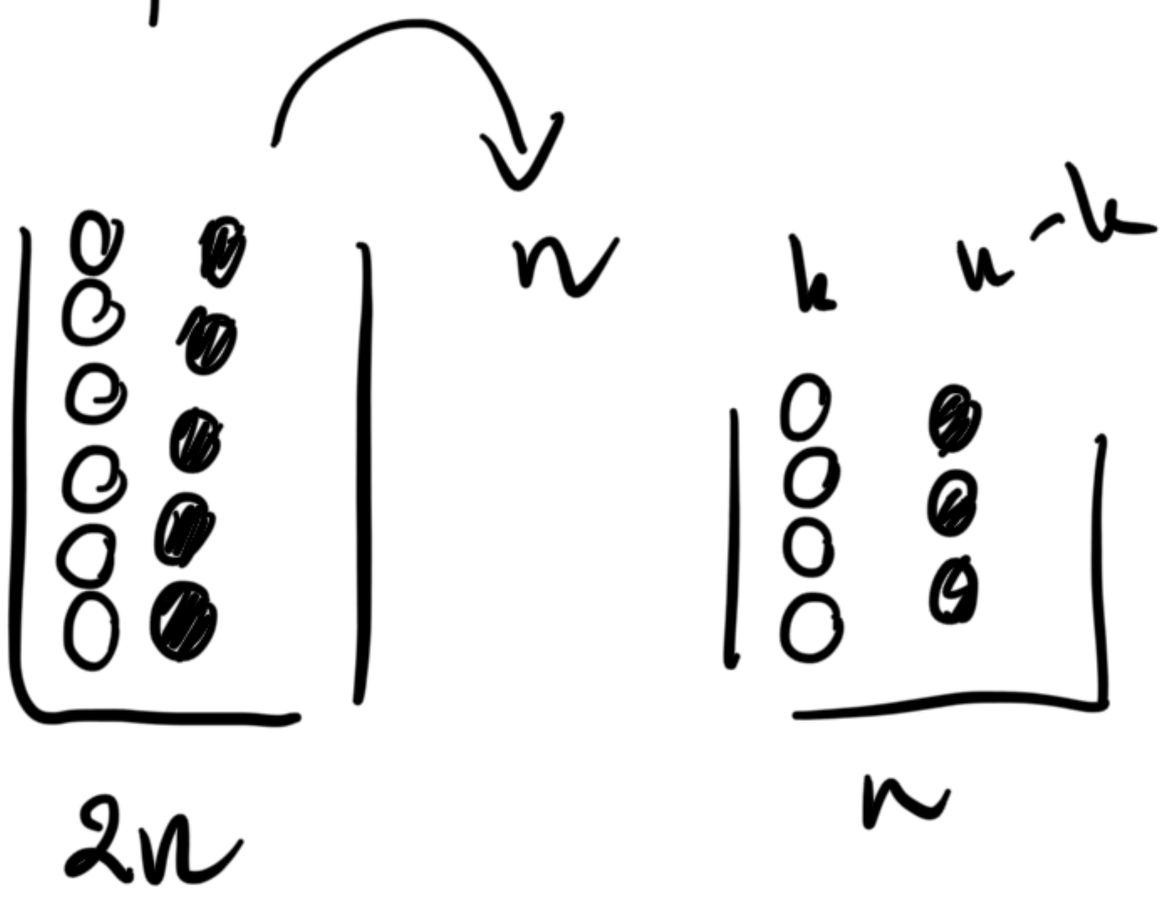
$$\binom{2n}{n} \overset{?}{=} \sum_{k=0}^{n} \binom{n}{k}^2 =$$

$$= \sum_{k=0}^{n} \binom{n}{k}\binom{n}{n-k}$$

choix 0 ↑ ↑ # choix ●



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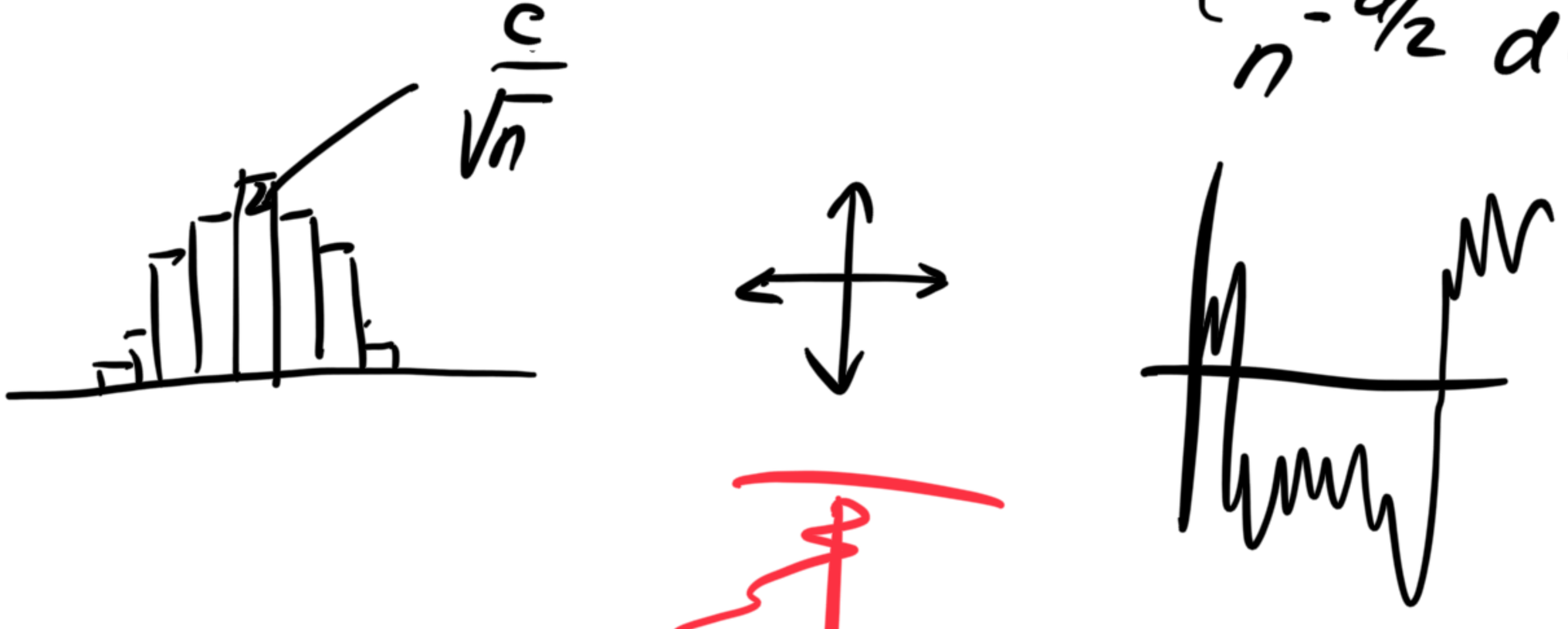
retours en 0 de la M.A. sur $\mathbb{Z}^d$.

$$\mathbb{P}[\text{être en 0 après } 2n \text{ pas}] = \begin{cases} \frac{1}{\sqrt{n}} & d=1 \\ \left(\frac{1}{\sqrt{n}}\right)^2 & d=2 \\ n^{-d/2} & d \in \mathbb{N} \end{cases}$$



$$\mathbb{E}[\#\text{ retours}] = \sum_{n \geq 1} \left(\frac{1}{\sqrt{n}}\right)^d = \begin{cases} \infty & d=1,2 \\ < \infty & \text{si } d \geq 3. \end{cases}$$