DPP
DAILY PRACTICE PROBLEMS

CLASS : XIth
DATE :

Solutions

SUBJECT : MATHS
DPP NO. :4

Topic :-PROBABILITY

1 **(b)**

Total number of ways $= 6 \times 6 \times 6$

Favourable number of ways $= 6$

$\therefore$ Required probability $= \frac{6}{6 \times 6 \times 6} = \frac{1}{36}$

2 **(a)**

Given, $P(A) = P(B) = x$

and $P(A \cap B) = P(A' \cap B') = \frac{1}{3}$

$\therefore$ $P(A' \cap B') = 1 - P(A \cup B)$

$\Rightarrow P(A \cup B) = 1 - \frac{1}{3} = \frac{2}{3}$ ...(i)

Also, $P(A \cup B) = P(A) + P(B) - P(A) \cap B)$

$\Rightarrow \frac{2}{3} = 2x - \frac{1}{3}$ [from Eq (i)]

$\Rightarrow x = \frac{1}{2}$

3 **(a)**

$S = \{00, 01, 02, \ldots, 49\}$

Let A be the event that sum of the digits on the selected ticket is 8, then

$A = \{08, 17, 26, 35, 44\}$

Let Bbe the event that the product of the digits is zero

$B = \{00, 01, 02, 03, \ldots, 09, 10, 20, 30, 40\}$

$\therefore A \cap B = \{8\}$

$\therefore$ Required probability$=P\left(\frac{A}{B}\right)$

$$= \frac{P(A \cap B)}{P(B)} = \frac{\frac{1}{50}}{\frac{14}{50}} = \frac{1}{14}$$

4 **(a)**

If any number the last digits can be 0,1,2,3,4,5,6,7,8,9. Therefore, last digit of each number can be chosen in 10 ways.

$\therefore$ The last digit of all numbers can be chosen in 10^n ways. If the last digit is to be 1,3,7, or 9, then none of the numbers can be even or end in 0 or 5. Thus, we have a choice of 4 digits viz. 1,3,7, or 9 with which each of n numbers should end.

So, favourable number of ways $= 4^n$

Hence, required probability $= \frac{4^n}{10^n} = \left(\frac{2}{5}\right)^n$

5 **(c)**

Consider the following events:

$A = A$ worker receives bonus, $B = A$ worker is skilled.

We have,

$P(A) = \frac{30}{100}$ and $P(B/A) = \frac{20}{100}$

$\therefore$ Required probability $= P(A \cap B) = P(A)P(B/A)$

$\Rightarrow$ Required probability $= \frac{30}{100} \times \frac{20}{100} = 0.06$

6 **(d)**

$\therefore$ Required probability $= \frac{^{10}C_1 + {}^{6}C_1}{^{16}C_1}$

$= \frac{16}{16} = 1$

7 **(c)**

Let $E =$ Event of getting a head from a coin

$F =$ Event of getting an odd number $\{1, 3,5\}$, from a die

$P(E) = \frac{1}{2}, P(F) = \frac{3}{6} = \frac{1}{2}$

Since, E and F are independent events

$\therefore\ P(E \cap F) = P(E) \cap P(F) = \frac{1}{2} \times \frac{1}{2} = \frac{1}{4}$

8 **(a)**

Probability that at least one shot hits the plane

$= 1 - P(\text{none of the shot hits the plane})$

$= 1 - 0.6 \times 0.7 \times 0.8 \times 0.9$

$= 1 - 0.3024 = 0.6976$

9 **(c)**

Number of favourable cases $(HTH, HTH) = 2$

Number of total cases $= 2^3 = 8$

$\therefore$ Required probability $= \frac{2}{8} = \frac{1}{4}$

10 **(c)**

Consider the following events:

$E_1 =$ Selecting first bag

$E_2 =$ Selecting second bag

$A =$ Getting a ticket bearing number 4

$\therefore$ Required probability $= P((E_1 \cap A) \cup (E_2 \cap A))$

$= P(E_1 \cap A) + P(E_2 \cap A)$

$= P(E_1)P(A/E_1) + P(E_2)P(A/E_2)$

$$= \frac{1}{2} \times \frac{1}{4} + \frac{1}{2} \times \frac{1}{6} = \frac{5}{24}$$

11 **(b)**

We have,

Required probability $= {}^6C_4\left(\frac{1}{2}\right)^6 + {}^6C_5\left(\frac{1}{2}\right)^6 + {}^6C_6\left(\frac{1}{2}\right)^6 = \frac{11}{32}$

12 **(c)**

Let X denote the number of aces.

