CBSE Test Paper 05

Chapter 15 Probability

1. A girl has a cube one letter written on each face, as shown below: M, N, P, M, N, M The cube is thrown once. The probability of getting M is **(1)**
   a. $\frac{1}{3}$
   b. $\frac{1}{5}$
   c. $\frac{1}{2}$
   d. $\frac{1}{4}$
2. If P(E) = 0.05, what will be the probability of 'not E'? **(1)**
   a. 0.55
   b. 0.59
   c. 0.95
   d. 0.095
3. A bag contains 50 balls of which 2x are red, 3x are white and 5x are blue. A ball is selected at random. The probability that it is not white is **(1)**
   a. $\frac{7}{10}$
   b. $\frac{2}{5}$
   c. $\frac{7}{45}$
   d. $\frac{3}{5}$
4. From a well-shuffled pack of 52 cards, one card is drawn at random. The probability of getting a face card is **(1)**
   a. $\frac{4}{13}$
   b. $\frac{3}{13}$
   c. $\frac{2}{13}$
   d. $\frac{6}{13}$
5. A card is drawn from a pack of 52 cards at random. The probability of getting either an ace or a king card is **(1)**
   a. $\frac{3}{13}$
   b. $\frac{8}{13}$
   c. $\frac{2}{13}$
   d. $\frac{4}{13}$

6. If the probability of winning a game is 0.7, what is the probability of losing it? **(1)**
7. A bag contains lemon flavoured candies only. Shalini takes out one candy without looking into the bag. What is the probability that she takes out an orange flavoured candy? **(1)**
8. Red queens and black jacks are removed from a pack of 52 playing cards. A card is drawn at random from the remaining cards, after reshuffling them. Find the probability that the drawn card is **(1)**
   i. a king,
   ii. of red colour,
   iii. a face card,
   iv. a queen.
9. Cards marked with number 3, 4, 5, ……., 50 are placed in a box and mixed thoroughly. A card is drawn at random from the box. Find the probability that the selected card bears a perfect square number. **(1)**
10. A black die and a white die are thrown at the same time. Write all the possible outcomes. What is the probability that the numbers obtained have a product less than 16? **(1)**
11. A box contains 5 red marbles, 8 white marbles and 4 green marbles. One marble is taken out of the box at random. What is the probability that the marble taken out will be:(i) red? (ii) white? (iii) not green? **(2)**
12. Two dice are numbered 1, 2, 3 ,4 ,5 , 6 and 1, 2, 2, 3, 3, 4 respectively. They are thrown and the sum of the numbers on them is noted. Find the probability of getting (i) sum 7 (ii) sum is a perfect square. **(2)**
13. A bag contains 3 red and 2 blue marbles. A marble is drawn at random. What is the probability of drawing a blue marble? **(2)**
14. Cards marked with the numbers 2 to 101 are placed in a box and mixed thoroughly. One card is drawn from this box. Find the probability that the number on the card is: **(3)**
   i. an even number
   ii. a number less than 14
   iii. a number which is a perfect square
   iv. a prime number less than 20.
15. There are 100 cards in a bag on which numbers from 1 to 100 are written. A card is

taken out from the bag at random. Find the probability that the number on the selected card **(3)**

i. is divisible by 9 and is a perfect square.
ii. is a prime number greater than 80.

16. Peter throws two different dice together and finds the product of the two numbers obtained. Rina throws a die and squares the number obtained. Who has the better chance to get the numbers 25? **(3)**
17. The king, queen and jack of club are removed from a deck of 52 cards. Then the cards are well-shuffled. One card is drawn at random from the remaining cards. Find the probability of getting **(3)**
    i. a heart
    ii. a king
    iii. a club
    iv. a '10 'of hearts.
18. A card is drawn at random from a well-shuffled deck of 52 cards. Find the probability of getting **(4)**
    i. a queen
    ii. a diamond
    iii. a king or an ace
    iv. a red ace.
19. Two customers Shyam and Ekta are visiting a particular shop in the same week (Tuesday to Saturday). Each is equally likely to visit the shop on any day as on another day. What is the probability that both will visit the shop on (i) the same day? (ii) consecutive days? (iii) different days? **(4)**
20. A dice is thrown twice. Find the probability that
    i. 5 may not come either time.
    ii. same number may not come on the dice thrown two times. **(4)**

