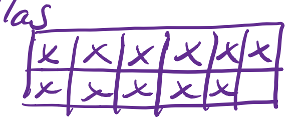
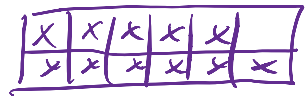
12 sillas

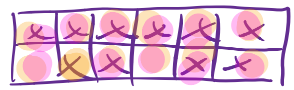




11 personas

1 silla libre → 12 configuraciones

10 personas



Problema general

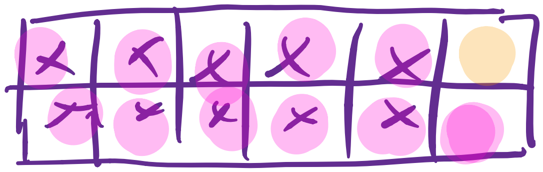
S sillas y n niños

¿Cuantas posibilidades hay para tener s-n sillas desocupadas?

Max: "66 configuraciones"

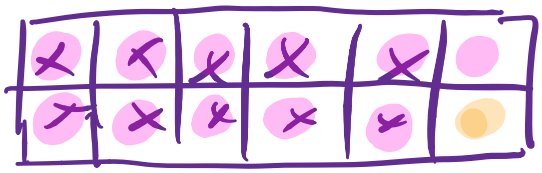
2 sillas libres ⟶ 12 × 11 = 132   132/2 = 66

Problema(12, 10) = $\frac{12 \cdot 11}{2}$



¿es la misma?

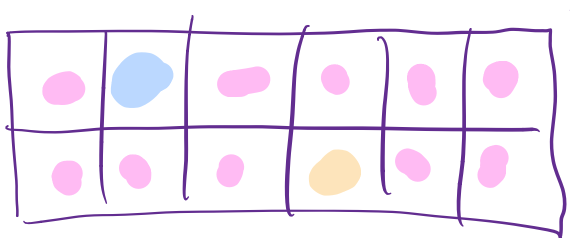
Si



12 sillas y 9 personas

Abraham: 44

Paty: 220



$\text{Problema}(12, 9) = 12 \times \text{Problema}(11, 9) = \frac{1320}{6} = 220$

$11 \times 10 = 110$

$$_sC_n = \binom{s}{n} = \frac{s!}{(s-n)!\,n!}$$

$$\frac{12\cdot11\cdot10\cdot9\cdot8\cdot7\cdot6\cdot5\cdot4\cdot3\cdot2\cdot1}{9\cdot8\cdot7\cdot6\cdot5\cdot4\cdot3\cdot2\cdot1\cdot3\cdot2\cdot1} = \frac{12\cdot11\cdot10}{3\cdot2\cdot1} = 220$$

Con 3 niños

$n' = s-n$

$$\frac{s!}{(s-n')!\,n'!} = \frac{s!}{(s-s+n)!\,(s-n)!} = \frac{s!}{n!\,(s-n)!}$$

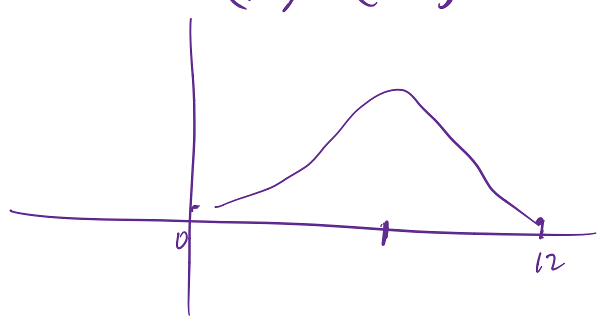
$$_sC_n = {}_sC_{s-n}$$

"Combinaciones de s elementos tomados de n en n"

$s=12$

$n=$	$s-n=$
12	0
11	1
10	2
9	3
8	4
7	5
6	6

$$\binom{s}{n} = \binom{s}{s-n}$$



1

1 1

1 2 1

1 3 3 1

1 4 6 4 1

1 5 10 10 5 1

1 6 15 20 15 6 1

1 7 21 35 35 21 7 1

1 8 28 56 70 56 28 8 1

P.d.

$\binom{0}{0}$

$\binom{1}{0}$ $\binom{1}{1}$

$\binom{2}{0}$ $\binom{2}{1}$ $\binom{2}{2}$

$\binom{3}{0}$ $\binom{3}{1}$ $\binom{3}{2}$ $\binom{3}{3}$

P.d. $\binom{s}{n} = \binom{s-1}{n-1} + \binom{s-1}{n}$

$$\binom{s-1}{n-1} + \binom{s-1}{n} =$$

$$\frac{(s-1)!}{((s-1)-(n-1))!\,(n-1)!} + \frac{(s-1)!}{((s-1)-n)!\,n!} =$$

$$\frac{(s-1)!}{(s-n)!\,(n-1)!} + \frac{(s-1)!}{(s-n-1)!\,n!} =$$

$$\frac{n(s-1)! + (s-n)(s-1)!}{(s-n)!\,n!} =$$

$$\frac{(n+s-n)(s-1)!}{(s-n)!\,n!} =$$

$$\frac{s(s-1)!}{(s-n)!\,n!} =$$

$$\frac{s!}{(s-n)!\,n!} =$$

$$= \binom{s}{n} \quad //$$