

Math 141 Week in Review
Week 8 Problem Set

1. For the following random variables, list the values that X can assume and state whether it is finite discrete, infinite discrete, or continuous.
 - A. Let X be the number of times you throw before you hit the bull's eye while playing darts.
 - B. Let X be the amount of water (in liters) that a person drinks each week.
 - C. Cards are drawn from a standard deck of cards with replacement until a king is drawn. Let X be the number of draws needed.
 - D. Bingo numbers are drawn out of a bag without replacement until B1 is called. Let X be the number of draws needed. (There are 75 total bingo numbers.)
 - E. Three marbles are pulled in succession with replacement from a jar containing 3 red, 2 blue, and 5 green. Let X be the number of blue marbles pulled.
 - F. Let X be the distance (in miles) between College Station and a student's hometown.

2. Two 4-sided die are rolled and the numbers are observed. Let X be the product of the numbers rolled.
 - A. Find the sample space for this experiment.
 - B. What are the possible values of X ?
 - C. Find the probability distribution for X .
 - D. Draw a histogram of this distribution.
 - E. What is $P(X \geq 8)$?

3. In a bag of 20 Starbursts, it is known that 7 are orange. A sample of 5 Starbursts is selected at random from the bag. Let X be the number of oranges selected.
 - A. Find the probability distribution of X .
 - B. Draw a histogram for X .
 - C. What is $P(X < 3)$?
 - D. Find the expected value of X .
 - E. What are the variance and standard deviation for this probability distribution?

4. Data is given below showing the age and number of cars of that age taken from a study of 2000 cars on a university campus. (Modified from Finite Mathematics by Waner/Costenoble)

Age of Car (in yrs)	0	1	2	3	4	5	6	7	8	9	10
Number of Cars	140	350	450	650	200	120	50	10	5	15	10

- A. Find the mean, median, mode, variance, and standard deviation for the age of a car.
- B. Let X be the age of a randomly selected car. Find the probability distribution of X .

5. Suppose the probability that a person likes sushi is 0.53.
- A. What are the odds that a person likes sushi?
 B. What are the odds that a person does NOT like sushi?
6. A gambler wants to bet on a horse race. There are 6 horses entered in the race. The odds of each horse winning are given below.

Horse	A	B	C	D	E	F
Odds	1 to 19	2 to 3	1 to 3	3 to 17	1 to 9	1 to 19

- A. Suppose the gambler places a \$20 bet on Horse B. If Horse B wins the race, the gambler gets \$45. Otherwise, he wins nothing. What are the expected net winnings for the gambler?
 B. Suppose the gambler places a \$30 bet on Horse A. If Horse A wins the race, the gambler gets \$150. Otherwise, he wins nothing. What are the expected net winnings for the gambler?
 C. Suppose the gambler wants to place a bet on Horse E. He knows that if Horse E wins, he will get an amount of money equal to 3 times his bet plus an extra \$140. How much should he bet so that this “game” would be considered fair?
7. A game at a carnival costs \$4 to play. The game consists of first tossing a coin. If a tail is tossed, the game is over and you win nothing. If a head is tossed, then a tile is selected from a bag of tiles containing one tile for every letter of the alphabet. If a vowel is selected, you win \$15. If w is selected, you win \$40. If l , m , or n is selected, you win \$5. If the dreaded x is selected, you have to pay an extra \$1. Otherwise, you win nothing. What are the expected net winnings for a person who plays this game? Is this game fair?
8. A car insurance policy covers damages from a car accident. If you get in an accident, the insurance company pays \$1500 for your car.
- A. Suppose your monthly payment is \$110 and the probability that you get in an accident is 0.05. What is the insurance company's expected gain?
 B. Suppose that you provide an extra risk to the insurance company because the probability that you get in an accident is 0.15. If the insurance company requires an expected gain that is greater than or equal to 0, what would be your minimum monthly payment?