Д/З 5. а) $p = \frac{1}{3} \Rightarrow q = 1 - p = \frac{2}{3}$

$$P(A) = C_5^2 \left(\frac{1}{3}\right)^2 \cdot \left(\frac{2}{3}\right)^3 = \frac{5 \cdot \cancel{4}^{2}}{\cancel{2}} \cdot \frac{1}{3^2} \cdot \frac{8}{3^3} = \frac{10 \cdot 8}{3^5} = \underline{\frac{80}{243}}$$

б) $P(A) \geq 0{,}8$ $\quad P(B) \geq 0{,}8$

$P(A \cap B) \geq 0{,}6$?

Якщо A та B – незалежні ($A_н$ та $B_н$)

$P(A\cap B) \geq P(A_H \cap B_H) = P(A_H) \cdot P(B_H) = 0{,}8 \cdot 0{,}8 = 0{,}64$

$0{,}64 \geq 0{,}48 \geq P(A\cap B)$

2) $|P(A\cap B) - P(A\cap C)| \leq P(B \triangle C)$

$|P(A\cap B) - P(A\cap C)| \leq P((A\cap B) \setminus P(A\cap C)) \leq P(B \setminus C) \leq P(B\triangle C)$

3) $P(\bigcap_{i=1}^{n} A_i) \geq 1 - \sum_{i=1}^{n} P(\bar{A}_i) - (n-1)$

$P(\bigcap_{i=1}^{n} A_i) = P(\overline{\bigcup_{i=1}^{n} \bar{A}_i}) = 1 - P(\bigcup_{i=1}^{n} \bar{A}) \Rightarrow P(\bigcup_{i=1}^{n} \bar{A}) =$

$= 1 - P(\bigcap_{i=1}^{n} A_i) \leq \sum_{i=1}^{n} P(\bar{A}_i) \Rightarrow P(\bigcap_{i=1}^{n} A_i) \geq 1 - \sum_{i=1}^{n} P(\bar{A}_i)$

Нехай $1 - \sum_{i=1}^{n} P(\bar{A}_i) = P(B)$

$P(\bar{B}) = \sum_{i=1}^{n} P(\bar{A}_i) > \sum_{i=1}^{n} (1 - P(A_i)) = n - \sum_{i=1}^{n} P(A_i)$

$P(\bar{B}) = 1 - P(\bar{B}) = 1 - n + \sum_{i=1}^{n} P(A_i) \Rightarrow P(\bigcap_{i=1}^{n} A_i) \geq 1 - n +$

$+ \sum_{i=1}^{n} (P(A_i))$

4) $|\Omega_k| = 6 \cdot 6 = 36$

$A_6 = \{[1;4], [2;3], [3;2], [4,1]\}$

$|A_6| = 4$

$P(A_6) = \frac{1}{9} \Rightarrow \overline{P(A_6)} = \frac{8}{9}$

$1 - \left(\frac{8}{9}\right)^n \geq \frac{95}{100} \Rightarrow 1 - \left(\frac{8}{9}\right)^n = \frac{19}{20}$

$\left(\frac{8}{9}\right)^n \geq \frac{1}{20}$

$n \geq \log_{\frac{8}{9}} \frac{1}{20}$