Name: _____

MATH 108
Spring 2023
HW 6: Due 03/01

"Life is a school of probability."
– Walter Bagehot

Problem 1. (10pt) The probabilities of several events in a finite probability space are given below:

$$\begin{aligned} P(A) &= 0.30 \quad P(B \text{ and } C) = 0.15 \\ P(B) &= 0.55 \quad P(D \mid A) = 0.10 \\ P(C) &= 0.75 \quad P(B \text{ and } D) = 0.01 \\ P(D) &= 0.25 \quad P(C \text{ and } D) = 0.00 \end{aligned}$$

(a) Assuming that A and B are independent, find $P(A \text{ or } B)$.

(b) Find $P(C \mid B)$.

(c) Are A and C disjoint? Explain.

(d) Are B and D independent? Explain.

(e) Find $P(A \text{ and } D)$.

Problem 2. (10pt) At a small community college, the number of times students accessed tutoring resources available to them during a semester is summarized in the table below.

	Never	1 – 2	3 – 5	> 5
Freshman	72	86	45	17
Sophomore	93	32	55	41
Junior	63	44	46	19
Senior	97	9	15	11

Based on the table above and showing all your work, answer the following:

(a) Find the probability that a randomly selected student never went to tutoring.

(b) Find the probability that a randomly selected student is a Junior.

(c) Find the probability that a randomly selected student went to tutoring once to two times or was a Sophomore.

(d) Find the probability that a randomly selected Senior went to tutoring more than five times.

(e) If a student was a Freshman, find the probability that they went to tutoring at most five times.

Problem 3. (10pt) At a local car dealership, there are 460 cars in the lot. Of these cars, 45 of them are electric vehicles and 126 of them are SUVs. There are also 3 which are electric SUVs.

(a) Find the probability that a randomly selected car was an electric vehicle.

(b) Find the probability that a randomly selected car was an electric vehicle or an SUV.

(c) Find the probability that a randomly selected car was neither an electric vehicle nor an SUV.

(d) If a randomly selected car was an SUV, what is the probability that it was electric?

(e) Find the probability that a randomly selected car was a non-SUV, electric vehicle.

Problem 4. (10pt) You randomly assign delivery trucks routes to make their deliveries around the community. Of these routes, 40% of them are highways, while the rest of them are surface streets. If a delivery truck takes the highway, they make their deliveries on-time 90% of the time. If a delivery truck takes surface streets, they make their delivery on-time 85% of the time.

(a) What percent of deliveries are on-time?

(b) What percent of deliveries are on-time or use surface streets?

(c) What percent of deliveries use highways?

(d) What percent of deliveries that use the highway are on-time?

(e) What percent of deliveries that are on-time use the highway?