Probability of selecting aces,

$$P = \frac{4}{52} = \frac{1}{13}$$

Probability of not selecting aces,

$$q = 1 - \frac{1}{13} = \frac{12}{13}$$

$$P(X = 1) = 2 \times \left(\frac{1}{13}\right) \times \left(\frac{12}{13}\right) = \frac{24}{169}$$

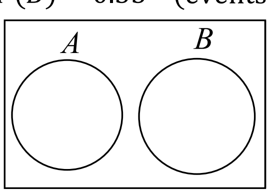
$$P(X = 2) = 2\left(\frac{1}{13}\right)^2 . \left(\frac{12}{13}\right)^0 = \frac{2}{169}$$

Mean $= \Sigma P_1 X_i = \frac{24}{169} + \frac{2}{169} = \frac{2}{13}$

13 **(d)**

$P(A) = 0.45$,

$P(B) = 0.35$ (events are mutually exclusive)



$P(A \cap B) = 0$

14 **(b)**
Total cases = 4
Correct option = 1
So, probability of correct answer $=\frac{1}{4}$
15 **(c)**
$P(E \cap F) = P(E).P(F)$

Now, $P(E \cap \bar{F}) = P(E) - P(E \cap F) = P(E)[1 - P(F)]$

$= P(E).P(F^c)$

and $P(E^c \cap F^c) = 1 - P(E \cup F)$

$= 1 - [P(E) + P(F) - P(E \cap F)$

$= [1 - P(E)][1 - P(F)] = P(E^c)P(F^c)$

Also $P(E/F) = P(E)$ and $P(E^c/F^c) = P(E^c)$

$\Rightarrow P(E/F) + P(E^c/F^c) = 1$

16 **(a)**
One integer can be chosen out of 200 integers in ${}^{200}C_1$ways. Let A be the event that an integer selected is divisible by 6 and B that it is divisible by 8

Then, $P(A) = \frac{33}{200}, P(B) = \frac{25}{200}$

and $P(A \cap B) = \frac{8}{200}$

$\therefore P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= \frac{33}{200} + \frac{25}{200} - \frac{8}{200} = \frac{1}{4}$

17 **(a)**
Given, $np = 4, npq = 2$

$\Rightarrow p = q = \frac{1}{2}, n = 8$

We know, $P(X = r) = {}^nC_r p^r q^{n-r}$

$\therefore P(X = 1) = {}^8C_1 \left(\frac{1}{2}\right)^7 \left(\frac{1}{2}\right)^1 = 8 \times \frac{1}{2^8} = \frac{1}{32}$

18 **(b)**

Let X be binomial variate with parameter $n = 100$ and P

Since, $P(X = 50) = P(X = 51)$ [given]

$\Rightarrow {}^{100}C_{50}p^{50}(1-p)^{50} = {}^{100}C_{51}p^{51}(1-p)^{49}$

$\Rightarrow \frac{100!}{50!50!} \times \frac{51!49!}{100!} = \frac{p}{1-p}$

$\Rightarrow \frac{51}{50} = \frac{p}{1-p}$

$\Rightarrow p = \frac{51}{101}$

19 **(d)**

Total number=90

Number divisible by 6 are {6,12,18,24,30,36,42,48,54,60,66,72,78,84,90}

Numbers divisible by 8 are {8,16,24,32,40,48,56,64,72,80,88}

Numbers divisible by 6 and 8 are {24,48,72}

Total number of numbers divisible by 6 or 8

$= 15 + 11 - 3 = 23$

$\therefore$ Required probability $= \frac{23}{90}$

20 **(a)**

Let A_i denote the event that the number i appears on the die, and let E denote the event that only white balls are drawn. Then,

$P(A_i) = \frac{1}{6}$ and, $P(E/A_i) = \frac{{}^6C_i}{{}^{10}C_i}, i = 1,2,\ldots,6$

Required probability $= P(E)$

$= P\left(\bigcup_{i=1}^{6}(E \cap A_i)\right) = \sum_{i=1}^{6} P(E \cap A_i) = \sum_{i=1}^{6} P(A_i)P\,(E/A_i)$

$= \frac{1}{6}\left\{\frac{6}{10} + \frac{15}{45} + \frac{20}{120} + \frac{15}{210} + \frac{6}{252} + \frac{1}{210}\right\} = \frac{1}{5}$

ANSWER-KEY										
Q.	1	2	3	4	5	6	7	8	9	10
A.	B	A	A	A	C	D	C	A	C	C
Q.	11	12	13	14	15	16	17	18	19	20
A.	B	C	D	B	C	A	A	B	D	A