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Solution

1. c. $\frac{1}{2}$

   Explanation: Number of possible outcomes (getting M) = 3

   Number of total outcomes = 6

   ∴ Required Probability = $\frac{3}{6} = \frac{1}{2}$

2. c. 0.95

   Explanation: We know that

   P(E) + P(not E) = 1

   ∴ P(not E) = 1 - P(E)

   = 1 - 0.05

   = 0.95

3. a. $\frac{7}{10}$

   Explanation: Here,

   $2x + 3x + 5x = 50 \Rightarrow 10x = 50 \Rightarrow x = 5$

   Number of red balls = 2 × 5 = 10

   Number of white balls = 3 × 5 = 15

   Number of blue balls = 5 × 5 = 25

   Now, Number of possible outcomes = 25 + 10 = 35

   And Number of total outcomes = 50 ∴ Required Probability = $\frac{35}{50} = \frac{7}{10}$

4. b. $\frac{3}{13}$

   Explanation: Face Cards are = 4 kings + 4 queens + 4 jacks = 12

   Number of possible outcomes = 12

   Number of Total outcomes = 52

   ∴ Required Probability = $\frac{12}{52} = \frac{3}{13}$

5. c. $\frac{2}{13}$

   Explanation: Number of Total outcomes = 52

   Number of aces and Number of kings = 4 + 4 = 8

   Required Probability = $\frac{8}{52} = \frac{2}{13}$

6. Let E be the event of winning the game. Then, P(E) = 0.7.
   Probability of losing the game = 1 - P(E) = (1 - 0.7) = 0.3.

7. ∵ Bag contains only lemon flavoured candies.
   So, getting an orange flavoured candy is impossible.
   probability $= \frac{Number\ of\ favorable\ outcome}{Total\ number\ of\ outcome}$
   ∴ P(orange flavoured candies) = $\frac{0}{1}$ = 0

8. After removing 2 red queens and 2 black jacks, the number of remaining cards = 52 - (2 + 2) = 48.

   i. Out of 48 cards, there are 4 kings.
      ∴ P(getting a king)$= \frac{4}{48} = \frac{1}{12}$
   ii. Number of cards of red colour = 26 - 2 = 24.
      Total number of cards = 48.
      ∴ P(getting a card of red colour)$= \frac{24}{48} = \frac{1}{2}$
   iii. Number of face cards = 12 - (2 + 2) = 8.
      Total number of cards = 48.
      ∴ P(getting a face card)$= \frac{8}{48} = \frac{1}{6}$
   iv. Number of queens in 48 cards = 4-2 = 2.
      ∴ P(getting a queen)$= \frac{2}{48} = \frac{1}{24}$.

9. Total number of cases = 48
   Possible outcomes are 4,9,16,25, 36,49, = 6.
   ∴ No. of favourable outcomes = 6
   Probablity of event happen P(E) $= \frac{Number\ of\ favourable\ outcomes}{Total\ number\ of\ outcomes}$
   $\Rightarrow$ P(perfect square number) = $\frac{6}{48}$
   $= \frac{1}{8}$

10. Consider the set of ordered pairs
    {(1,1)(1,2)(1,3)(1,4)(1,5)(1,6)
    (2,1)(2,2)(2,3)(2,4)(2,5)(2,6)
    (3,1)(3,2)(3,3)(3,4)(3,5)(3,6)
    (4,1)(4,2)(4,3)(4,4)(4,5)(4,6)
    (5,1)(5,2)(5,3)(5,4)(5,5)(5,6)}

Clearly, there are 36 elementary events.

