Introduction to Statistical Methods   2022 da 04387

Assignment 1, DSE section 1 Chandupatla Anirudh Reddy

Q1.)

a) What is the probability that an individual purchased small cup?

$P(Small \ cup)$

	Small (S)	Medium (M)	Large (L)	Total
Regular (R)	14%	20%	26%	60%
Decaf (D)	20%	10%	10%	40%
total	34%	30%	36%	100%

$P(S) = P(S \cap R) + P(S \cap D)$

$= 14\% + 20\%$

$= 34\%$

$P(S) = 0.34$

b.) $P(Small \ cup \ of \ Decaf) = P(S \cap D) = 20\% = 0.2$

c.) $P(Decaf \ | \ small \ cup) = P(D|S) = \dfrac{P(D \cap S)}{P(S)} = \dfrac{0.2}{0.34} = 0.588$

Q2.) required given info

$P(Email) = P(E) = 40\% = 0.4$

$P(Cell \ phone) = P(C) = 30\% = 0.3$

$P(Laptop) = P(L) = 25\% = 0.25$

$P(Email \ and \ cell phone) = P(E \cap C) = 23\% = 0.23$

$P(Laptop \ | \ cellphone) = P(L|C) = 70\% = 0.7$

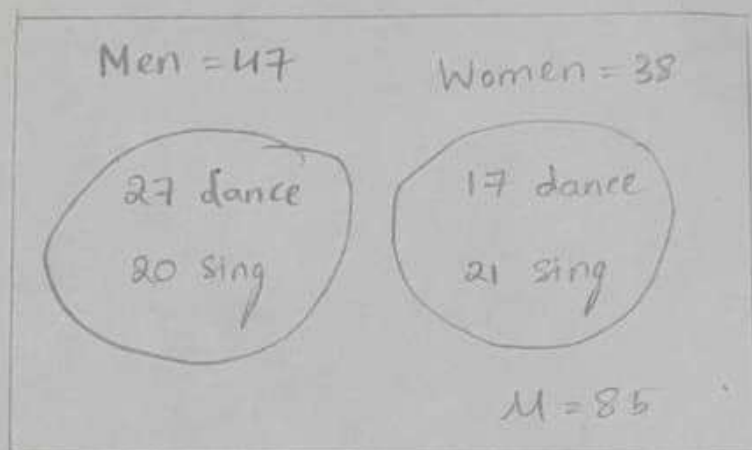a.) $P(Cell \ phone \ | \ Email) = P(C|E) = \dfrac{P(E \cap C)}{P(E)} = \dfrac{0.23}{0.4} = 0.575$

b.) $P(cell \ phone \ | \ Laptop) = P(C|L) = \dfrac{P(C \cap L)}{P(L)} = \dfrac{P(L|C) \cdot P(C)}{P(L)}$

$= \dfrac{(0.7) \times (0.3)}{(0.25)} = 0.84$

Q3.)   Venn diagram using given information.

P(Likes to dance | a women)

$= P(D|W) = \dfrac{P(D \cap W)}{P(W)} = \dfrac{(17/85)}{(38/85)}$

$= \dfrac{17}{38}$

$= 0.447$

Men = 47   Women = 38

27 dance   17 dance

20 sing   21 sing

M = 85

Q4.)   given,

P('A' becoming manager) = P(A) = 0.1

P('B' becoming manager) = P(B) = 0.4

P('C' becoming manager) = P(C) = 0.2

P(Incentive | A is manager) = P(Incentive | B is manager)

= P(Incentive | C is manager) = 0.5

i.e P(I|A) = P(I|B) = P(I|C) = 0.5

$\left\{ \text{Total Probability} \Rightarrow P(x) = \sum P(E_i) \cdot P(x|E_i) \right\}$

P(I) = P(A)·P(I|A) + P(B)·P(I|B) + P(C)·P(I|C)

$= (0.1)(0.5) + (0.4)(0.5) + (0.2)(0.5)$

$= (0.7)(0.5) = 0.35$

P(A becoming manager | Incentive) = P(A|I) = $\dfrac{P(A \cap I)}{P(I)}$

$= \dfrac{P(A) \cdot P(I|A)}{P(I)} = \dfrac{(0.1)(0.5)}{0.35} = 0.142$