Poeth

1)

a) What is Probability ?

→ Probability is numerical measure of how likely an event is to occur. Its range is 0 to 1

b) Key Probability Terminology

Sample Space (S)

Event

Outcome

Experiment

Favorable outcome

c) Give at least three probability event examples from the dataset

* Student Passes the final exam

* Student studies more than 10 hours/week

* Student participates in group discussion

2 Empirical Probability (from dataset)

Suppose 14 out of 20 students passed

$$P(\text{Pass}) = \frac{14}{20} = 0.70$$

Theoretical Probability

done through assumption such as coin

$$P(\text{head}) = \frac{1}{2} = 0.50$$

3

a) Define a random Variable for the event "Number of student passing the final exam" out of 3 randomly selected students

Let X = number of students (out of 3 selected) who pass the final exam.

Assume probability a student passes = 0.8

b) Probability Distribution Table

This is

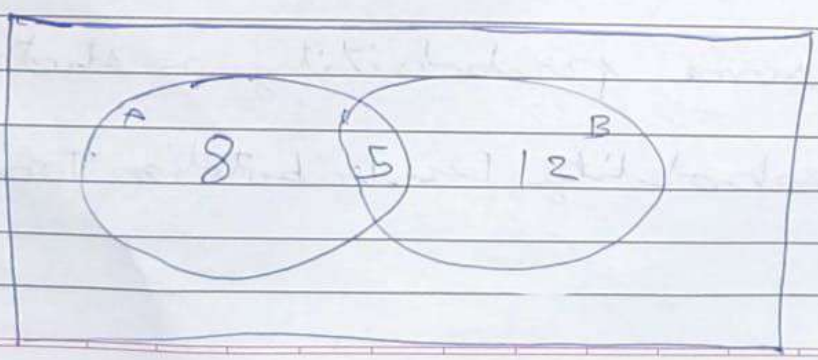
x	Description	Probabilit
0	None Pass	0.027
1	one Pass	0.189
2	Twe Pass	0.441
3	All three Pass	0.343
	= 1	

c) $\mu = np = 3(0.7) = 2.1$ mean

$\sigma^2 = np(1-p) = 3(0.7)(0.3) = 0.63$
Variance

4) Venn Diagram in Probability

⇒ A = Student who study >10 hours/week
B = Student who attend >80% classes



5 Contingency Table & Probability Calculation

Group Discussion	Pass	Fail	Total
Yes	10	2	12
No	4	4	8
Total	14	6	20

a) Joint Probability : Participates AND Passes

$$P(GD \cap Pass) = \frac{10}{20} = 0.50$$

b) Marginal Probability : Passes

$$P(Pass) = \frac{14}{20} = 0.70$$

c) Conditional Probability

$$P(Pass | GD) = \frac{10}{12} = 0.8333$$

6) Cadilional Probablity

$$P(Poss/GD) = 0.8333$$

The students who participate in Group discution have 83% chance.

$P(Poss/GD) = 0.833$
$P(Poss) = 0.70$

The Propobility of Possing increased when student is in Group Discution so this is dependent event

7) Bayes Theorem APPlication

→ $P(HighAttendence/Poss) = 0.70$
$P(HighAttendence/Foit) = 0.40$
$P(HighAttendence) = 0.60$

We wornt:

$$P(Poss/HighAttendence)$$

using Bayes theorm

$$P(Poss/HA) = \frac{P(HA/Poss)\ P(Poss)}{P(HA)}$$

We need P(Poss)

Assume Poss rate = 50%.

$$P(\text{Poss} \mid HA) = \frac{(0.7)(0.5)}{0.60}$$

$$= \frac{0.35}{0.60}$$

$$= 0.5833$$

Final Answer

$$P(\text{Poss} \mid \text{High Attendance}) = 58.33\%$$

— x — Summary — x —

There are 3 factor that effect study - hours, attendence, group Discussion

This thing the higher the value of this factor the higher the chance of Passing