

Week-9 Discrete Variable Distributions

Answer the following questions

1. Discrete Random variables have countable values. (True or False)
2. Classify each random variable as either discrete or continuous
 - a. The time between customers entering a checkout lane at a retail store.
 - b. The weight of refuse on a truck arriving at a landfill.
 - c. The number of passengers in a passenger vehicle on a highway at rush hour.
 - d. The number of clerical errors on a medical chart.
3. Determine whether or not the table is a valid probability distribution of a discrete random variable. Explain fully.

x	-2	0	2	4
$P(x)$	0.3	0.5	0.2	0.1

x	0.5	0.25	0.25
$P(x)$	-0.4	0.6	0.8

x	1.1	2.5	4.1	4.6	5.3
$P(x)$	0.16	0.14	0.11	0.27	0.22

4. A discrete random variable X has the following probability distribution :

x	77	78	79	80	81
$P(x)$	0.15	0.15	0.20	0.40	0.10

Compute each of the following quantities.

- a. $P(80)$
- b. $P(X > 80)$

- c. $P(X \leq 80)$
 - d. The mean μ of X
 - e. The variance σ^2 of X
 - f. The standard deviation σ of X
5. Determine whether or not the random variable X is a binomial random variable. If so, give the values of n and p . If not, explain why not.
- a. X is the number of dots on the top face of fair die that is rolled.
 - b. X is the number of hearts in a five-card hand drawn (without replacement) from a well-shuffled ordinary deck.
 - c. X is the number of defective parts in a sample of ten randomly selected parts coming from a manufacturing process in which 0.02% of all parts are defective.
 - d. X is the number of times the number of dots on the top face of a fair die is even in six rolls of the die.
 - e. X is the number of dice that show an even number of dots on the top face when six dice are rolled at once.
6. An English-speaking tourist visits a country in which 30% of the population speaks English. He needs to ask someone directions.
- a. Find the probability that the first person he encounters will be able to speak English.
 - b. The tourist sees four local people standing at a bus stop. Find the probability that at least one of them will be able to speak English.
7. If a patient is waiting for a suitable blood donor and the probability that the selected donor will be a match is 0.2, then find the expected number of donors who will be tested till a match is found including the matched donor.
8. Suppose you are playing a game of darts. The probability of success is 0.4. What is the probability that you will hit the bullseye on the third try?

