Solutions of Worksheet No: 2

(Class No: 3)

Permutation & combination

Qno 1 Total = 13 ; Boys = 9 & Girls = 4

Required = 7

(i) Exactly 3 girls:

$\Rightarrow$ 3 Girls and 4 boys

ways = $4C_3 \times 9C_4$

$= 4 \times \frac{9 \times 8 \times 7 \times 6}{24}$

$= 4 \times 126$

$= 504$ Ans

(2) atleast 3 girls : Two cases:

	(9) B	(4) G
Req = 7	4	3
	3	4

Case I: 4 Boys and 3 girls

$= 9C_4 \times 4C_3$

$= 504$

Case II. 3 Boys & 4 girls

$= 9C_3 \times 4C_4$

$= \frac{9 \times 8 \times 7}{6} \times 1$

$= 84$

Required ways: Case I + Case II $= 504 + 84 = 588$ Ans

(3) atmost 3 girls: 4 Cases

(9) B	(4) G
4	3
5	2
6	1
7	0

Case I: 4 Boys & 3 girls $= 9C_4 \times 4C_3 = 504$

Case II 5 Boys & 2 girls $= 9C_5 \times 4C_2 = 756$

Case III 6 Boys & 1 girl $= 9C_6 \times 4C_1 = 336$

Case IV 7 Boys & 0 girl $= 9C_7 \times 4C_0 = 36$

Required ways $= 504 + 756 + 336 + 36 = 1632$ Ans

Solution (LU-5 = 2) PQC (9)

Q N 2 → Total Cards = 52

Suits = 4 (diamond, club, heart, spade)
(13) (13) (13) (13)

Colour = 2 (Red, Black)
(26) (26)

Face Cards = 12 (Jack, Queen, King)
(4) (4) (4)

(i) Four cards are of the same suit.

It means either all four cards are of diamond or club or heart or spade

Required ways = $^{13}C_4 + {}^{13}C_4 + {}^{13}C_4 + {}^{13}C_4 = (715) \times 4 = 2860$ Ans

(2) Four cards belongs to four different suits

It means 1 card of diamond, 1 of club, 1 of heart and 1 of spade

Required ways = $^{13}C_1 \times {}^{13}C_1 \times {}^{13}C_1 \times {}^{13}C_1 = 13 \times 13 \times 13 \times 13$
$= 28561$ Ans

(3) all are face cards

Required ways = $^{12}C_4 = 495$ Ans

(4) Two are red and 2 are Black.

Required ways = $^{26}C_2 \times {}^{26}C_2 = \left(\frac{26 \times 25}{2}\right) \times \left(\frac{26 \times 25}{2}\right)$
$= 325 \times 325 = 105625$ Ans

(5) Cards are of same colour : Two cases.

It means 4 are red (or) 4 cards are black

Required ways = $^{26}C_4 + {}^{26}C_4 = (14950) + (14950) = 29900$ Ans

Solution W.S 2 (P & C) (3)

Qn. 3 → total = 15 players
Req... 11 players

(1) there is no restriction =

Req ways = $^{15}C_{11}$
= $^{15}C_4$ (Shortcut)
= 1365 Ans

(2) A particular player is always chosen:
It means 1 person is already selected
Now we have to select remaining 10 from remaining 14 persons

Required ways = $^{1}C_1 \times {}^{14}C_{10}$
= $1 \times {}^{14}C_4$ (Short cut)
= 1001 Ans

(3) A particular player is never chosen:
It means we have to select 11 players from the remaining 14 players

Required ways = $^{14}C_{11}$
= $^{14}C_3$ (Shortcut)
= 364 Ans

Qn 4 → total ball = 11
5 Red & 6 white
Required = 6 balls

Three cases:

(5) R	(6) W
2	4
3	3
4	2

Req = 6

Case I: 2 Red & 4 White
= $^{5}C_2 \times {}^{6}C_4$ = 10 × 15 = 150

Case III 3 Red & 3 black balls

$= {}^5C_3 \times {}^6C_3$

$= 10 \times 20 = 200$

Case III 4 Red & 2 black balls

$= {}^5C_4 \times {}^6C_2$

$= 5 \times 15 = 75$

Required ways = Case I + Case II + Case III

$= 150 + 200 + 75$

$= 425$ Ans

Ques 5 → total 18 points out of which 5 points are collinear

(1) no of Straight lines:

Req ways $= {}^{18}C_2 - {}^5C_2 + 1$

(total no of ways of selecting 2 points out of 18 points) (No. of overlapping / Repeated lines)

(Collinear points always make one line)

$= \frac{18 \times 17}{2} - \frac{5 \times 4}{2} + 1$

$= 153 - 10 + 1 = 144$ Ans

(2) No. of triangles

Required ways $= {}^{18}C_3 - {}^5C_3$ → (Collinear points never form any triangle)

$= 816 - 10 = 806$ Ans..

Qn 6 →

(6) A	(7) B
4	6
5	5
6	4

Req = 10

Four cases

Case 1 : 4 from part A & 6 from B

$= {}^6C_4 \times {}^7C_6$

$= 15 \times 7 = 105$

Case II : 5 from part A & 5 from part B

$= {}^6C_5 \times {}^7C_5$

$= 6 \times 21 = 126$

Case III : 6 from part A & 4 from part B

$= {}^6C_6 \times {}^7C_4$

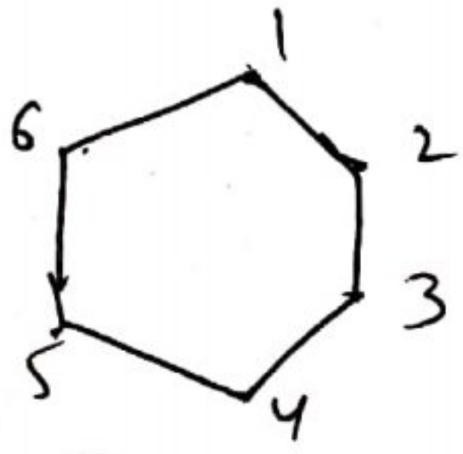
$= 1 \times 35 = 35$

Required way = Case I + case II + case III

$= 105 + 126 + 35$

$= 266$ Ans

Qn 7 → Hexagon



(i) No of triangles $= {}^6C_3$

$= \frac{6 \times 5 \times 4}{6} = 20$ Ans

(ii) No of diagonals : Total No of 'lines' that can be drawn using 6 point $= {}^6C_2$

But it also contains sides

∴ Required No of diagonals $= {}^6C_2 - 6 = 15 - 6 = 9$ Ans

Solution (W-52) PEC (8)

Q.No 8 → total player = 17

5 Bowlers & 12 Batsmen

Required = 11

No of ways of = Select 4 bowlers & 7 batsmen

$= {}^5C_4 \times {}^{12}C_7$

$= {}^5C_1 \times {}^{12}C_5$ (Shortcut)

$= 5 \times \frac{12 \times 11 \times 10 \times 9 \times 8}{5 \times 4 \times 3 \times 2 \times 1}$

$= 5 \times 792$

$= 3960$ Ans.