Assignment 2 Solution

PROBABILITY MODELS

Q1. Consider two events:

- EVENT A: where the first dice rolls 1
- Event B: where the second dice rolls 5

What is the probability of obtaining one on the first dice or five on the second dice?

Ans1.

a) 1/6 (Hint: possible outcomes for AUB/total number of sample outcomes)

b) 1/36 (Hint: possible outcomes for AUB/total number of sample outcomes)

c) 11/36 (Hint: possible outcomes for AUB/total number of sample outcomes)

d) 5/6 (Hint: possible outcomes for AUB/total number of sample outcomes)

Q2. Which of the following is correct if the two events are mutually exclusive?

a) P(A U B) = P(A) - P(B) (Hint: In case of mutually exclusive events, P(A ∩ B) = 0)
b) P(A U B) = P(A) + P(B) - P(A ∩ B) (Hint: In case of mutually exclusive events, P(A ∩ B) = 0)
c) P(A U B) = P(A) + P(B) + P(A ∩ B) (Hint: In case of mutually exclusive events, P(A ∩ B) = 0)
d) P(A U B) = P(A) + P(B) (Hint: In case of mutually exclusive events, P(A ∩ B) = 0)

Q3. When two events do not occur simultaneously; they are:

a) Joint Events (Hint: two events that are dependent on each other)

b) Mutually exclusive events (Hint: There is no intersection between the two events)

c) Independent events (Hint: the two unrelated events)

d) Complement events (Hint: Complement events are always mutually exclusive but not the other way round)

Q4. Which of the following distribution has a bell-shaped curve?

a) Normal Distribution (Hint: Mean, Mode, and median are same for bell-shaped curve)

b) Poison Distribution (Hint: Mean, Mode, and median are same for bell-shaped curve)

c) Binomial distribution (Hint: Mean, Mode, and median are same for bell-shaped curve)

d) None of the above

Q5. The formula for calculating standardized normal random variable is:

a) $\frac{X-\mu}{\sigma}$ **(μ= mean, and σ = standard deviation)**

b) $\frac{X-\sigma}{\mu}$(μ= mean, and σ = standard deviation)

c) $\frac{X+\mu}{\sigma}$(μ= mean, and σ = standard deviation)

d) $\frac{X+\sigma}{\mu}$(μ= mean, and σ = standard deviation)

Q6. Consider two events

Event A: where the first dice rolls even number

Event B: where the second dice rolls odd number

If two dice are thrown together, what is the probability of getting an even number on one dice and an odd number on the other dice?

Ans:

a) 1/4 (Hint: possible outcomes for AUB/total number of sample outcomes)

b) 3/4 (Hint: possible outcomes for AUB/total number of sample outcomes)

c) 3/5 (Hint: possible outcomes for AUB/total number of sample outcomes)

d) 1/2 (Hint: possible outcomes for AUB/total number of sample outcomes)

Q7. Given that E and F are events such that P(E) = 0.6, P(F) = 0.3 and P(E∩F) = 0.2, then P(E|F) ?

a) 2/3 (Hint: P(F|E) = P(E∩F) / P(E))

b) 1/3 (Hint: P(F|E) = P(E∩F) / P(E))

c) 3/4 (Hint: P(F|E) = P(E∩F) / P(E))

d) 1/4 (Hint: P(F|E) = P(E∩F) / P(E))

Q8. Binomial Distribution is a _____

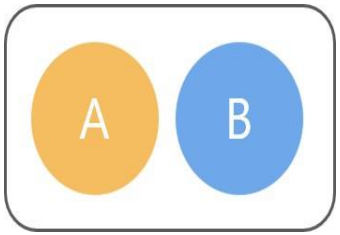
a) Continuous distribution (Hint: A probability distribution in which the random variable X can take on any value (is continuous)

b) Discrete distribution (Hint: discrete distribution is one in which the data can only take on certain values)

c) Normal distribution (Hint: continuous probability distribution that is symmetrical around its mean, most of the observations cluster around the central peak)

d) Not a Probability distribution

Q9. The given diagram shows:



a) Mutually exclusive events (Hint: mutually exclusive events do not occur at the same time)

b) Union of Events (Hint: the union of events A and B can be represented as A ∪ B or 'A or B')

c) Intersection Events (Hint: This is a composite event with the intersection of two events represented by (A ∩ B))

d) Complementary Events (Hint: The probability of event A and its complement is 1)

Q10. Assume a normal distribution with a mean of 'μ' and standard deviation given by 'σ'. What is the probability of X lying between μ-2σ and μ+2σ?

a) 50% (Hint: the probability of X lying between (μ-σ and μ+σ) and (μ-3σ and μ+3σ) is 68% and 99.7% respectively)

b) 100% (Hint: the probability of X lying between (μ-σ and μ+σ) and (μ-3σ and μ+3σ) is 68% and 99.7% respectively)

c) 75% (Hint: the probability of X lying between (μ-σ and μ+σ) and (μ-3σ and μ+3σ) is 68% and 99.7% respectively)

d) 95% (Hint: the probability of X lying between (μ-σ and μ+σ) and (μ-3σ and μ+3σ) is 68% and 99.7% respectively)