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EPPS 6313 Homework 3

Due Date: 2/27/22

Question 1

	B	**B′**	**Total**
A	10	30	**40**
A′	25	35	**60**
Total	**35**	**65**	**100**

a. P (A) = 40/100 = **0.4**

b. P (A′) = 60/100 = **0.6**

c. P (A and B) = 10/100 = **0.1**

d. P (A or B) = P (A) + P (B) – P(A and B)

= 0.4 + 0.35 – 0.1 = **0.65**

e. P (A|B) = P (A and B) / P (B)

= 0.1/0.35 = 10/35 or **0.29**

f. **A a**nd B are not independent. Probability of A given B is not equal to probability of A.

P (A|B) ≠ P (A) {0.29 ≠ 0.4}

Similarly, P (A and B) ≠ P (A) P (B) {0.1 ≠ 0.14)

Question Two

	Female	**Male**	**Total**
Coke	120	95	215
Pepsi	95	80	175
Neither	65	45	110
Total	280	220	500

a. P(Pepsi | Male) = P (Pepsi and Male) / P (Male)

   P (Pepsi and Male) = 80/500 = 0.16

   P (Male) = 220/500 = 0.44

   P (Pepsi | Male) = 0.16/0.44 = **0.36**

b. P(Pepsi | Female) = P (Pepsi and Female) / P (Male)

   P (Pepsi and Female) = 95/500 = 0.19

   P (Female) = 280/500 = 0.56

   P (Pepsi | Female) = 0.19/0.56= **0.34**

c. The preference for Pepsi depends on gender. The probability one prefers Pepsi given that he is male is not equal to propability that one is a male customer. That is;

   P (Pepsi | Male) ≠ P (Male) { 0.36 ≠ 0.44)

   Similarly, P (Pepsi | Female) ≠ P (Female) { 0.34 ≠ 0.56)

Question Three

Bill (x)	**$(x - \bar{x})$**	**$(x - \bar{x})^2$**
96	-53.72	2886.077
171	21.28	452.7438
202	52.28	2732.966
178	28.28	799.6327
147	-2.72	7.410494
102	-47.72	2277.41
153	3.28	10.74383
197	47.28	2235.188
127	-22.72	516.2994
157	7.28	52.96605
185	35.28	1244.522
90	-59.72	3566.744
116	-33.72	1137.188
172	22.28	496.2994
111	-38.72	1499.41
148	-1.72	2.966049
213	63.28	4004.077
130	-19.72	388.966
Σ = 2695	**Σ=0**	**Σ = 24311.61**

a. Mean = 2695/18

= $149.72

b. Variance = 23311.61 / 17

= **1430.10**

c. Standard deviation= √1430.10

= $37.82

d. Histogram

i.Order Data

ii. range: 90 – 123

iii. width: 123

iv. Bins: 7

v. Size of bin: $18