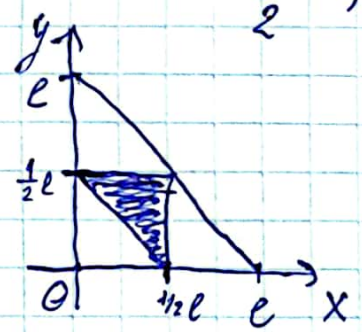
1) $\Omega = \{(x,y) \mid 0 < x+y < \ell,\ x>0,\ y>0\}$

$A = \{(x,y) \mid (x < y + (\ell - x - y)) \wedge (y < x + (\ell - x - y)) \wedge$

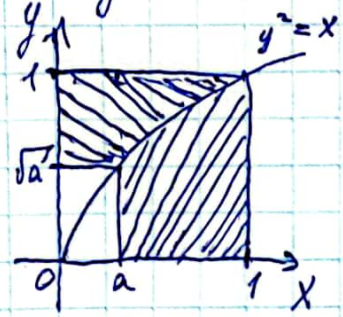
$\wedge (\ell - x - y < x + y)\} \Rightarrow$

$\Rightarrow x < \frac{\ell}{2},\ y < \frac{\ell}{2},\ x+y > \frac{\ell}{2}$



$$P(A) = \frac{S(A)}{S(\Omega)} = \frac{\frac{1}{8}\cdot\ell^2}{\frac{1}{2}\cdot\ell^2} = \frac{1}{4}$$

2) $\begin{cases} y^2 > x,\ y > \sqrt{a} \\ y^2 \leq x,\ x > a \end{cases}$



$$P(A) = 1 - a\sqrt{a}$$

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

$= (P(A) + P(B) - P(A))\,P(A \cap B) =$

$= P(A)P(B) + P(B)P(B) - P(A \cup B) =$

$= P(A)P(B) - P((A \cup B) \setminus B) \leq P(A)P(B)$