Notes

- $P(\phi)=0$
- If E be an event then Probability of non-happening of E is denoted by $P(\bar{E})$ or $P(E')$ and is given by $P(\bar{E})=1-P(E)$.
- $P(\bar{A}\cap B)=P(B)-P(A\cap B)$
- $P(A\cup B)=P(A)+P(B)-P(A\cap B)$

  If A and B are mutually exclusive then $A\cap B=\phi \Rightarrow P(A\cap B)=0$

  Then $P(A\cup B)=P(A)+P(B)$

- $P(A\cup B\cup C)=P(A)+P(B)+P(C)-P(A\cap B)-P(B\cap C)-P(C\cap A)+P(A\cap B\cap C)$

  If A, B and C are mutually exclusive then $P(A\cup B\cup C)=P(A)+P(B)+P(C)$

Conditional Probability

Let A and B be any two events of a random experiment. Then Probability of occurrence of A given that B has already occurred is denoted by P(A/B) and is defined as

$$P\left(A/B\right) = \frac{P(A \cap B)}{P(B)}, \quad P(B) \neq 0$$

Properties

Let A and B be any two events of a sample space S then

$$P\left(S/B\right) = P\left(B/B\right) = 1$$

$$P\left((A \cup B)/F\right) = P\left(A/F\right) + P\left(B/F\right) - P\left((A \cap B)/F\right)$$

$$P\left(E'/F\right) = 1 - P\left(E/F\right)$$

Questions

1. A pair of dice is rolled, find $P(A/B)$ if

   A : 3 appears on one die

   B : sum of number appearing is 7

2. A card is drawn from a well shuffled deck of 52 cards and then a second card is drawn, find

   The probability that the first card is a spade and then second card is a club if the first card is not replaced.\