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Distribution of alike objects

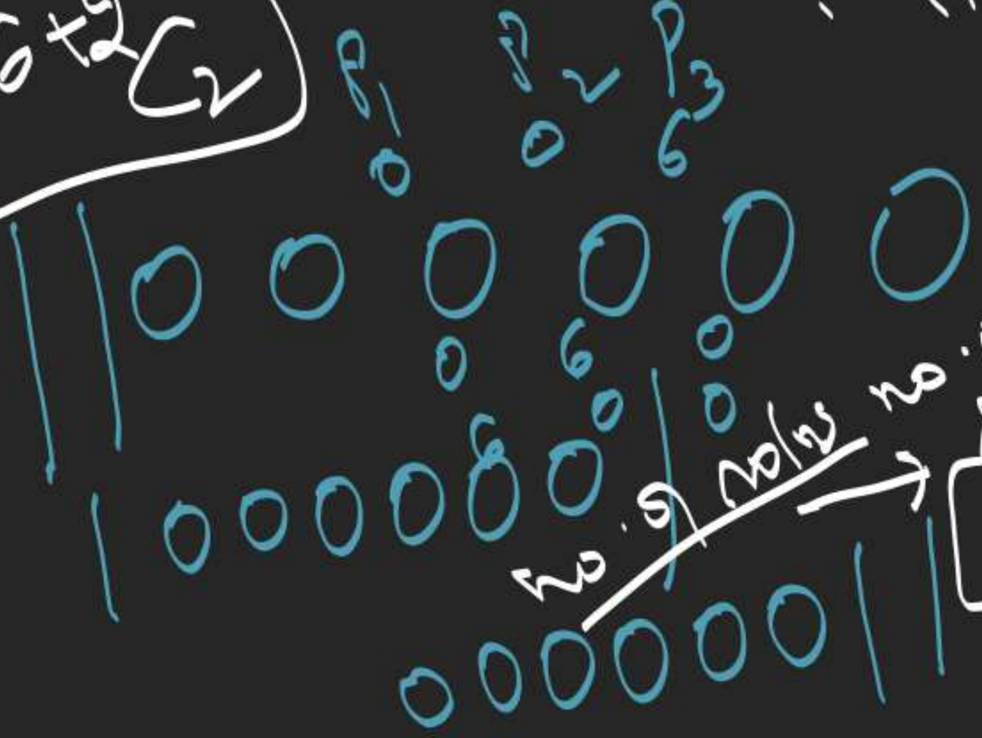
Aim → To find 'n' over 'p' persons

$(x_1, x_2, x_3) = (1,2,3), (1,3,2), (6, \ldots, (0,0,6), (0,6,0), (6,0,0)$

Method → $\dfrac{(n+(p-1))!}{n!\,(p-1)!} = {}^{n+p-1}C_{p-1}$

$\boxed{{}^{6+2}C_2}$

alike 6 objects over 3 persons



no. of poles → no. of objects obtained by p_1

$\boxed{x_1 + x_2 + x_3 = 6}$

p_1	p_2	p_3
1	4	1

$x_1, x_2, x_3 \in$ Whole no.s

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To distribute 'n' alike objects over 'p' persons $(n > p)$ so that every person gets atleast one object.

$n = 6$, $p = 3$

$x + y + z = 6$, $x, y, z \in N$

$x \to P_1$ get, $y \to P_2$, $z \to P_3$

$$\boxed{{}^{6-3+2}C_2}$$

$1 \times {}^{(n-p)+p-1}C_{p-1}$

Distribute 1 object to each person

${}^{n-1}C_{p-1}$

$0 \times 0 \times 0 \times \ldots \times 0 \times \ldots \times 0$

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Q_1 Q_2 Q_3 Q_8

3

$$^{30-2(8)+7}C_7 = \boxed{^{21}C_7}.$$

Find no. of solns of $\overset{Q_1+Q_2}{(x_1+x_2}+x_3+\dots+x_8 = 30$

x_1 = marks in Q_1

$x_i \geq 2$, $x_i \in I$.

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2. Find no. of natural number soln. of eqn. $\overset{\geq 1}{x}+\overset{\geq 1}{y}+\overset{\geq 1}{z}=102$.

$$^{102-3+2}C_2 = {}^{101}C_2$$

DPP-9 (remaining)
DPP-10 (1–7)

$x+y+z+t=0,1,2,3,\dots,30$

$$\left({}^{4}C_4 + {}^{3}C_3 + {}^{4}C_3 + {}^{5}C_3 + {}^{6}C_3 + \dots + {}^{33}C_3\right) = \boxed{{}^{34}C_4}$$

$^{5}C_4$, $^{6}C_4$

3. Find no. of non negative integral solution of (i) inequality $\boxed{x+y+z+t \leq 30}$

$x+y+z+t+w=30$

$^{30+4}C_4$

(ii) inequality $23 < x+y+z+t \leq 30$

$24 \leq \quad \leq 30$ $w=0,1$

$(\leq 30)-(\leq 23)$

$\boxed{{}^{34}C_4 - {}^{27}C_4}$

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$$23 < x+y+z+t \leq 30$$

$$x+y+z+t = 24, 25, 26, 27, 28, 29, 30 \, .$$

$$-{}^{27}C_4 + \left({}^{27}C_4 + {}^{27}C_3\right) + {}^{28}C_3 + {}^{29}C_3 + {}^{30}C_3 + {}^{31}C_3 + {}^{32}C_3 + {}^{33}C_3$$

$${}^{28}C_4 \qquad {}^{29}C_4$$

$$= -{}^{27}C_4 + {}^{34}C_4$$