QUESTION 1

professor thinks students who live on campus are more likely to get As in the

probability course. To check this theory, the professor combines the data from the past

few years. 600 students have taken the course, 120 students have gotten As, 200

students lived on campus, 80 students lived off campus and got As.

(a). Does this data suggest that "getting an A" and "living on campus" are dependent or independent

Determing whether "getting an A" and "living on campus" are dependent or independent,

Let A represent "getting an A."

Let C represent "living on campus."

From the given data

The probability of getting an A (P(A)) is 120/600 = 1/5.

The probability of living on campus (P(C)) is 200/600 = 1/3.

The probability of living off campus (P(~C)) is 1 - P(C) = 2/3.

The probability of getting an A given that a student lived on campus (P(A|C)) is 80/200 = 2/5.

To determine if A and C are dependent or independent, we need to compare P(A|C) with P(A)P(C).

If P(A|C) = P(A)P(C), then A and C are independent. If P(A|C) ≠ P(A)P(C), then A and C are dependent.

In this case:

P(A)P(C) = (1/5) * (1/3) = 1/15

P(A|C) = 2/5

Since P(A|C) is not equal to P(A)P(C), we can conclude that "getting an A" and "living on campus" are dependent.

PART 2 (b). If events A and B are independent. What is the condition for two events A and B,

to be independent?

Two events A and B are considered independent if the probability of their joint occurrence is equal to the product of their individual probabilities.

$P(A \cap B) = P(A) * P(B)$

Where:

A: Getting an A in the probability course.

B: Living on campus.

Based on the information given:

600 students have taken the course.

120 students have gotten As.

200 students lived on campus.

80 students lived off campus and got As.

Finding the probabilities :

P(A) = (students who got As) / students who took the course) = 120 / 600 = 1/5

P(B) = (students who lived on campus) / (students who took the course) = 200 / 600 = 1/3

$P(A \cap B)$ = (students who both got As and lived on campus) / (students who took the course) = 80 / 600 = 2/15

Checking if A and B are independent

compare $P(A \cap B)$ with P(A) * P(B):

P(A) * P(B) = (1/5) * (1/3) = 1/15

Since $P(A \cap B) = 2/15 \neq 1/15$, events A and B are not independent in this context.

Therefor p(AnB) doesn’t equal p(A) and p(B

NUMBER 2

Suppose that I want to purchase a smart phone. I can choose either a large or a small screen; a 64GB, 128GB, or 256GB storage capacity, and a black or white cover.

(a) How many different options do I have?

Screen size: 2 choices (large or small)

Storage capacity: 3choices (64GB, 128GB, 256GB)

Cover colour: 2 choices (black or white)

Therefor, the total number of different options is 2*3*2=12

(b)what are these options?

THE 12 options are;

1.Large screen,64GB, black cover

2.Large screen,64GB, white cover

3.Large screen,128GB, black cover

4.Large screen,128GB, white cover

5.Large screen,256GB black cover

6.Large screen,256GB, white cover

7.Small screen,64GB, black cover

8. Small screen,64GB, white cover

9. Small screen,128GB, black cover

10. Small screen,1,28GB, white cover

11. Small screen,256GB, black cover

12. Small screen,256GB, white cover