

Name: _____

MATH 108

Spring 2023

HW 7: 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:

$$P(A) = 0.30 \quad P(B \text{ and } C) = 0.15$$

$$P(B) = 0.55 \quad P(D | A) = 0.10$$

$$P(C) = 0.75 \quad P(B \text{ and } D) = 0.01$$

$$P(D) = 0.25 \quad P(C \text{ and } D) = 0.00$$

- (a) Assuming that A and B are independent, find $P(A \text{ or } B)$.
- (b) Find $P(C | B)$.
- (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?