6 черни

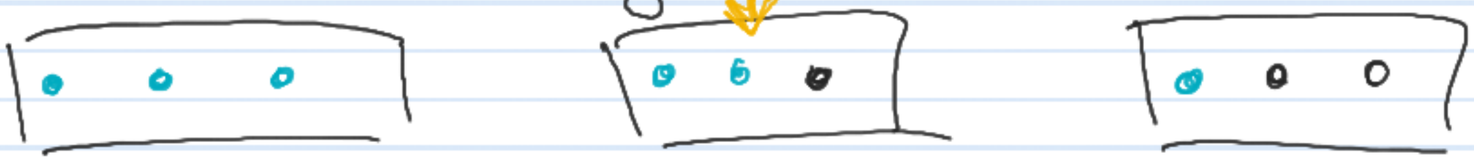
4 бели

3 черни

7 бели

$\boxed{+1 \text{ бяла}}$

Теглим докато изтеглим бяла



$\frac{4}{10} \cdot \frac{7}{10}$ $\qquad$ $\frac{54}{100}$ $\qquad$ $\frac{6}{10} \cdot \frac{3}{10}$

$1 \to 1$

0

$\frac{2}{3} \to \frac{3}{2}$

$\frac{1}{3} \cdot \frac{2}{3}$

$\frac{1}{3} \to \frac{3}{1}$

$\frac{2}{3} \cdot \frac{1}{3}$

В-стта да изтеглим бяла на I

$$\frac{28}{100} \cdot 1 + \frac{54}{100} \cdot \frac{2}{3} + \frac{18}{100} \cdot \frac{1}{3} = \frac{7}{10} \; ; \; \frac{3}{10} \cdot \frac{7}{10} = \frac{21}{100}$$

В-стта да изт. бяла на 2-то за I път

$$\frac{28}{100} \cdot 0 + \frac{54}{100} \cdot \frac{2}{9} + \frac{18}{100} \cdot \frac{2}{9} = \frac{144}{900} = \frac{72}{450} = \frac{8}{50} = \frac{4}{25} = \boxed{\frac{16}{100}}$$

108
36

$$\mathbb{P}(A) = \sum_i \mathbb{P}(A \mid H_i)\,\mathbb{P}(H_i)$$

$\{H_i\}$ е пълна гр. от съб.

$$\mathbb{E}X = \sum_i \mathbb{E}(X \mid H_i)\,\mathbb{P}(H_i)$$

очакването на X, ако е изпълнено H_i

$$\mathbb{E}(X+Y) = \mathbb{E}X + \mathbb{E}Y$$

$$\mathbb{E}(cX) = c\,\mathbb{E}X$$

n монети

1 2 3 . . . n

p – $\mathbb{P}$(да изт. кой да е)

$$X_k = \begin{cases} 1, & \text{ако изтеглим мон. } k \\ 0, & \text{ако не я изтеглим} \end{cases}$$

$\sim Ber(p)$; $\mathbb{E}X_k = p$

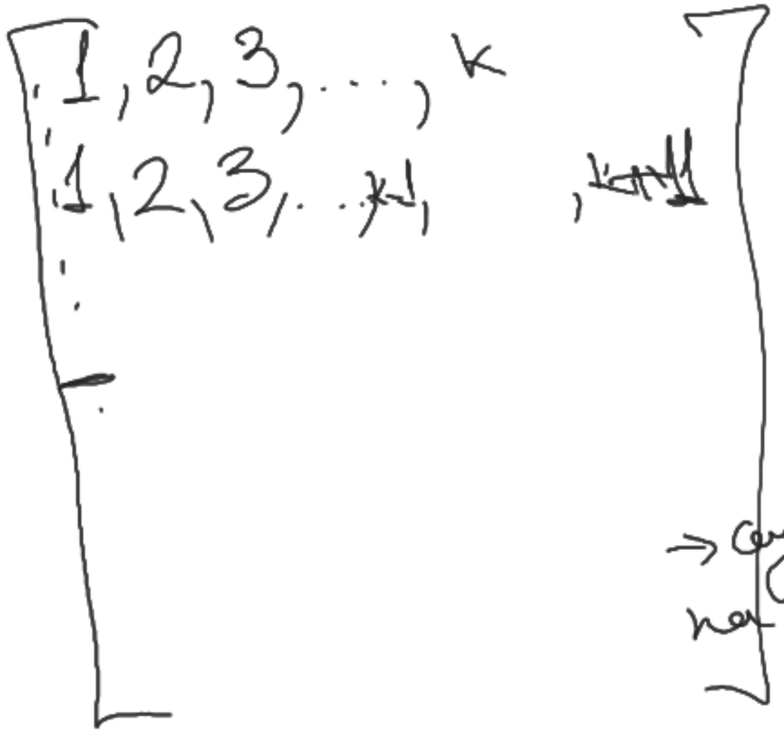
$$\mathbb{E}(1\cdot X_1 + 2\cdot X_2 + 3\cdot X_3 + \dots + nX_n)$$

