DISCRETE PMF

TEXT:

1 (6 points)**.** Let the variable X have the following probability mass function:

x	$P(X = x)$	$P(X \leq x)$
1	0.80	
10		
25	0.06	
100	0.04	

(a) Complete the table above by finding the probability $P(X = 10)$.

(b) Complete the table above by constructing the cumulative distribution function for X.

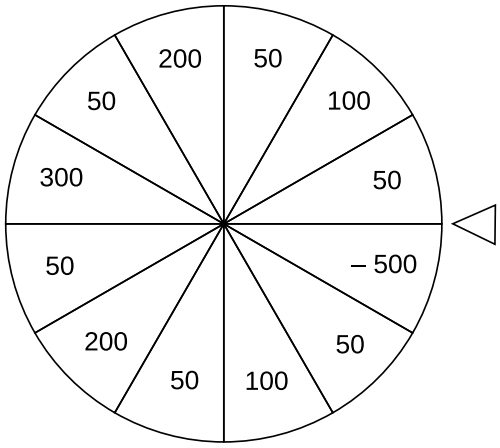
(c) Find the expected value of X.

(d) Find $P(X \leq 10)$

(e) Find $P(X > -1)$

(f) Find $P(X$ is odd$)$

2 (3 points)**.** Consider a casino game where the player spins the prize wheel with 12 sectors, each of equal angular measure. Each sector has the prize amount written on it (in points), and the amounts are as pictured.



(a) Construct the probability mass function for the number of points.

(b) Find the expected value for the number of points.

3 (3 points)**.** A car dealer records how many cars they sold on a given day, for ten days:

Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue
1	0	3	1	1	0	7	4	0	1

(a) Based on this data, construct an empirical probability mass function for the number of cars sold per day.

(b) Find the expected number of cars the dealer can sell per day.

4 (3 points)**.** Consider a casino game where three fair coins are tossed, and then the player receives $1 for each one that shows Heads, unless all three coins show Tails, and then the player has to pay the casino $13.

(a) Construct the probability mass function for the total profit in this game.

(b) Find the expected value for the profit. Is the game worth playing?

5 (3 points)**.** Denzel pays $5 for a lottery ticket, and has to guess a random three-digit number, from 000 to 999. If Denzel guesses first two digits and misses the last one, then he can collect $20. If Denzel guesses all three digits, then he can collect $1000. In all other cases Denzel wins nothing.

(a) Construct the probability mass function for the total profit in this game. (The profit is the winnings minus the five dollars for the ticket.)

(b) Find the average amount Denzel wins or loses every time he plays the game. Is the game worth playing?

6. Find the standard deviation $\sigma_X = \sqrt{E(X^2) - (EX)^2}$ for every random variable in this lab.

(1)

(2)

(3)

(4)

(5)