DPP

DAILY PRACTICE PRACTICE PROBLEMS

CLASS : XIth
DATE :

Solutions

SUBJECT : MATHS
DPP NO. :1

Topic :-PERMUTATIONS AND COMBINATIONS

1 **(b)**

$\because f(x_i) \neq y_i$

ie, no object goes to its scheduled place. Then, number of one-one mappings

$$= 6!\left(1 - \frac{1}{1!} + \frac{1}{2!} - \frac{1}{3!} + \frac{1}{4!} - \frac{1}{5!} + \frac{1}{6!}\right)$$

$$= 6!\left(\frac{1}{2!} - \frac{1}{3!} + \frac{1}{4!} - \frac{1}{5!} + \frac{1}{6!}\right)$$

$$= 360 - 120 + 30 - 6 + 1 = 265$$

2 **(d)**

We have,

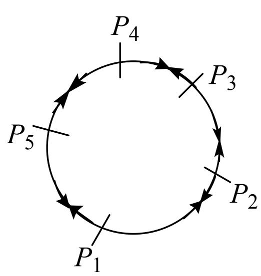
Required number of ways

$$= {}^{m+n}C_m \times (m-1)\,! \times (n-1)\,! = \frac{(m+n)\,!}{m\,n}$$

3 **(a)**

$\because$ Remaining 5 can be seated in 4! ways.

Now, on cross marked five places 2 person can sit in ${}^5P_2$ ways



So, number of arrangements

$$= 4! \times \frac{5!}{3!}$$

$= 24 \times 20 = 480$ ways

4 **(a)**

Given, ${}^{2n+1}P_{n-1} : {}^{2n-1}P_n = 3:5$

$\Rightarrow \dfrac{(2n+1)!}{(n+2)!} \times \dfrac{(n-1)!}{(2n-1)!} = \dfrac{3}{5}$

$\Rightarrow \dfrac{(2n+1)2n}{(n+2)(n+1)n} = \dfrac{3}{5}$

$\Rightarrow 10\,(2n+1) = 3(n^2 + 3n + 2)$

$\Rightarrow 3n^2 - 11n - 4 = 0$

$\Rightarrow (3n+1)(n-4) = 0$

$\Rightarrow\ n = 4 \qquad \left(n \neq -\dfrac{1}{3}\right)$

5 **(b)**

Required number of ways

$= {}^4C_1 \times {}^6C_4 + {}^4C_2 \times {}^6C_3 + {}^4C_3 \times {}^6C_2 + {}^4C_4 \times {}^6C_1$

$= 60 + 120 + 60 + 6$

$= 246$

6 **(a)**

Required number of ways $= {}^8C_5$

$= \dfrac{8 \times 7 \times 6}{3 \times 2 \times 1} = 56$

The total number of ways a voter can vote

$= {}^8C_1 + {}^8C_2 + {}^8C_3 + {}^8C_4 + {}^8C_5$

$= 8 + 28 + 56 + 70 + 56 = 218$

7 **(c)**

From the first set, the number of ways of selection two lines $= {}^4C_2$

From the second set, the number of ways of selection two lines $= {}^3C_2$

Since, these sets are intersect, therefore they from a parallelogram,

$\therefore$ Required number of ways $= {}^4C_2 \times {}^3C_2$

$= 4 \times 3 = 12$

8 **(b)**

Since, a set of m parallel lines intersecting a set of another n parallel lines in a plane, then the number of parallelograms formed is ${}^mC_2 \times {}^nC_2$.

9 **(a)**

$^{50}C_4 + \sum_{r=1}^{6} {}^{56-r}C_3$
$= {}^{50}C_4 + {}^{55}C_3 + {}^{54}C_3 + {}^{53}C_3 + {}^{52}C_3 + {}^{51}C_3 + {}^{50}C_3$
$= {}^{51}C_4 + {}^{51}C_3 + {}^{52}C_3 + {}^{53}C_3 + {}^{54}C_3 + {}^{55}C_3$
$[\because {}^{n}C_r + {}^{n}C_{r+1} = {}^{n+1}C_{r+1}]$
$= {}^{52}C_4 + {}^{52}C_3 + {}^{53}C_3 + {}^{54}C_3 + {}^{55}C_3$
$= {}^{53}C_4 + {}^{53}C_3 + {}^{54}C_3 + {}^{55}C_3$
$= {}^{54}C_4 + {}^{54}C_3 + {}^{55}C_3 = {}^{55}C_4 + {}^{55}C_3 = {}^{56}C_4$