∴ n(Total number of throws) = 36

Number of pairs such that the numbers obtained have a product less than 16 can be selected as listed below:

{(1,1)(1,2)(1,3)(1,4)(1,5)(1,6)

(2,1)(2,2)(2,3)(2,4)(2,5)(2,6)

(3,1)(3,2)(3,3)(3,4)(3,5)

(4,1)(4,2)(4,3)

(5,1)(5,2)(5,3)

(6,1)(6,2)}

Therefore, n(Favourable events) = 25

P(the number obtained appearing have a product less than 16) = $\frac{number\ obtained\ have\ a\ product\ less\ than\ 16}{Total\ number\ throws}$ = $\frac{25}{36}$

11. Total number of marbles in the box = 5 + 8 + 4 = 17

∴Total number of elementary events = 17

Proabibilty of the event $= \frac{Number\ of\ favourble\ outcomes}{Total\ number\ of\ possible\ outcomes}$

i. There are 5 red marbles in the box.

∴Favourable number of elementary events = 5

∴P (getting a red marble) = $\frac{5}{17}$

ii. There are 8 white marbles in the box.

∴Favourable number of elementary events = 8

∴P (getting a white marble) = $\frac{8}{17}$

iii. There are 5 + 8 = 13 marbles in the box, which are not green.

∴Favourable number of elementary events = 13

∴P (not getting a green marble) = $\frac{13}{17}$

12. Total possible outcomes $= 36$

i. Sum of number $= 7$

Favourable outcomes are (3, 4), (4, 3), (4, 3), (5, 2), (5, 2),(6, 1)

Favourable ways $= 6$

Probability that sum of number is 7 = $\frac{6}{36} = \frac{1}{6}$

ii. Sum is a perfect square i.e., sum is 4 or 9

Favourable outcomes are (1, 3), (1, 3), (2, 2), (2, 2), (5, 4), (6, 3), (6, 3) = 7

Probability = $\frac{7}{36}$

13. There 5 marbles in the bag. Out of these 5 marbles one can be chosen in 5 ways.

    Total number of elementary events = 5

    Since the bag contains 2 blue marbles.

    Therefore, one blue marble can be drawn in 2 ways.

    Favourable number of elementary events = 2

    Hence, P (Getting a blue marble) $= \frac{2}{5}$

14. There are 100 cards in the box out of which one card can be drawn in 100 ways.

    Total number of elementary events = 100

    i. From numbers 2 to 101, there are 50 even numbers, namely, 2, 4, 6, 8, ..., 100.

    Out of these 50 even numbered cards, one card can be chosen in 50 ways.

    Favourable number of elementary events = 50

    Hence, P (Getting an even numbered card)$= \frac{50}{100} = \frac{1}{2}$

    ii. There are 12 cards bearing numbers less than 14 i.e. numbers 2, 3, 4, 5, 13

    Favourable number of elementary events = 12

    Hence, required probability$= \frac{12}{100} = \frac{3}{25}$

    iii. Those numbers from 2 to 101 which are perfect squares are

    4,9,16,25,36,49,64,81,100 i.e.

    squares of 2,3,4,5,..., and 10 respectively.

    Therefore, there are 9 cards marked with the numbers which are perfect squares.

    Favourable number of elementary events = 9

    Hence, P (Getting a card marked with a number which is a perfect square)$= \frac{9}{100}$

    iv. Prime numbers less than 20 in the numbers from 2 to 101 are 2,3,5,7,11,13,17 and 19.

    Thus, there are 8 cards marked with prime numbers less than 20.

    Out of these 8 cards one card can be chose in 8 ways.

    Favourable number of elementary events = 8

    Hence, P (Getting a card marked with a prime number less than 20)$= \frac{8}{100} = \frac{2}{25}$

15. Total no. of possibilities are {1,2, 3 ... 99, 100}

    So n=100

i. Number divisible by 9 and perfect square are {9, 36,81}

So m = 3

∴Required probability P = $\frac{m}{n} = \frac{3}{100}$

ii. Now the prime number more than 80 upto 100 are 83, 89, 97. So m=3

Hence, the probability P= $\frac{m}{n} = \frac{3}{100}$

16. Peter throws two dice together,

∴Total number of possible outcomes = 6^2 = 36

Possible outcome where product of two numbers is 25 (5,5)

∴No. of favourable outcomes = 1

P(product is 25) = $\frac{1}{36}$

Rina throws one dice,

∴Total number of all possible outcomes = 6

The number where square is 25 is 5

No. of favourable outcomes = 1

P(a number whose square is 25) $= \frac{1}{6}$

On comparison

∵ $\frac{1}{6} > \frac{1}{36}$

Hence, Rina has better chances to get the number 25.

