

Assignment - 01

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Section : 20

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Answer to the Question NO - c1

from the given numbers:

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11

the pairs that sums to 12 are:

$\{1, 11\},$

$\{2, 10\},$

$\{3, 9\},$

$\{4, 8\},$

$\{5, 7\}.$

Here, 6 doesn't have any pair. This is because of the Pigeonhole Principle; confirms that two of them are selected from one of the six(6) sets who sums to 12.

(proved)

Answer to the Question NO-2

Given,

Total people to vote = 302

Now,

To win an election,

a candidate must secure more votes than others all combined.

at least more than half of the total votes.

total vote = 302

$$\text{half of total votes} = \frac{302}{2} = 151$$

Now, to guarantee a win, a candidate needs more than half.

\therefore at least $151 + 1 = 152$ votes.

(Ans:-)

answer to the Q. NO-3

My ID - 22301689 \rightarrow total digits = 8.

digits \rightarrow 2 3 0 1 6 8 9 [\because repetition allowed]

\rightarrow 0 1 2 3 6 8 9 \rightarrow 7 digits
according to the question, to create a 4-digits odd number greater than 2000 without repetition.

$\square \square \square \square$

In 1st slot, any digit can select from 2, 3, 6, 8, 9
 \therefore combination = ${}^5C_1 = 5$ (for thousand place)

In 2nd slot, 1 digit can be selected from number than other numbers of 1st box.

\therefore combination will be = ${}^6C_1 = 6$ (for hundred place)

Then in 3rd slot, here remaining options are 5 because other 2 numbers have already been used in 1st, 2nd slot

\therefore combination = ${}^5C_1 = 5$ (for 10th place)

Finally, in the 4th slot,

only 3 options to create odd number \rightarrow 1, 3, 9

\therefore the combination will be = ${}^3C_1 = 3$ (for unit place)

\therefore The total number of "4-digits odd number" will be

$$= {}^5C_1 \times {}^6C_1 \times {}^5C_1 \times {}^3C_1$$

$$= 5 \times 6 \times 5 \times 3$$

$$= 450 \quad (\text{Ans:})$$

Answer to the Question NO - 04

Here,

Total person = 7

The table is round, so relative positions of the friends needed to be considered.

Without Tamim, remaining 6 persons,

to arrange, $(n-1)! = (6-1)! = 5!$

= 120 ways.

Given,

Tamim's best friend wants to seat between Tamim and his other friend.

\therefore the total number of ways = 120×2
= 240 ways

(Ans:)

Answer to the Question NO - 5

According to the given condition,

n objects taken 4 at a time.

and 6 times the number of combination of n objects taken 2 at a time.

which means,

$${}^nC_4 = 6 \times {}^nC_2$$

$$\Rightarrow \frac{n!}{(n-4)! \times 4!} = 6 \times \frac{n!}{(n-2)! \times 2!}$$

$$\Rightarrow \frac{(n-2)!}{(n-4)!} = \frac{6 \times 4!}{2!}$$

$$\Rightarrow \frac{(n-2)(n-3)(n-4)}{(n-4)!} = 72$$

$$\Rightarrow n^2 - 2n - 3n + 6 = 72$$

$$\Rightarrow n^2 - 5n - 66 = 0$$

$$\therefore n = 11, -6 \quad [\text{not acceptable}]$$

$$\therefore n = 11$$

(Ans:)

Answer to the Question NO-05

$$(a) + (b) \Rightarrow$$

Given 3 colours \rightarrow red, blue or green.
the given two conditions will be fulfilled when:-

Step-1:

\rightarrow by painting the central triangle in any of the 3 colours.

Step-2:-

\rightarrow Now, by painting the remaining 3 triangles, with any one of the remaining two colours.

Now, for every two (2) turns of the given 3 colours:-

$$\begin{aligned}\text{the number of ways} &= 3 \times 2 \times 2 \times 2 \times 2 \\ &= 3 \times (2)^3 \\ &= 24 \text{ ways.}\end{aligned}$$

(Ans:)

Answer to the Question NO-7 (a)

* (a) Math and English books alternate:

Given,

Total math books = 6

Selected math books = 4

Total English books = 5

Selected English books = 3

∴ The quantity of ways to arrange and select 4 math books and 3 English books from given 6 math books and 5 English books,

$$= \frac{6 \times 5}{2} \times \frac{5 \times 4 \times 3}{3 \times 2}$$

= 150 ways.

Now, 4 Math books and 3 English books :- for this, total $4+3=7$ books, alternate pattern can be done in ways.

$$\begin{aligned} \therefore \text{the number of ways will be} &= 4! \times 3! \times 150 \\ &= 21600. \end{aligned}$$

(Ans:)

Answer to the Question NO - 7 (b)

Maths at the beginning and an English book is in the middle of the shelf:-

Here,

selected 4 Maths and 3 English books ;

total = 7 books where 1 math book will be at the beginning and an English book in the middle of the shelf,

\Rightarrow firstly,

$$7 - 2 = 5 \text{ books.}$$

from (a),

total number of ways to arrange the selected books = 150

\therefore the number of ways will be = $5! \times 4 \times 3 \times 150$

$$= 216000$$

(Ans)