MAT 107: Exam 3 **Name:** _____
Winter – 2022
01/21/2023
Time Limit: '∞'

Write your name on the appropriate line on the exam cover sheet. This exam contains 11 pages (including this cover page) and 10 questions. Check that you have every page of the exam. Answer the questions in the spaces provided on the question sheets. Be sure to answer every part of each question and show all your work. If you run out of room for an answer, continue on the back of the page — being sure to indicate the problem number.

Question	Points	Score
1	10	
2	10	
3	10	
4	10	
5	10	
6	10	
7	10	
8	10	
9	10	
10	10	
Total:	100	

1. (10 points) Consider a finite probability space with...

$$\begin{array}{ll} P(A) = 0.35 & P(B \text{ and } D) = 0.15 \\ P(B) = 0.40 & P(A \text{ and } C) = 0.10 \\ P(C) = 0.65 & P(C \text{ and } D) = 0 \\ P(D) = 0.25 & \end{array}$$

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

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

   (c) Find $P(A \text{ or } C)$.

   (d) Are C and D independent events? Explain.

2. (10 points) Below is a summary of a survey of people about whether or not they preferred to shop in-person or online.

Age/Shopping	In-Person	Online
18 – 30	17	34
30 – 50	54	61
50+	40	22

   (a) Find the percentage of people surveyed that preferred to shop in-person or were 18–30.

   (b) Find the percentage of people surveyed that were 50+ and preferred to shop in-person.

   (c) Find the percentage of people surveyed that preferred to shop online, if they were 30–50.

3. (10 points) Fifty people were surveyed about whether they had read any news online or in print in the last month. Of these people, 27 said they had read news online, 11 said they read news in print, and 5 said they read both.

   (a) Find the probability that a randomly selected person surveyed read news only online in the last month.

   (b) Find the probability that a randomly selected person surveyed had read no news in the last month.

   (c) Find the probability that a randomly selected person surveyed that read news online in the last month had also read news in print in the last month.

4. (10 points) Suppose in a certain town, 51% of people are women and 49% are men. Of men, 56% tend to lean conservative while only 52% of women lean conservative.

   (a) Find the probability that a randomly selected person in the town leans conservative.

   (b) Find the probability that a randomly selected person in the town is a woman or leans conservative.

   (c) Find the probability that a randomly selected person in the town is a man, assuming they do not lean conservative.

5. (10 points) A certain professor's Wordle scores are given below:

# Guesses	1	2	3	4	5	6
Times Occurred	0	2	17	48	39	5

Find the average number of guesses it takes the professor to guess the word, i.e. the expected number of guesses.

6. (10 points) Consider the following dataset:

$$\begin{array}{cccccccccccccccccc} & -4 & & 10 & & 1 & & 8 & & 8 & & 21 & & 17 & & 2 & & 0 & \\ 6 & & 14 & & -3 & & 9 & & 11 & & 20 & & 12 & & 13 & & -6 & & 16 \end{array}$$

(a) Find the 5-number summary.

(b) Find the IQR.

(c) Find P_{32}.

7. (10 points) Consider the following dataset:

$$2 \quad 4 \quad 4 \quad 9$$

(a) Find the mean.

(b) Find the standard deviation.

8. (10 points) Suppose that the amount of time teenagers spend on their phone per week is normally distributed with mean 752 and standard deviation 279.

   (a) Find the percentage of teens that spend less than 600 minutes on their phone.

   (b) Find the percentage of teens that spend more than 600 minutes on their phone.

   (c) How many minutes would a teen minimally need to spend on their phone to be in the greatest 20% of minutes teenagers spend on their phone per week?

9. (10 points) Suppose that a certain model of car gets an average of 38.6 miles per gallon (mpg) with standard deviation 4.2 mpg. If you took a simple random sample of 45 cars, what is the probability that their average miles per gallon was less than 38 mpg?

10. (10 points) Suppose that only 3% of people can identify Moldova on a map. If you randomly surveyed 490 people, what is the probability that more than 8 people surveyed could identify Moldova on a map?