

- 1) Prove or disprove, $P(A|B') = 1 - P(A|B)$ when $0 < P(B) < 1$.
- 2) Prove or disprove, $P(A|B \cup C) = P(A|B) + P(A|C) - P(A|B \cap C)$, when $P(B \cap C) > 0$.
- 3) Find $P(A|B)$ when $A \subseteq B$ and $P(B) > 0$.
- 4) Let A, B have positive probabilities. If A, B are independent then what are the values of $P(A|B)$ and $P(B|A)$?
- 5) Let A, B have positive probabilities. If $P(A) \leq P(A|B)$ then prove that $P(B) \leq P(B|A)$.
- 6) If A, B are independent then find $P(A'|B')$.
- 7) When A, B are disjoint events, with $P(B) > 0$, what are $P(A|B)$ and $P(A|A \cup B)$?
- 8) There are three boxes, A, B, C , such that box A has 10 red and 16 green balls, box B has 11 red and 15 green balls, and box C has 12 red and 14 green balls. A box is selected at random and from the selected box a ball is drawn at random. What is the probability that the drawn ball is red?
- 9) Three branches (factories) of a firm, A, B, C , respectively produce 50%, 40% and 10% of the total output of the firm. The percentages of the defective output of these factories are respectively 3%, 2% and 1%. An item is selected at random from the pooled output of the three factories and is found to be defective. What is the probability that it was manufactured by factory A ?
- 10) USB Flash-drives were imported from four countries, C_1, C_2, C_3, C_4 . The percentage of the total amount imported from the respective countries were 30%, 40%, 20%, 10%. The drives were then packed into small identical looking packages. Each package contained drives from only one country. Certain proportions of the drives were faulty. The percentage of faulty drives from the respective four countries were 3%, 2%, 1%, 1%. Out of one package, five drives were checked and 2 of them turned out to be faulty. What is the probability that the package came from country C_1 ?
- 11) A box contains two green and four red balls. Two balls are randomly drawn one after the other without replacement.
 - a) What is the probability that the second ball is red?
 - b) What is the probability that the second ball is red given that the first ball was red?
 - c) What is the probability that the first ball was red given that the second ball drawn was red?