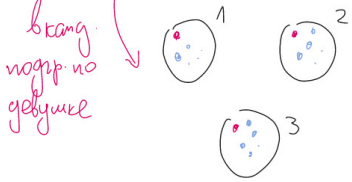
дз 2

(2.1) один выигр.: $\frac{\binom{6}{1}\cdot\binom{43}{5}}{\binom{49}{6}}$ два: $\frac{\binom{6}{2}\cdot\binom{43}{4}}{\binom{49}{6}}$

$$P(\text{Не менее трех}) = 1 - \frac{\binom{43}{6}}{\binom{49}{6}} - \frac{\binom{6}{1}\cdot\binom{43}{5}}{\binom{49}{6}} - \frac{\binom{6}{2}\cdot\binom{43}{4}}{\binom{49}{6}}$$

miro

(2.2) Зп но



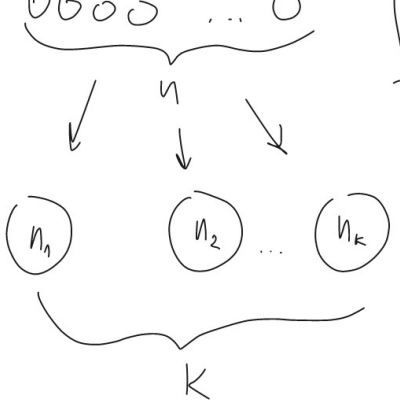
$$P(\text{все g в разных}) = \frac{3!\cdot\binom{3n}{n}\binom{2n}{n}}{\binom{3(n+1)}{n+1}\cdot\binom{2(n+1)}{n+1}}$$

решить в какой гр какая девушка

составить группы

miro

(2.3)



$$\frac{\binom{n}{n_1}+\binom{n-n_1}{n_2}+\binom{n-n_1-n_2}{n_3}+\ldots+\binom{n-n_1-\ldots-n_{k-1}}{n_k}}{k^n}$$

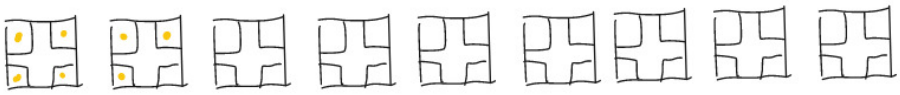
miro

9 купе по 4 места

2.4 Продано 7 бил. Вероятность что оказались заняты ровно

а) 2 купе

б) 3 купе

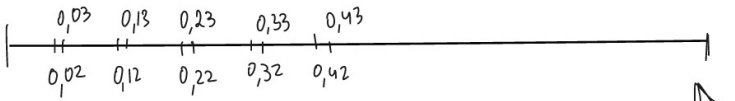


$$\frac{\binom{9}{2}\cdot 2\cdot\binom{4}{3}}{\binom{36}{7}} = \frac{8\cdot\binom{9}{2}}{\binom{36}{7}}$$

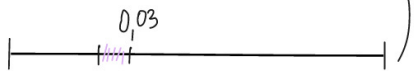
б) $4^3\cdot\frac{\binom{9}{3}\cdot\binom{9}{4}}{\binom{36}{7}}$ ← 3х посадили, остальных раскидываем в разные купе

miro

2.5



такие тут 10



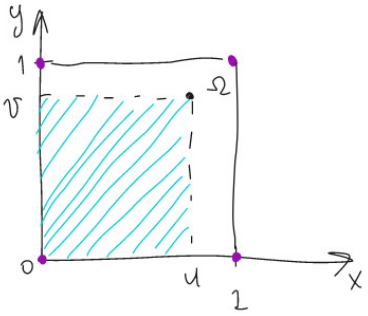
$0, n_1 2 n_3 \dots$

$0{,}01$ – длина

Вся длина интервалов $10 \cdot 0{,}01 = 0{,}1$ $\quad \frac{0{,}1}{1} = \frac{1}{10}$

miro

2.6



а) $P\{X < u, Y < v\} = P\{X < u\} \cdot P\{Y < v\} = uv$

$\forall\ u, v \in (0,1)$

Т.к. X не зав от Y, то $A = \{X < u\}$, $B = \{Y < v\}$ – незав. события.

