**CBSE Test Paper 03**

**CH-16 Probability**

1. A sum of money is rounded off to the nearest rupee. The probability that the error occurred in rounding off is at least 15 paise is

   a. $\frac{29}{101}$

   b. $\frac{29}{100}$

   c. $\frac{71}{101}$

   d. $\frac{71}{100}$

2. A positive integer is chosen at random. The probability that sum of the digits of its square is 39 is

   a. $\frac{2}{39}$

   b. 0

   c. 0

   d. $\frac{1}{11}$

3. A dice is rolled 6 times. The probability of obtaining 2 and 4 exactly three times each is

   a. 1/ 5184

   b. 1/ 46656

   c. none of these

   d. 5/ 11664

4. A drawer contains 5 black socks and 4 blue socks well mixed. A person searches the drawer and pulls out 2 socks at random. The probability that they match is

a. 4/ 9

b. 6/ 9

c. 5/ 9

d. 41/ 81

5. Two events A and B have probabilities 0.25 and 0.50 respectively. The probability that both A and B occur simultaneously is 0.14. Then the probability that neither A nor B occurs is

   a. 0.375

   b. 0.39

   c. 0.89

   d. 0.86

6. Fill in the blanks:

   For any two events A and B, $A \subseteq B \Rightarrow$ P(A) _____ P(B).

7. Fill in the blanks:

   Two or more events are said to be _____ if one of them occurs, other cannot occur.

8. From a group of 2 men and 3 women, two persons are selected. Describe the sample space of this experiment.

9. Suppose we throw a die once. Find the probability of getting a number greater than 4.

10. The numbers 1, 2, 3 and 4 are written separately on four slips of paper. The slips are put in a box and mixed thoroughly. A person draws two slips from the box, one after the other without replacement. Describe the sample space for the experiment.

11. In shuffling a pack of 52 playing cards, four are accidentally dropped. Find the chance that the missing cards should be one from each suit.

12. A die is thrown repeatedly until a six comes up. What is the sample space for this

experiment?

13. From a deck of 52 cards, four cards are drawn simultaneously. Find the chance that they will be the four honours of the same suit.

14. A box contains 9 red, 6 green and 5 black balls. A person draws 4 balls from the box at random. Find the probability that among the balls drawn there is at least one ball of each colour.

15. 20 cards are numbered from 1 to 20. One card is drawn at random. What is the probability that the number on the card drawn is,

    i. A prime number
    ii. An odd number
    iii. A multiple of 5
    iv. Not divisible by 3.

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**Solution**

1. (d) $\frac{71}{100}$

   **Explanation:** The sample space is,

   s = {-0.50, -0.49, -0.48, ....., -0.01, 0.00, 0.01, ..... 0.49}

   Let A be the event that the round off eror is at least 15 paise.

   Then $A^c$ is the event that the round off error is at most 14 paise.

   The sample space of $A^c$ is,

   $A^c$ = {-0.14, -0.15, ....., -0.01, 0.00, 0.01, ....., 0.14}

   $\therefore P(A^c) = \frac{29}{100}$

   $\therefore P(A) = 1 - p(A^c) = 1 - \frac{29}{100} = \frac{71}{100}$

2. (b) 0

   **Explanation:** There is no positive integer for which sum of square of digits is 39 .so required probability is zero

3. (d) 5/ 11664

   **Explanation:** Total ways of getting 2 and 4 exactly 3 times is 6! / (3! 3!) = 20

   Total number of ways in throwing 6 dice is $6^6$

   Therefore probability is 20/ $6^6$ = 5/11664

4. (a) 4/ 9

   **Explanation:**

   Let A be the event of getting 2 blue socks out of 4 then,$n(A) = {}^4C_2 = 6$

   And B be the event of getting 2 black socks out of 5 then, $n(B) = {}^5C_2 = 10$

Total number of ways to select 2 socks out of (5+4) = 9 socks is = $^9C_2$ =36

i.e. number of elements in the sample space n(S) = 36

$P(A) = \frac{n(A)}{n(S)} = \frac{6}{36} = \frac{1}{6}$ and $P(B) = \frac{n(B)}{n(S)} = \frac{10}{36} = \frac{5}{18}$

Hence required probability $P(A) + P(B) = \frac{1}{6} + \frac{5}{18} = \frac{8}{18} = \frac{4}{9}$

5. (b) 0.39

   **Explanation:**

   We have, P(A) = 0.25, P(B) = 0.50, $P(A \cap B) = 0.14$

   $\therefore$ Required Probability $= P(\overline{A} \cap \overline{B})$

   $= 1 - P(A \cap B)$

   $= 1 - [P(A) + P(B) - P(A \cap B)]$

   $= 1 - [0.25 + 0.50 - 0.15]$

   = 0.39

6. less than or equal to

7. mutually exclusive

8. Let 2 men by represented by $M_1$ and $M_2$ and 3 women be represented by $W_1$, $W_2$, and $W_3$.

   $\therefore$ Sample space,

   S = {

   $M_1M_2, M_1W_1, M_1W_2, M_1W_3, M_2W_1, M_2W_2, M_2W_3, W_1W_2, W_2W_3, W_1W_3\}$

9. Suppose A be the event of getting a number greater than 4.

   Number of possible outcomes = Total number of outcomes on throwing a die = 6

   Number of favourable outcomes = $\{5, 6\} = 2$

   $\therefore$ Probability of getting a number greater than 4 is,

   $P(A) = \frac{2}{6}$ = $\frac{1}{3}$

10. Here numbers 1, 2,3 and 4 are written separately on four slips of paper, put in a box

and mixed thoroughly.

