септембар 1 2022.

1. $A(1,1,0)\quad B(-1,3,-2)\quad C(2,-3,1)\quad D(0,1,1)$

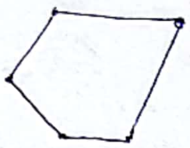
$$\vec{AB}=(-2,2,-2)$$
$$\vec{AC}=(1,-4,1)$$
$$\vec{AD}=(-1,0,1)$$

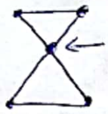
$$[\vec{AB},\vec{AC},\vec{AD}]=\begin{vmatrix}-2 & 2 & -2\\ 1 & -4 & 1\\ -1 & 0 & 1\end{vmatrix}=-2(-4)-2(1+1)-2(-4)=8-4+8=12$$

$\boxed{12\neq 0 \Rightarrow \text{нису компланарне}}$

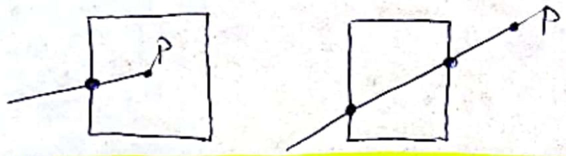
$$\boxed{V=\frac{1}{6}\left|[\vec{AB},\vec{AC},\vec{AD}]\right|=\frac{12}{6}=2}$$

2. Проста полигонска линија је полигон који нема самопресеке, тј. унутрашње дијагонале му се не секу.





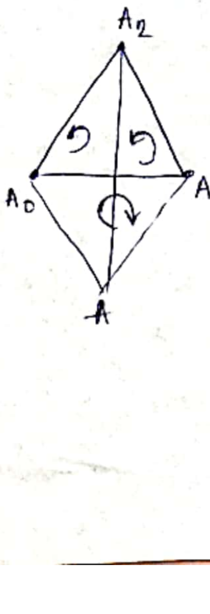
Повучемо полуправу из тачке на полигон, ако је број тачака пресека са полигоном паран, она је ван полигона, у супротном она је унутар полигона.



$$\boxed{P(A_0,A_1,\dots,A_{n-1})=P(A,A_0,A_1)+\dots+P(A,A_{n-1},A_0)}$$

(б) $P(A_0A_1A_2)=\frac{1}{2}D_{A_0A_1A_2}$

$n=3$



$$P(AA_0A_1)+P(AA_1A_2)+P(AA_2A_0)=P(A_0A_1A_2)$$

(ик) $P(A_0A_1\dots A_{n-1}A_n)=P(A_0A_1\dots A_{n-1})+P(A_0A_{n-1}A_n)\overset{ux}{=}$

$=P(AA_0A_1)+\dots+P(AA_{n-2}A_{n-1})+\cancel{P(AA_{n-1}A_0)}+\cancel{P(AA_0A_{n-1})}+$

$+P(AA_{n-1}A_n)+P(AA_nA_0)=$

$=P(AA_0A_1)+\dots+P(AA_{n-2}A_{n-1})+P(AA_{n-1}A_n)+P(AA_nA_0)$

③ a) $y^2 = 4x-6$

$-2x+y+3=0 \rightarrow y = 2x-3$

$4x^2-12x+9 = 4x-6$

$4x^2-16x+15=0$

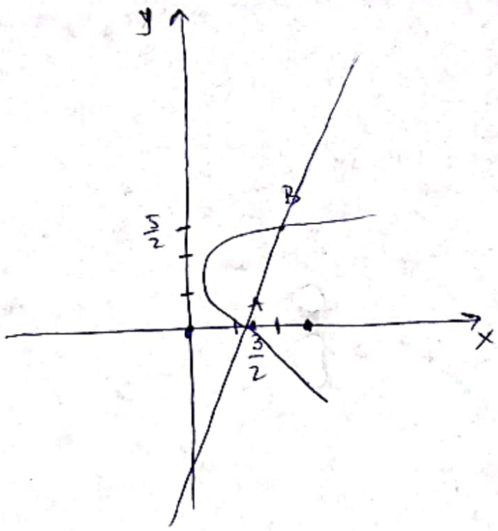
$x_{1,2} = \dfrac{16 \pm \sqrt{256-240}}{8} = \dfrac{16\pm 4}{8} = \begin{cases} \frac{20}{8} = \frac{5}{2} \\ \frac{12}{8} = \frac{3}{2} \end{cases}$

