**Questions:**

**Question 1:** A bag contains 3 red and 2 blue balls. Two balls are drawn one after the other without replacement. What is the probability that the second ball drawn is red given that the first ball drawn was red?

**Question 2:** A school has 60% male and 40% female students. 30% of the male students and 20% of the female students are in the honor roll. What is the probability that a randomly chosen honor roll student is male?

**Question 3:** In a deck of 52 cards, what is the probability that a card drawn is a spade given that it is a face card?

**Question 4:** A factory has two machines. Machine A produces 70% of the items and has a defect rate of 5%. Machine B produces 30% of the items and has a defect rate of 10%. What is the probability that an item is defective given that it was produced by Machine A?

**Question 5:** If the probability that it will rain tomorrow is 0.3 and the probability that it will rain tomorrow given that it is cloudy today is 0.6, what is the probability that it will be cloudy today?

**Answers:**

1. P(First Ball being Red) = 3/5 = 0.6

P(Second Ball being Red) = 2/4 = 0.5

P(Second ball being red AND first being red) = 0.6\*0.5 = 0.3

P(Second Ball being red | First was red) = P(First AND Second)/P(First) = 0.3/0.6 = 0.5.

1. P(Males) = 6/10 = 0.6

P(Females) = 4/10 = 0.4

P(Honours who are male) = 3/10 = 0.3

P(Honours who are female) = 2/10 = 0.2

P(Honours), Using total probability = P(H|M).P(M) + P(H|F). P (F)

= 0.3\*0.6 + 0.2\*0.4

= 0.26

P(M|H) = P(M).P(H|M) / P(H) = 0.6\*0.3/0.26 = 0.69 = 69%

1. P(S|F) = P(S AND F)/P(F) = 3/52 / 12/52 = 1/4 = 0.25
2. The answer is already provided in the question. Probability that an item is defective given that it was produced by A is = 5%.
3. Probability that it is cloudy today = 0.5.