Answer on Question #42090 – Math - Statistics and Probability

The card is taken out from a pack of 52 cards. The selection of each cards is equiprobable. In which of the following cases the events A and B are independent.

i. A: “The card drawn is a diamond”

B: “The card drawn is a knave”

ii. A: “The card drawn is a red”

B: “The card drawn is a queen”

iii. A: “The card drawn is a queen or king”

B: “The card drawn is a king or knave”

Solution

The probability of A or B is $P(A) + P(B) - P(A \; and \; B)$. If the events A and B are independent $P(A \; and \; B) = 0$.

i. A: “The card drawn is a diamond”

B: “The card drawn is a knave”

The events A and B are independent, because $P(A \; and \; B) = 0$ (a card cannot be a diamond and be a knave).

ii. A: “The card drawn is a red”

B: “The card drawn is a queen”

The events A and B are not independent, because $P(A \; and \; B) \neq 0$ (a card can be a red and be a queen - queen of diamonds and queen of hearts).

iii. A: “The card drawn is a queen or king”

B: “The card drawn is a king or knave”

The events A and B are not independent, because $P(A \; and \; B) \neq 0$ (a card can be a king in both cases).

Answer: i.