

CONDITIONAL PROBABILITY

1. From a pack of 52 cards, two are drawn one by one without replacement. Find the probability that both of them are kings. [Ans. 1/221]
2. From a pack of 52 cards, 4 are drawn one by one without replacement. Find the probability that all are aces. [Ans. 1/270725]
3. Find the chance of drawing 2 white balls in succession from a bag containing 5 red 7 white balls, the ball first drawn not being replaced. [Ans. 7/22]
4. A bag contains 25 tickets, numbered from 1 to 25. A ticket is drawn and then another ticket is drawn without replacement. Find the probability that both tickets will show even numbers. [Ans. 11/50]
5. From a deck of cards, three cards are drawn one by one without replacement. Find the probability that each time it is a card spade. [Ans. 11/850]
6. Two cards are drawn without replacement from a pack of 52 cards. Find the probability that:
(i) Both are kings (ii) the first is king and the second is an ace (iii) the first is a heart and second is red. [Ans. (i) 1/221 (ii) 4/663 (iii) 25/204]
7. A bag contains 20 tickets, numbered from 1 to 20. Two tickets are drawn without replacement. What is the probability that the first ticket has an even number and the second an odd number. [Ans. 5/19]
8. An urn contains 3 white, 4 red 5 black balls. Two balls are drawn one by one without replacement. What is the probability that at least one ball is black? [Ans. 15/22]
9. A bag contains 5 white, 7 red and 3 black balls. If three balls are drawn one by one without replacement, find the probability that none is red. [Ans. 8/65]
10. 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 heart and the second card is diamond if the first card is not replaced. [Ans. 13/204]
11. An urn contains 10 black and 5 white balls. Two balls are drawn from the urn one after the other without replacement. What is the probability that both drawn balls are black? [Ans. 3/7]
12. Three cards are drawn successively, without replacement from a pack of 52 well shuffled cards. What is the probability that first two cards are kings and third card drawn is an ace? [Ans. 2/5525]
13. A box of orange is inspected by examining three randomly selected oranges drawn without replacement. If all the three oranges are good, the box is approved for sale otherwise it is rejected. Find the probability that a box containing 15 oranges out of which 12 are good and 3 are bad ones will be approved for sale. [Ans. 44/91]
14. A bag contains 4 white, 7 black and 5 red balls. Three balls are drawn one after the other without replacement. Find the probability that the balls drawn are white, black and red respectively. [Ans. 1/24]

15. If $P(A) = \frac{7}{13}$, $P(B) = \frac{9}{13}$ and $P(A \cap B) = \frac{4}{13}$, find $P(A/B)$. [Ans. 4/9]
16. If A and B are events such that $P(A) = 0.6$, $P(B) = 0.3$ and $P(A \cap B) = 0.2$, find $P(A/B)$ and $P(B/A)$. [Ans. 2/3, 1/3]
17. If A and B are two events such that $P(A \cap B) = 0.32$ and $P(B) = 0.5$, find $P(A/B)$. [Ans. 0.64]
18. If $P(A) = 0.4$, $P(B) = 0.8$, $P(B/A) = 0.6$. Find $P(A/B)$ and $P(A \cup B)$. [Ans. 0.3, 0.96]
19. If A and B are two events such that
 $P(A) = \frac{1}{3}$, $P(B) = \frac{1}{4}$ and $P(A \cup B) = \frac{5}{12}$, find $P(A/B)$ and $P(B/A)$. [Ans. 2/3, 1/2]
20. $P(A) = \frac{6}{11}$, $P(B) = \frac{5}{11}$ and $P(A \cup B) = \frac{7}{11}$, find $P(A \cap B)$, $P(A/B)$, $P(B/A)$. [Ans. 4/11, 4/5, 2/3]
21. $P(A) = \frac{7}{13}$, $P(B) = \frac{9}{13}$ and $P(A \cap B) = \frac{4}{13}$, find $P(\frac{\bar{A}}{B})$. [Ans. 5/9]
22. $P(A) = \frac{1}{2}$, $P(B) = \frac{1}{3}$ and $P(A \cap B) = \frac{1}{4}$, find $P(A/B)$, $P(B/A)$, $P(\bar{A}/B)$ and $P(\bar{A}/\bar{B})$. [Ans. 3/4, 1/2, 1/4, 5/8]
23. If A and B are two events such that $2P(A) = P(B) = \frac{5}{13}$ and $P(A/B) = \frac{2}{5}$, find $P(A \cup B)$. [Ans. 11/26]
24. If $P(A) = \frac{6}{11}$, $P(B) = \frac{5}{11}$ and $P(A \cup B) = \frac{7}{11}$, find (i) $P(A \cap B)$ (ii) $P(A/B)$ (iii) $P(B/A)$. [Ans. (i) 4/11, (ii) 4/5, (iii) 2/3]
25. A coin is tossed three times. Find $P(A/B)$ in each of the following:
 A = head on third toss, B = heads on first two tosses. [Ans. 1/2]
26. A = at least two heads, B = at most two heads. [Ans. 3/7]
27. A = at most two tails, B = at least one tail. [Ans. 6/7]
28. Two coins are tossed once. Find $P(A/B)$ in each of the following:
 A = tail appears on one coin, B = one coin shows head. [Ans. 1]
29. A = no tail appears, B = no head appears. [Ans. 0]
30. A die is thrown three times. Find $P(A/B)$ and $P(B/A)$, if
 A = 4 appears on the third toss, B = 6 and 5 appear respectively on the first two tosses. [Ans. 1/6, 1/36]
31. Mother, father and son line up at random for a family picture. If A and B are two events given by
 A = son on one end, B = father in middle, find $P(A/B)$ and $P(B/A)$. [Ans. 1, 1/2]
32. A dice is thrown twice and the sum of numbers appearing is observed to be 6. What is the conditional probability that the number 4 has appeared at least once? [Ans. 2/5]
33. Two dice are thrown. Find the probability that the numbers appeared has the sum 8, if it is known that the second die always exhibits 4. [Ans. 1/6]
34. A pair of dice is thrown. Find the probability of getting 7 as the sum, if it is known that the second die always exhibits an odd number. [Ans. 1/6]
35. A pair of dice is thrown. Find the probability of getting 7 as the sum, if it is known that the second die always exhibits a prime number. [Ans. 1/6]

