1.One of two boxes contains 4 red balls and 2 green balls and the second box contains 4 green and two red balls. By design, the probabilities of selecting box 1 or box 2 at random are 1/3 for box 1 and 2/3 for box 2.  
A box is selected at random and a ball is selected at random from it.  
a) Given that the ball selected is red, what is the probability it was selected from the first box?  
b) Given that the ball selected is red, what is the probability it was selected from the second box?

Answer-

1.a)1/2 b)1/2

2. 1% of a population have a certain disease and the remaining 99% are free from this disease. A test is used to detect this disease. This test is positive in 95% of the people with the disease and is also (falsely) positive in 2% of the people free from the disease.  
If a person, selected at random from this population, has tested positive, what is the probability that she/he has the disease?

Answer:- 0.32

3. Three factories produce light bulbs to supply the market. Factory A produces 20%, 50% of the tools are produced in factories B and 30% in factory C.  
2% of the bulbs produced in factory A, 1% of the bulbs produced in factory B and 3% of the bulbs produced in factory C are defective.  
A bulb is selected at random in the market and found to be defective. what is the probability that this bulb was produced by factory B?  
  
Answer:-0.277

4. A radar system is designed such that the probability of detecting the presence of an aircraft in its range is 98%. However if no aircraft is present in its range it still report (falsely) that an aircraft is present with a probability of 5%. At any time, the probability that an aircraft is present within the range of the radar is 7%.  
a) What is the probability that no aircraft is present in the range of the radar given that an aircraft is detected?  
b) What is the probability that an aircraft is present in the range of the radar given that an aircraft is detected?

c) What is the probability that an aircraft is present in the range of the radar given that no aircraft is detected?  
d) What is the probability that no aircraft is present in the range of the radar given that no aircraft is detected?

Answer:-

4.a) 0.40

b) 0.59

c) 0.0016

d) 0.9984

5. In the email the word ‘offer’ occurs in 80% of the spam messages in my account. Also, let’s assume ‘offer’ occurs in 10% of my desired e-mails. If 30% of the received e-mails are considered as a scam, and I will receive a new message which contains ‘offer’, what is the probability that it is spam?

Answer:-0.774

6. a diagnostic test has 99% accuracy and 60% of all people have Covid-19. If a patient tests positive, what is the probability that they actually have the disease?

Answer:-0.993

7.  has two bags. Bag I has 7 red and 2 blue balls and bag II has 5 red and 9 blue balls. Amy draws a ball at random and it turns out to be red. Determine the probability that the ball was from the bag I using the Bayes theorem.

Answer: 0.64

8.  that the chances of a person having a skin disease are 40%. Assuming that skin creams and drinking enough water reduces the risk of skin disease by 30% and prescription of a certain drug reduces its chance by 20%. At a time, a patient can choose any one of the two options with equal probabilities. It is given that after picking one of the options, the patient selected at random has the skin disease. Find the probability that the patient picked the option of skin screams and drinking enough water using the Bayes theorem.

Answer:-0.47

9. **A man is known to speak the truth 3/4 times. He draws a card and reports it is king. Find the probability that it is actually a king.**

Answer:-0.5

1.What is the probability of selecting two queen cards from the deck of 52 cards?

Ans.-1/221

2. What is the probability of selecting two black cards from the deck of 52 cards?

Ans.25/102

3. There are 12 balls in the pool. 6 balls are blue and the rest are red. Two of the balls are picked up from the pool without replacement. What is the probability of selecting two red balls from the pool?

Ans.-5/22

4. There are 8 blue, 7 green, and 6 red-colored pens in a packet. Suppose you draw 2 pens at random from the packet and do not replace them. You then draw another pen. What is the probability that two pens drawn are green and one is red?

Ans.- 18/570

5. In a class, 35% of the students study science and history. 65% of the students study science. What is the probability of a student studying history given he/she is already studying science?

Ans.- 0.53