$$= 1\cdot \underbrace{\mathbb{E}X_1}_{p} + 2\underbrace{\mathbb{E}X_2}_{p} + \dots + n\underbrace{\mathbb{E}X_n}_{p}$$

$$= p\cdot(1+\dots+n) = \frac{n\cdot(n+1)}{2}\cdot p$$

$$\mathbb{E}(\text{сума}) = \sum \mathbb{E}(\text{сума} \mid \text{изтеглени са } k) \binom{n}{k} p^k (1-p)^{n-k}$$

$k=1 \rightarrow \frac{1+2+\dots+n}{n} \cdot \binom{n}{1} p (1-p)^{n-1} \rightarrow \frac{n+1}{2} \cdot n \cdot p (1-p)^{n-1}$



→ имаме $\binom{n}{k}$ възможности

→ сумата на всички $(1+2+3+\dots+n) \cdot \binom{n-1}{k-1}$

$$= \sum_k \frac{\frac{n(n+1)}{2} \binom{n-1}{k-1}}{\binom{n}{k}} \cdot \binom{n}{k} p^k (1-p)^{n-k} = \frac{n(n+1)}{2} \sum_k \binom{n-1}{k-1} p^k (1-p)^{n-k} = p \frac{n(n+1)}{2}$$

X	0	1
	$1-p$	p

$\rightarrow$

X	0	1	2	3	4
	$1-p$	p	0	0	0

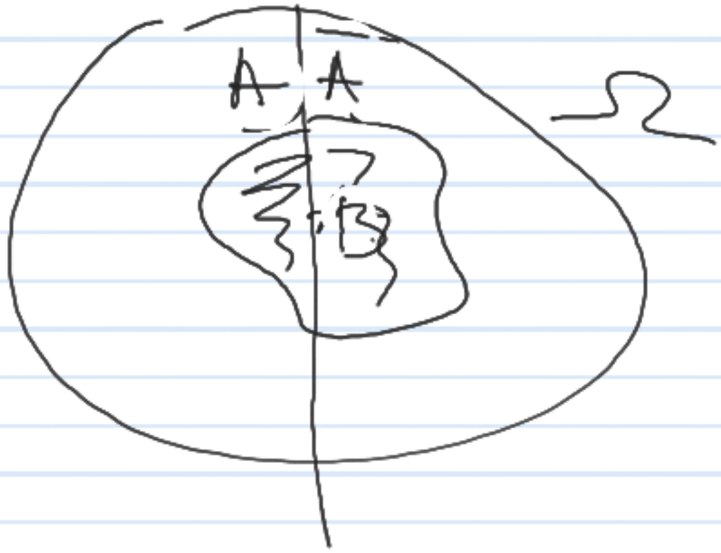
$X \overset{d}{=} Y \qquad \mathbb{P}(X=a) = \mathbb{P}(Y=a)$

$$1 \geq \mathbb{P}(A \cup B \cup C) = \mathbb{P}(A) + \mathbb{P}(B) + \mathbb{P}(C) - \boxed{\sum \mathbb{P}(A \cap B)} + \mathbb{P}(A \cap B \cap C)$$

$\sum \mathbb{P}(A \cap B) \leq 1$

$$\boxed{1 \geq 3a - 1} \Rightarrow a \leq \frac{2}{3}$$

$$P(A \cap B) + P(\bar{A} \cap B) = P(B)$$



$$P(A \cap B) = P(A)P(B)$$

$$P(A)P(B) + P(\bar{A} \cap B) = P(B)$$

$$\Rightarrow \quad P(\bar{A} \cap B) = P(B)(1 - P(A))$$

$$= P(B) \cdot P(\bar{A})$$

$$\Rightarrow \bar{A} \perp\!\!\!\perp B$$

$X = \#$ хора докато имат 2-ма с еднакъв РД

$P(X=k) = P($ до $(k-1)$ нямат равни $\cap$ k-тият е някой от предишните$)$

$$= \frac{365}{365} \cdot \frac{364}{365} \cdots \frac{365-k+2}{365} \cdot \frac{k-1}{365}$$

1 2

за $k \geq 2$

$$\boxed{P(X=1)=0}$$