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Batch - 7 Data Science

Fundamentals of Data Science
Assignment - 1

Q1 Basic Probability

Product	Transaction	Total transaction	Probability
Clothing	35	150	0.2333
Electronics	43	150	0.2867
Furniture	30	150	0.2000
Grocery	24	150	0.16000
Sports	18	150	0.12000

Q2 Expected Value (E[x])

$$E[x] = \Sigma (x_i \cdot P(x_i))$$

Purchase	Amount (x_i)	Probability P(x_i)	Calculation ($x_i \cdot P(x_i)$)
50		0.25	$50 \times 0.25 = 12.50$
100		0.35	$100 \times 0.35 = 35$
200		0.25	$200 \times 0.20 = 40.00$
300+		0.20	$300 \times 0.20 = 60.00$

$$E[x] = 12.50 + 35 + 40 + 60$$
$$= 147.50$$

Q3 Probability Distribution of Spending behaviour

Range	Transaction	Total transaction	Probability (Transaction/ Total transaction)
0-50	25	150	0.1667
50-100	50	150	0.3333
100-200	40	150	0.2667
200+	35	150	0.2333

Q4 Joint Probability (PC Product ∩ Payment Method))

$$P(A \cap B) = \frac{\text{Transactions where both A and B occur}}{\text{Total transactions}}$$

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Product & Payment	Transactions	total transactions	Joint Probabilities
Clothing ∩ Credit Card	20	150	20/150 = 0.1333
Electronics ∩ Debit Card	18	150	18/150 = 0.12
Furniture ∩ Net Banking	14	150	14/150 = 0.0933

Q5 Conditional Probability (P (Payment Method | Product))

$$P(B|A) = \frac{P(A \cap B)}{P(A)}$$

Product/ Payment	Cash (C)	Credit Card (CC)	Debit Card (DC)	NB	UPI
Clothing	8/35 = 0.229	8/35 = 0.229	4/35 = 0.114	6/35 = 0.171	9/35 = 0.257
Electronics	4/43 = 0.093	12/43 = 0.279	7/43 = 0.163	10/43 = 0.233	10/43 = 0.233

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				14/30	0/30
Furniture	5/3=0.167	6/30=0.200	5/30=0.167	=0.467	=0
				6/24	6/24
Grocery	4/24=0.167	3/24=0.125	5/24=0.208	=0.25	=0.25
				4/18	4/18
Sports	5/18=0.278	2/18=0.111	3/18=0.167	=0.222	=0.222