VSZ1, 2.ZH PÓTLÁSA, 2022.12.05.

(1) a) (3) $\mathbb{P}(\text{ALADÁR CÉLBA TALÁL}) = \frac{1}{1+4\cdot1\cdot0.2+(0.2)^2\cdot\pi} = 0.5193 = p_1$

$\mathbb{P}(\text{BÉLA CÉLBA TALÁL}) = \frac{1}{1+4\cdot1\cdot0.3+(0.3)^2\cdot\pi} = 0.4028 = p_2$

b) X = ALADÁR CÉLBA TALÁLATAINAK SZÁMA $\sim Bin(100, p_1)$

(6) Y = BÉLA — " — — " — — " — $\sim Bin(100, p_2)$

$X^* := \frac{X - 100\cdot p_1}{\sqrt{100}} \approx N(0, p_1\cdot(1-p_1))$, $Y^* := \frac{Y - 100\cdot p_2}{\sqrt{100}} \approx N(0, p_2\cdot(1-p_2))$

↑ DE MOIVRE

$\mathbb{P}(X+Y \geq 98) = \mathbb{P}\left(\frac{X - 100\cdot p_1}{10} + \frac{Y - 100\cdot p_2}{10} \geq \frac{98 - 100\cdot(p_1+p_2)}{10}\right)$

$= \mathbb{P}(X^* + Y^* \geq 0.579) = 1 - \Phi\left(\frac{0.579}{0.7}\right) = 1 - 0.7967$

$= 0.2033$

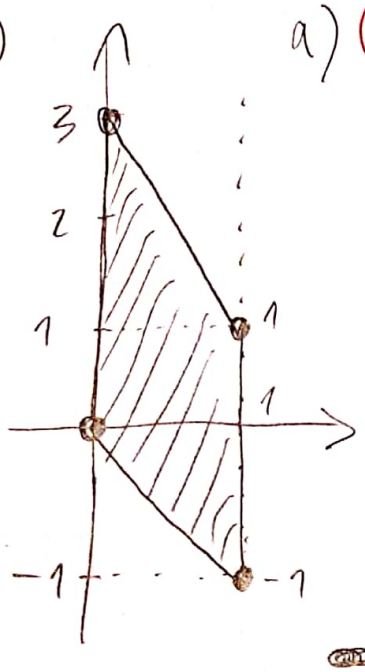
$Z^* \sim N(0, p_1\cdot(1-p_1) + p_2\cdot(1-p_2)) \sim N(0, \sigma^2)$

$\sigma^2 = 0.49$, $\sigma = 0.7$

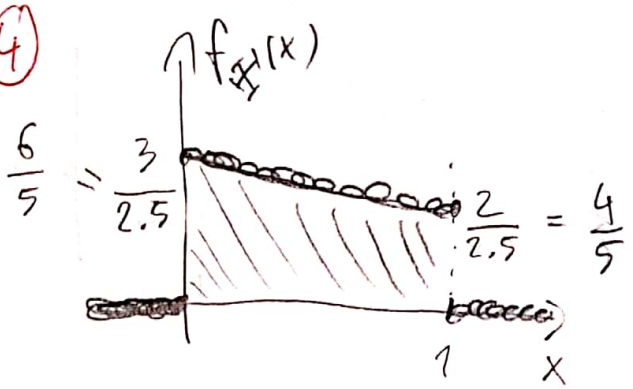
$\mathbb{P}(\text{ÖSSZESEN LEGALÁBB 98 ALKALOMMAL ELTALÁLJÁK A CÉLT}) \approx 0.2033$

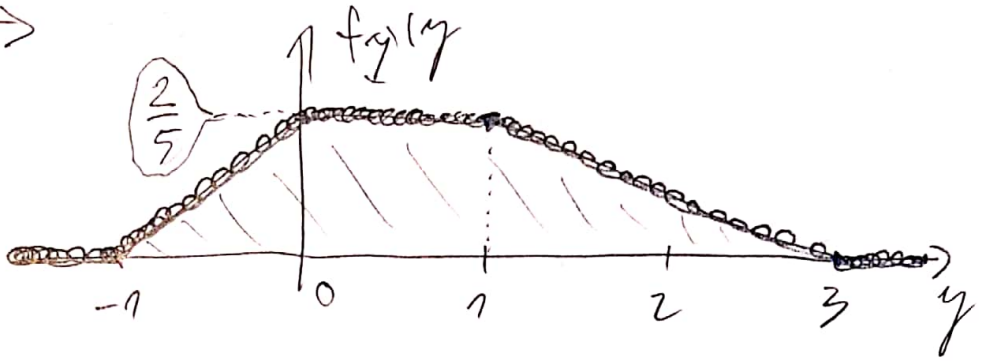
1.OLDAL

(2)



a) (4)





b) (3)

$$f_{X|Y}(x,y) = \begin{cases} \frac{1}{1+y} \cdot \mathbb{1}[x \in (-y, 1)] & \text{HA } y \in (-1, 0] \\ 1 \cdot \mathbb{1}[x \in (0,1)] & \text{HA } y \in [0,1] \\ \frac{2}{3-y} \mathbb{1}[x \in (0, \frac{3}{2} - \frac{y}{2})] & \text{HA } y \in [1,3) \end{cases}$$

$$\mathbb{P}(X < \tfrac{1}{2} \mid Y = 2) = 1$$

---

(3) $Y_i :=$ i-EDIK DOBÁS EREDMÉNYE, $i = 1, \dots, 10$

(4) $A_i := \{ Y_i + Y_{i+1}$ OSZTHATÓ 5-ÖC$\}$, $X_i := \mathbb{1}[A_i]$, $i = 1, \dots, 9$

$X = \sum_{i=1}^{9} X_i$, $E(X) = 9 \cdot \mathbb{P}(A_1) = 9 \cdot \frac{4+3}{36} = \frac{7}{4} = 1.75$

BÓ: (4) $\mathrm{Var}(X) = \sum_{i,j=1}^{9} \mathrm{Cov}(X_i, X_j) = 9 \cdot \frac{7}{36} \cdot (1 - \frac{7}{36}) + 18 \cdot C$,

AHOL $C = \mathrm{Cov}(X_1, X_2) = \mathbb{P}(A_1 \cap A_2) - (\frac{7}{36})^2$

$\hookrightarrow = (2+1+1+1+1+1+2)/(6)^3$

2.0 CPAL