When two slips are drawn from the box without replacement then sample space is given by S = {(1, 2), (1, 3), (1, 4), (2,1), (2, 3), (2, 4), (3, 1), (3, 2), (3, 4), (4, 1), (4, 2), (4, 3)}

11. Since from well-shuffled pack of cards, 4 cards missed out

$\therefore n(S) = {}^{52}C_4$

Let E be the event that four missing cards are from each suit

$\therefore n(E) = {}^{13}C_1 \times {}^{13}C_1 \times {}^{13}C_1 \times {}^{13}C_1$

$\therefore P(E) = \frac{{}^{13}C_1 \times {}^{13}C_1 \times {}^{13}C_1 \times {}^{13}C_1}{{}^{52}C_4}$

$= \frac{\frac{13\times13\times13\times13}{52\times51\times50\times49}}{4\times3\times2\times1}$

$= \frac{2197}{20825}$

12. In the given experiment,on throwing a die, six may come up on the first throw, the second throw,

the third throw, the fourth throw and so on till six comes up.

Hence, the sample space (S) of this experiment is given by,

S= {6, (1, 6), (2, 6), (3, 6), (4, 6), (5, 6), (1, 1, 6), (1, 2, 6), (1, 3, 6), (1, 4, 6), (1, 5, 6), (2, 1, 6), (2, 2, 6), (2, 3, 6), (2, 4, 6), (2, 5, 6), (3, 1, 6), (3, 2, 6), (3, 3, 6), (3, 4, 6), (3, 5, 6), (4, 1, 6), ... (4, 5, 6), (5, 1, 6), ... (5, 5, 6), ... }.

13. From a deck of cards, four cards are drawn.

$\therefore n(S) = {}^{52}C_4$

Suppose E be the event that all the four cards drawn are honour cards from the same suit.

(∵ Honour cards means king, queen, jack and ace)

$\therefore$ E = ${}^4C_4$\or\${}^4C_4$\or\${}^4C_4$\or\${}^4C_4$

$\Rightarrow n(E) = 4 \times {}^4C_4$

$= 4$

$\therefore P(E) = \frac{4}{{}^{52}C_4}$

$= \frac{4\times4\times3\times2\times1}{52\times51\times50\times49}$

$= \frac{96}{6497400}$

$= \frac{4}{270725}$

14. There are three ways of drawing four balls.

(i) A : 2 red, 1 green and 1 black ball

(ii) B : 1 red, 2 green and 1 black ball

(iii) C : 1 red, 1 green and 2 black balls

Since A, B, C are mutually exclusive events

$\therefore\ P(A \cup B \cup C)$ = P (A) + P(B) + P(C)

$= \frac{{}^{9}C_2 \times {}^{6}C_1 \times {}^{5}C_1}{{}^{20}C_4} + \frac{{}^{9}C_1 \times {}^{6}C_2 \times {}^{5}C_1}{{}^{20}C_4} + \frac{{}^{9}C_1 \times {}^{6}C_1 \times {}^{5}C_2}{{}^{20}C_4}$

$= \frac{9\times4\times6\times5+9\times3\times5\times5+9\times6\times5\times2}{5\times19\times16\times17}$

$= \frac{1080+675+540}{9690} = \frac{2295}{9690} = \frac{153}{646}$

15. Let S be the sample space

S = {1,2,3,4,5.....20}

Let $E_1$, $E_2$ and $E_3$, $E_4$ are the event of getting prime number, an odd number, multiple of 5 and not divisible by 3 respectively.

$P(E_1) = \frac{8}{20} = \frac{2}{5}$, $E_1$ = $\{2, 3, 5, 7, 11, 13, 17, 19\}$

$P(E_2) = \frac{10}{20} = \frac{1}{2}$, $E_2$ = $\{1, 3, 5, 7, 9, 11, 13, 15, 17, 19\}$

$P(E_3) = \frac{4}{20} = \frac{1}{5}$, $E_3$ = $\{5, 10, 15, 20\}$

$P(E_4) = \frac{14}{20} = \frac{7}{10}$, $E_4$ = $\{1, 2, 4, 5, 7, 8, 10, 11, 13, 14, 16, 17, 19, 20\}$