively we can calculate the complement.