36. A die is rolled. If the outcome is an odd number, what is the probability that it is prime? **[Ans. 2/3]**
37. A pair of dice is thrown. Find the probability of getting the sum 8 or more, if 4 appears on the first die. **[Ans. 1/2]**
38. Find the probability that the sum of number showing on two dice is 8, given that at least one dies does not shoe five. **[Ans. 3/25]**
39. Two numbers are selected at random from integers 1 through 9. If the sum is even, find the probability that die does not show five. **[Ans. 5/8]**
40. A die is thrown twice and the sum of the numbers appearing is observed to be 8. What is the conditional probability that the number 5 has appeared at least once? **[Ans. 2/5]**
41. A die is thrown three times. Events A and B are defined as follows:
A: 4 on the third throw, B: 6 on the first and 5 on the second throw. **[Ans. 1/6]**
42. Three dice are thrown at same time. Find the probability of getting three two's if it is known that the sum of the numbers on the dice was a six. **[Ans. 1/10]**
43. Two dice are thrown and it is known that the first die shows a 6. Find the probability that the sum of the numbers showing on two dice is 7. **[Ans. 1/6]**
44. A pair of dice is thrown. Let E be the events that the sum is greater than or equal to 10 and F be the event "5 appear on the first die". Find P (E/F). If F is the event "5 appear on at least one die", find P (E/F). **[Ans. 1/3, 3/11]**
45. The probability that a student selected at random from a class will pass in mathematics is 4/5, and the probability that he/ she passes in mathematics and computer science is 1/2. What is the probability that he/ she pass in computer science if it is known that he/she has passed in mathematics? **[Ans. 5/8]**
46. The probability that a certain person will buy a shirt is 0.2, the probability that he will buy a trouser is 0.3, and the probability that he will buy a shirt given that he buys a trouser is 0.4. Find the probability that he will buy both a shirt and a trouser. Find also the probability that he will buy a trouser given that he buys a shirt. **[Ans. 0.12, 0.6]**
47. In a school there are 1000 students, out of which 430 are girls. It is known that out of 430, 10% of girls study in class XII. What is the probability that a student chosen randomly studies in class XII given that the chosen students is a girl? **[Ans. 1/10]**
48. In a hotel 60% of students read HINDI newspaper, 40% read ENGLISH newspaper and 20% read both HINDI and ENGLISH newspapers. A student is selected at random.
49. Find the probability that she read neither HINDI nor ENGLISH news paper.
50. If she reads HINDI newspaper, find the probability that she reads ENGLISH newspaper.

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51. If she reads ENGLISH newspaper, find the probability that she reads h
52. Ten cards numbered 1 through 10 are placed in a box, mixed up thoroughly and then one card is drawn randomly. If it is known that the number on the drawn card is more than 3, what is the probability that it is an even number?
[Ans. 4/7]
53. Assume that each born child is equally likely to be a boy or a girl. If a family has two children what is the constitutional probability that both are girls? Given that (i) the youngest is girl (ii) at least one is girl.
[Ans. (i) 1/2 (ii) 1/3]
54. Consider the experiment of tossing a coin. If the coin shows head toss it again but if it shows tail then throw a die. Find the conditional probability of the event 'the die shows a number greater than 4, given that 'there is at least one tail'.
[Ans. 2/9]
55. Consider the experiment of throwing a die, if a multiple of 3 comes up throw the die again and if any other number comes toss a coin. Find the conditional probability of event 'the coin shows a tail', given that 'at least one die show a 2'.
[Ans. 3/8]