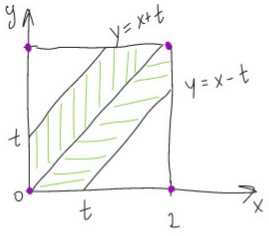
Значит, $P(A \cap B) = P(A) \cdot P(B)$

$P(A \cap B) = \frac{\lambda(A \cap B)}{\lambda(\Omega)} = \frac{u \cdot v}{1}$

miro

5) $0 < t < 1$

1) $P\{|X-Y| < t\}$

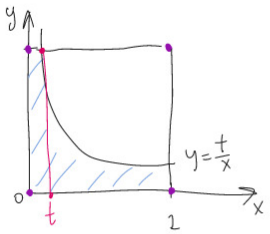


$\begin{cases} x-y=t \\ x-y=-t \end{cases}$

$S_{инт.} = 1-(1-t)^2$

$P\{|X-Y| < t\} = \dfrac{1-(1-t)^2}{1}$

2)

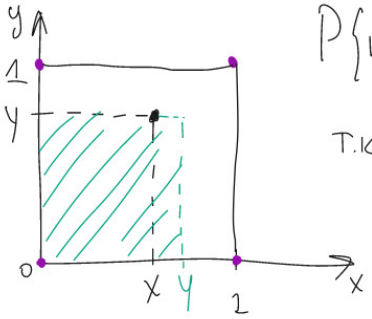


$X \cdot y = t \Rightarrow y = \frac{t}{x}$

$S_{инт.} = t + \int_t^1 \frac{t}{x}\,dx = t + t \cdot \ln|x| \Big|_t^1 = t - t \cdot \ln|t|$

$P\{Xy < t\} = \dfrac{t(1-\ln|t|)}{1}$

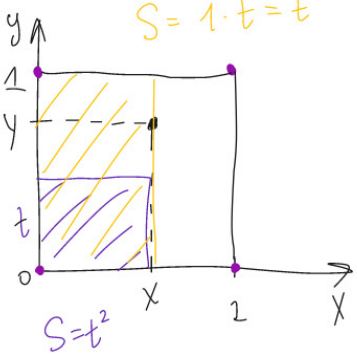
3)



$P\{\max(x,y) < t\} = \dfrac{t^2}{1}$

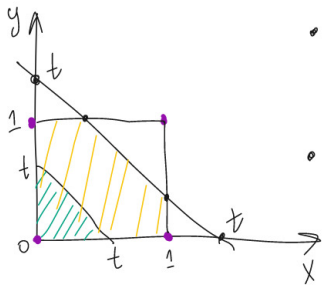
т.к. все параметры не max значения могут меняться от 0 до этого max значения

4)



$P\{\min(x,y) < t\} = \dfrac{t-t^2}{1}$

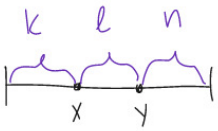
в) $P\{X+Y < t \mid t \in (0,2)\}$



- $t \in (0,1]$ $\quad \frac{t^2}{2}$
- $t \in [1,2)$ $\quad \frac{t^2}{2} - (t-1)^2 = 1 - \frac{(2-t)^2}{2}$

miro

2.8



$$\begin{cases} \min(x,y) + |y-x| > 1 - \max(x,y) \\ |y-x| + 1 - \max(x,y) > \min(x,y) \\ \min(x,y) + 1 - \max(x,y) > |y-x| \end{cases}$$

1) $\min(x,y) + |y-x| > 1 - \max(x,y)$

$x + y + |y-x| = 1$

$2\max(x,y) = 1$

$\max(x,y) > \frac{1}{2}$

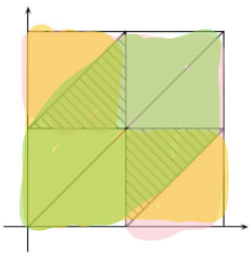
min | | max

2) $|y-x| + 1 - \max(x,y) > \min(x,y)$

$1 > x + y - |y-x|$ (max)

$1 > 2\min(x,y)$ (min) $\Rightarrow$ 2 min

$\frac{1}{2} > \min(x,y)$



3) $\min(x,y) + 1 - \max(x,y) > |y-x|$

$1 > |y-x| + \max - \min$

$1 > 2|y-x|$

miro