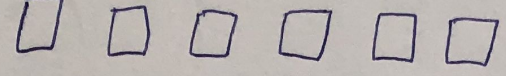
07.12.

СЕМ упр.

1 зад



6 цифри м/у 0 и 9

1) $\mathbb{P}$(сумата от цифрите = 21) = ?

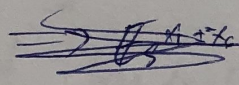
$4+4+4+4+5+0 \longrightarrow \frac{6!}{4!} = 30$

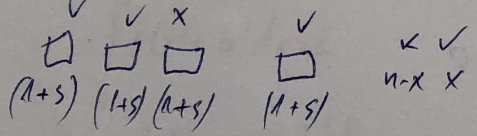
$X_i \sim Unif(\{0,1,\dots 9\})$, т.е. $\mathbb{P}(X_1 = k) = 1/10$ за $k = 0,1,\dots 9$

$\mathbb{E}s^{X_1+\dots+X_n} = \mathbb{E}s^{X_1}s^{X_2}\dots s^{X_n} \overset{\text{нез}}{=} \mathbb{E}s^{X_1}\mathbb{E}s^{X_2}\dots\mathbb{E}s^{X_n}$ еди.разпр $(\mathbb{E}s^{X_1})^4$

$\mathbb{E}s^X = s^0p_0 + s^1p_1 + s^2p_2 + \dots$

$\mathbb{E}s^{X_1} = s^0\frac{1}{10} + s^1\frac{1}{10} + \dots + s^9\frac{1}{10} = \frac{1}{10}(1+s+\dots+s^9) = \frac{1}{10}\cdot\frac{1-s^{10}}{1-s}$

 $\longrightarrow \mathbb{E}s^{X_1+\dots+X_6}$



$s^k\binom{n}{k}p^k(1-p)^{n-k}$

2) $\mathbb{P}(X_1+X_2+X_3 = X_4+X_5+X_6) = ?$

$= \sum_k \mathbb{P}(X_1+\dots X_3 = k)\cdot\mathbb{P}(X_4+X_5+X_6 = k) = \sum_k (\text{коеф пред } s^k \text{ в } \mathbb{E}s^{X_1+X_2+X_3} = (\mathbb{E}s^{X_1})^3)^2$