$\left.\begin{array}{ll} x_1 = \frac{5}{2} & y_1 = 2 \\ x_2 = \frac{3}{2} & y_2 = 0 \end{array}\right\} \Rightarrow \boxed{\begin{array}{l} A\left(\frac{3}{2}, 0\right) \\ B\left(\frac{5}{2}, 2\right) \end{array}}$

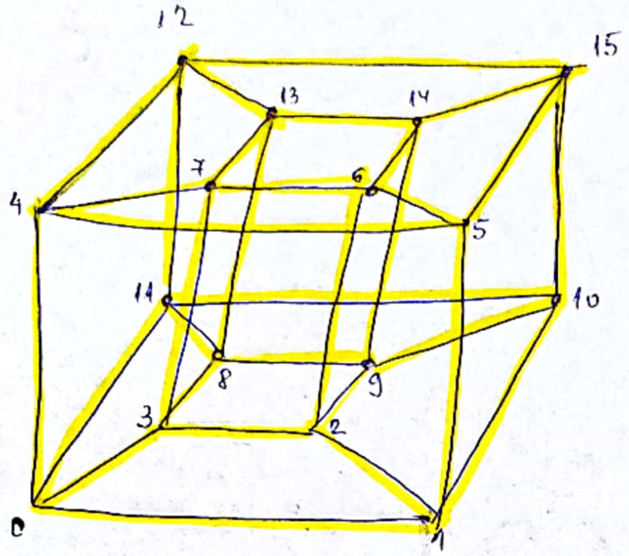
б) $x = \dfrac{t^2}{2p}$, $y = t$ → стандардна параметризација

$\boxed{\begin{array}{l} y = t \in [0,2] \\ t^2 = 4x-6 \Rightarrow x = \dfrac{t^2+6}{4} \end{array}}$ $t \in [0,2]$

в)



(5.)



$\mathcal{I} = \{0, \dots, 15\}$

$P = \{0, \dots, 15\}$

$P_0 = \langle 0, 1, 5, 4 \rangle$

$P_1 = \langle 1, 5, 15, 10 \rangle$

$P_2 = \langle 15, 10, 11, 12 \rangle$

$P_3 = \langle 11, 12, 4, 0 \rangle$

$P_4 = \langle 0, 3, 2, 1 \rangle$

$P_5 = \langle 0, 3, 8, 11 \rangle$

$P_6 = \langle 8, 11, 10, 9 \rangle$

$P_7 = \langle 10, 9, 2, 1 \rangle$

$P_8 = \langle 4, 5, 6, 7 \rangle$

$P_9 = \langle 5, 6, 14, 15 \rangle$

$P_{10} = \langle 14, 15, 12, 13 \rangle$

$P_{11} = \langle 12, 13, 7, 4 \rangle$

$P_{12} = \langle 3, 8, 13, 7 \rangle$

$P_{13} = \langle 3, 2, 6, 7 \rangle$

$P_{14} = \langle 2, 9, 14, 6 \rangle$

$P_{15} = \langle 9, 8, 13, 14 \rangle$

32 38,

$I = \{01, 15, 54, 5\,15, 15\,10, 10\,1, 10\,11, 11\,12, 12\,4, 40, 03, 32, 38, 8\,11, 11\,0, 10\,9, 98, 92, 21, 56, 67, 74, 6\,14, 14\,15, 15\,12, 12\,13, 13\,14, 13\,7, 37, 8\,13, 9\,14, 26\}$ 32

$$\boxed{\chi(M) = P - I + P = 16 - 32 + 16 = 0}$$