STAT 1910 - Winter 2022

Assignment - III

CHAPTER 4

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MARKS: 6

Question 1. (1.0 mark)

Two students are randomly selected from a statistics class, and it is observed whether or not they suffer from math anxiety. List all the outcomes included in each of the following events. Indicate which are simple and which are compound events.

a. Both students suffer from math anxiety.
b. Exactly one student suffers from math anxiety.
c. The first student does not suffer and the second suffers from math anxiety.
d. None of the students suffers from math anxiety.

S = suffers D = does not suffer

a. Outcome: {SS} This is a simple event.
b. Outcomes: {SD, DS} This is a compound event.
c. Outcome: {DS} This is a simple event.
d. Outcome: {DD} This is a simple event.

Question 2. (2.0 marks)

Six hundred adults were asked whether or not they watch for calories and fat content when they buy groceries. The following table gives the two-way classification of their responses, where *yes* means that an adult watches for calories and fat content and *no* means he/she does not watch.

	Yes	No	No Opinion
Men	74	168	58
Women	106	124	70

a. If one adult is randomly selected from these 600 adults, find the probability that this adult
   i. is a man
   ii. does not watch for calories and fat content
   iii. watches for calories and fat content given that this adult is a woman
   iv. is a man given that this adult has no opinion
b. Are events *men* and *yes* mutually exclusive? What about *yes* and *no opinion*?
c. Are events *men* and *no* independent? Why or why not?

a. Probabilities
   a. 0.5
   b. 0.487
   c. 0.177
   d. 0.097
b. The events men and yes are not mutually exclusive because you could be a man who watches their calories. Yes and no opinion are mutually exclusive as you cannot be watching your calories and have no opinion on watching your calories at the same time.
c. The events men and no are independent because these two events are not mutually exclusive and being a man doesn't affect the choice of yes, no, or no opinion.

Question 3. (1.5 marks)

Two thousand randomly selected adults were asked whether or not they have ever shopped on the Internet. The following table gives a two-way classification of the responses obtained.

	Have Shopped	Have Never Shopped
Male	500	700
Female	300	500

a. Suppose one adult is selected at random from these 2000 adults. Find the following probabilities.

i. *P*(*has never shopped on the Internet* and *is a male*)

ii. *P*(*has shopped on the Internet* and is a *female*)

b. Mention what other joint probabilities you can calculate for this table and then find those.

a. Probabilities
   i. 0.35
   ii. 0.15

b. The other joint probabilities you could find are, has shopped on the internet and is male, and, has never shopped on the internet and is female
   i. P (has shopped on the internet and is male) = 0.25
   ii. P (has never shopped on the internet and is female) = 0.25

Question 4. (1.5 marks)

Two thousand randomly selected adults were asked if they think they are financially better off than their parents. The following table gives the two-way classification of the responses based on the education levels of the persons included in the survey and whether they are financially better off, the same as, or worse off than their parents.

	Less Than High School	High School	More Than High School
Better off	140	450	420
Same	60	250	110
Worse off	200	300	70

Suppose one adult is selected at random from these 2000 adults. Find the following probabilities.

a. *P*(*better off* or *high school*)

b. *P*(*more than high school* or *worse off*)

c. *P*(*better off* or *worse off*)

a. 0.78
b. 0.55
c. 0.79