1 (a) $\Omega = \{(c,c,c), (c,c,x), \dots, (x,x,x)\}$

$|\Omega| = 2^3 = 8$

(b) $\{0,2,4,6,8\}$ $\Omega = \{(0,2),(0,4),\dots,(8,6)\}$

$|\Omega| = 5 \cdot 4 = 20$ A

(c) $\Omega = \{X, C1, C2, \dots, C6\}$

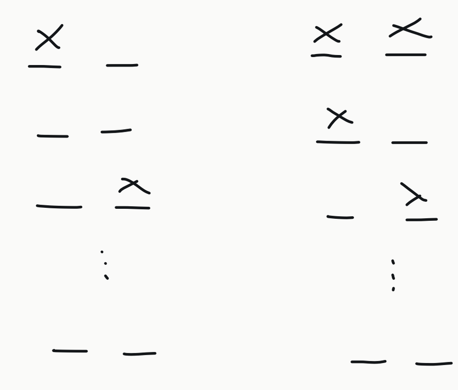
$|\Omega| = 7$

(d) $\Omega = \{a_1, a_2 : a_1, a_2 \in \{1, \dots, 30\} \ a_1 \neq a_2\}$

$|\Omega| = C^{30}_2$

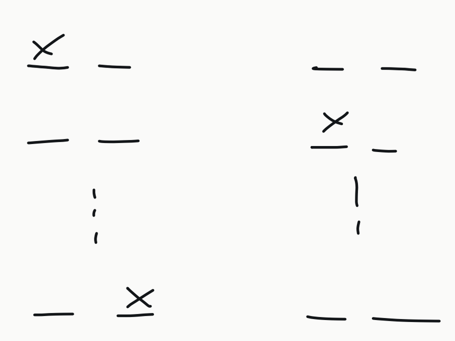
(e) $\Omega = \mathbb{R}^+$

3_ (a)



C^n_i

(b)

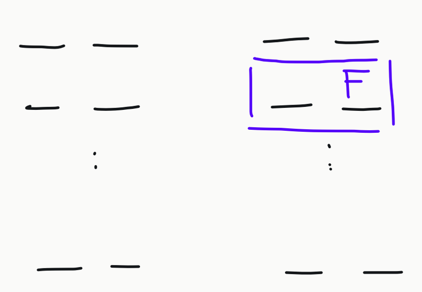


$C^n_i \, i! = \frac{n!}{(n-i)!\,i!} \cdot i! = \frac{n!}{(n-i)!} = A^n_i$

↑ ordenar a las personas

otra forma A^n_i

(c) $n = 4m$



fila 1

" 2

⋮

fila m

equiprobabilidad → P(sentarme junto a un famoso) = $\frac{\text{casos favorables}}{\text{casos posibles}}$ =

casos posibles = A^n_i

casos favorables etapa 1 elegimos pares de asientos (donde sentamos al famoso) $2m$

etapa 2 elegimos ventana o pasillo 2 formas

etapa 3 sentar al resto de la gente A^{n-2}_{i-2}

$P(\text{sentarme junto al famoso}) = \frac{2m \cdot 2 \cdot A^{n-2}_{i-2}}{A^n_i}$

5_ $P(\{i\}) = \alpha_i$

(a) $P(\Omega) = 1 = P(\{1\} \cup \{2\} \cup \dots \cup \{6\}) = P(1) + P(2) + \dots + P(6)$

$P(1) = \alpha$, $P(2) = 2 \cdot \alpha$, $P(6) = 6 \cdot \alpha$

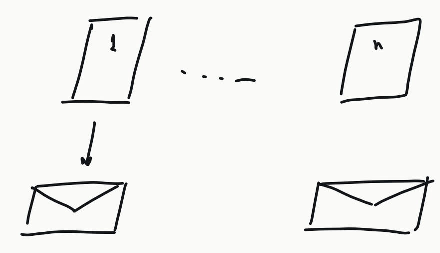
$\alpha + 2\alpha + \dots + 6\alpha = 1$

$\alpha(1 + 2 + \dots + 6) = 1 \Rightarrow \alpha = \frac{1}{21}$

(b) $P(5) = 5 \cdot \alpha = \frac{5}{21}$

(c) $P(\text{par}) = P(\{2\} \cup \{4\} \cup \{6\}) = P(2) + P(4) + P(6) = \frac{2}{21} + \frac{4}{21} + \frac{6}{21} = \frac{12}{21}$

6_



A_1 = carta 1 al sobre correcto

A_2 = " 2 "

⋮

A_n = " n "

P(al menos una carta en el sobre correcto) = $P(\bigcup_{i=1}^n A_i)$

$$P\left(\bigcup_{i=1}^n A_i\right) = \sum_{i=1}^n P(A_i) - \sum_{1 \le i < j \le n} P(A_i \cap A_j) + \sum_{1 \le i < j < k \le n} P(A_i \cap A_j \cap A_k) - \dots$$

$P(A_i) = \frac{1}{n}$ $P(A_i \cap A_j) = \frac{1}{n} \cdot \frac{1}{(n-1)}$

$$P\left(\bigcup_{i=1}^n A_i\right) = \underbrace{\sum_{i=1}^n P(A_i)}_{n \cdot \frac{1}{n} = 1} - \underbrace{\sum_{1 \le i < j \le n} P(A_i \cap A_j)}_{C^n_2 \cdot \frac{1}{n(n-1)}} + \underbrace{\sum_{1 \le i < j < k \le n} P(A_i \cap A_j \cap A_k)}_{C^n_3 \cdot \frac{1}{n(n-1)(n-2)}} - \dots$$

$C^n_2 = \frac{n!}{(n-2)!\,2!}$ $C^n_3 = \frac{n!}{(n-3)!\,3!}$

$\frac{n!}{2!\,\underbrace{n(n-1)(n-2)!}_{n!}} = \frac{1}{2!}$ $\frac{1}{3!}$

$$P_n = P\left(\bigcup_{i=1}^n A_i\right) = 1 - \frac{1}{2!} + \frac{1}{3!} - \frac{1}{4!} + \dots$$

(b) $\lim_n P_n = 1 - e^{-1}$ Taylor de exp

$e^x = 1 + x + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots$

$e^{-x} = 1 - x + \frac{x^2}{2!} - \frac{x^3}{3!} + \dots$

$-e^{-x}\Big|_{x=1} = -1 + x - \frac{x^2}{2!} + \frac{x^3}{3!} - \dots$

$-e^{-1} = -1 + 1 - \frac{1}{2!} + \frac{1}{3!} - \dots$

$1 - e^{-1} = 1 - \frac{1}{2!} + \frac{1}{3!} - \dots$