17. According to the question,

Cards removed = king, queen and jack of clubs $= 3$

∴ Cards left $= 52 - 3 = 49$

$Probability = \frac{favourable\ outcomes}{Total\ outcomes}$

i. Number of hearts $= 13$

∴ Probability of drawing a heart = $\frac{13}{49}$

ii. Total number of kings $= 4$

Number of kings left $= 4 - 1 = 3$

∴ Probability of drawing a king = $\frac{3}{49}$

iii. Number of clubs left $= 13 - 3 = 10$

Probability of drawing a club = $\frac{10}{49}$

iv. There is only one '10' of hearts.

∴ Probability of drawing one '10' of hearts = $\frac{1}{49}$

18. A standard deck has 52 cards.
    13 ranks of cards are available in 4 different suits namely
    ♠ Spades - Black in colour
    ♥ Hearts - Red in colour
    ♦Diamonds - Red in colour
    ♣Clubs - Black in colour
    A,2,3,4,5,6,7,8,9,10, J,Q,K are the cards available in all the suits
    Jack, Queen, King are referred as face cards.
    2,3,4,5,6,7,8,9,10 are referred as number cards.
    Total number of all possible outcomes = 52

    i. Total number of queens = 4
       ∴P(getting a queen) = $\frac{4}{52} = \frac{1}{13}$
    ii. Number of diamond suits = 13
       ∴P(getting a diamond) = $\frac{13}{52} = \frac{1}{4}$
    iii. Total number of kings = 4
       Total number of aces = 4
       Let E be the event of getting a king or an ace card.
       Then, the favorable outcomes = 4 + 4 = 8
       ∴P(getting a king or an ace) = P(E) = $\frac{8}{52} = \frac{2}{13}$
    iv. Number of red aces = 2
       ∴P(getting a red ace) = $\frac{2}{52} = \frac{1}{26}$

19. Total favourable outcomes associated to the random experiment of visiting a particular shop in the same week (Tuesday to Saturday) by two customers Shyam and Ekta are:
    (T, T) (T, W) (T, TH) (T, F) (T, S)
    (W, T) (W, W) (W, TH) (W, F) (W, S)
    (TH, T) (TH, W) (TH, TH) (TH, F) (TH, S)
    (F, T) (F, W) (F, TH) (F, F) (F, S)
    (S, T) (S, W) (S, TH) (S, F) (S, S)
    ∴Total number of favourable outcomes = 25

    i. The favourable outcomes of visiting on the same day are (T, T), (W, W), (TH, TH), (F, F) and (S, S).

∴Number of favourable outcomes = 5

Hence required probability $= \frac{Number\ of\ favorable\ outcomes}{Number\ of\ total\ outcomes} = \frac{5}{25} = \frac{1}{5}$

ii. The favourable outcomes of visiting on consecutive days are (T, W), (W, T), (W, TH), (TH, W), (TH, F), (F, TH), (S, F) and (F, S).

∴ Number of favourable outcomes = 8

Hence required probability $= \frac{Number\ of\ favorable\ outcomes}{Number\ of\ total\ outcomes} = \frac{8}{25}$

iii. Number of favourable outcomes of visiting on different days are 25 - 5 = 20

∴Number of favourable outcomes = 20

Hence required probability $= \frac{Number\ of\ favorable\ outcomes}{Number\ of\ total\ outcomes} = \frac{20}{25} = \frac{4}{5}$

20. No. of total outcome = 36

i. Number of outcomes when 5 may not come either time

= Outcome except (1,5), (2,5), (3,5), (4,5), (5,1), (5,2), (5,3), (5,4), (5, 5), (5, 6), (6, 5)

= 36 -11

= 25

Probability that 5 may not come either time = $\frac{25}{36}$

ii. Number of outcomes when same number may not come on the dice thrown two times

= Outcome except (1, 1), (2, 2), (3, 3), (4, 4), (5, 5), (6, 6)

= 36 - 6

= 30

Probability that same number may not come on the dice thrown two times $= \frac{30}{36} = \frac{5}{6}$