10 **(a)**
Total number of four digit numbers $= 9 \times 10 \times 10 \times 10$

$= 9000$

Total number of four digit numbers which divisible by 5

$= 9 \times 10 \times 10 \times 2 = 1800$

$\therefore$ Required number of ways $= 9000 - 1800 = 7200$

11 **(a)**
Man goes from Gwalior to Bhopal in 4 ways and they come back in 3 ways.

$\therefore$ Total number of ways $= 4 \times 3 = 12$ ways

12 **(c)**
Here, we have 1 M, 4 I's,4 S's and 2 P's
$\therefore$ Total number of selections
$= (1+1)(4+1)(2+1) - 1 = 149$

13 **(c)**
Number of lines from 6 points $= {}^{6}C_2 = 15$

Points of intersection obtained from these lines $= {}^{15}C_2 = 105$

Now, we find the number of times, the original 6 points come.

Consider one point say A_1.Joining A_1 to remaimimg 5 points, we get 5 lines and any two lines from these 5 lines gives A_1 as the point of intersection.

$\therefore A_1$ is commom in ${}^{5}C_2 = 10$ times out of 105 points of intersections.

Similar is the case with other five points.

$\therefore$ 6 original points come $6 \times 10 = 60$ times in points of intersection.

Hence, the number of distinct points of intersection

$= 105 - 60 + 6 = 51$

15 **(b)**

At first we have to a accommodate those 5 animals in cages which cannot enter in 4 small cages, therefore, number of ways are $^6P_5$ and rest of the five animals arrange in 5! ways.

Total number of ways $= 5! \times {}^6P_5$

$= 120 \times 720 = 86400$

16 **(b)**

$T_n = {}^nC_3$ and $T_{n+1} - T_n = 21$

$\Rightarrow \quad {}^{n+1}C_3 - {}^nC_3 = 21$

$\Rightarrow \quad {}^nC_2 + {}^nC_3 - {}^nC_3 = 21$

$\Rightarrow \quad {}^nC_2 = 21$

$\Rightarrow \quad \frac{n(n-1)}{2} = 21$

$\Rightarrow \quad n^2 - n - 42 = 0$

$\Rightarrow \quad (n-7)(n+6) = 0$

$\therefore \quad n = 7 \qquad [\because \ \neq -6]$

17 **(b)**

Total number of ways

$= {}^{10}C_1 + {}^{10}C_2 + {}^{10}C_3 + {}^{10}C_4$

$= 10 + 45 + 120 + 210 = 385$

18 **(b)**

The total number of two factors product $= {}^{n+2}C_8$. The number of numbers from 1 to 200 which are not multiples of 5 is 160. Therefore, total number of two factors product, which are not multiple of 5, is ${}^{160}C_2$

Hence, required number of factors $= {}^{200}C_2 - {}^{160}C_2$

$= 19900 - 12720$

$= 7180$

19 **(b)**

Total number of m-elements subsetcs of $A = {}^nC_m$ ...(i)

and number of m-elements subsets of A each containing the element $a_4 = {}^{n-1}C_{m-1}$

According to question, ${}^nC_m = \lambda . {}^{n-1}C_{m-1}$

$\Rightarrow \frac{n}{m} . {}^{n-1}C_{m-1} = \lambda . {}^{n-1}C_{m-1}$

$\Rightarrow \lambda = \frac{n}{m}$ or $n = m\lambda$

20 **(a)**

The number of 1 digit numbers $= 9$

The number of 2 digit non-repeated numbers $= 9 \times 9 = 81$

The number of 3 digit non-repeated number

$= 9 \times {}^9P_2 = 9 \times 9 \times 8 = 648$

$\therefore$ Required number of ways =9+81+648=738

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