MODEL 4

1) $X = X_1 \cdot X_2$

a) $P(X_1 > 1) = \frac{5}{10}$

X_1: 5 de 1, 4 de 2, un 3

X_2: 4 de 1, 4 de 2, 2 de 3

b) $P(X_2 \leq 2) = \frac{8}{10}$

c) $P(X=4) =$

$$X \sim \begin{pmatrix} 1 & 2 & 3 & 4 & 6 & 9 \\ & & & \frac{4}{25} & & \end{pmatrix}$$

$P(X_1 \cdot X_2 = 4) = P(X_1 = 2 \text{ și } X_2 = 2) = \frac{4}{10} \cdot \frac{4}{10} = \frac{16}{100} = \frac{8}{50} = \frac{4}{25}$

o desfacem

d) $P(X = 2 \mid X_2 \leq 1) = P(X = 2 \mid X_2 = 1) = \frac{P(X = 2 \cap X_2 = 1)}{P(X_2 = 1)} = \frac{P(X_1 \cdot X_2 = 2 \cap X_2 = 1)}{P(X_2 = 1)} =$

$= \frac{P[(X_1 = 1 \cap X_2 = 2) \cup (X_1 = 2 \cap X_2 = 1) \cap X_2 = 1]}{P(X_2 = 1)} =$

$= \frac{P[(\overbrace{X_1 = 1 \cap X_2 = 2 \cap X_2 = 1}^{=\emptyset}) \cup (X_1 = 2 \cap \overbrace{X_2 = 1 \cap X_2 = 1}^{=})]}{P(X_2 = 1)} = \frac{P(X_1 = 2 \cap \cancel{X_2 = 1})}{\cancel{P(X_2 = 1)}} = \frac{4}{10}$

2) $F_X, F_Y : \mathbb{R} \to [0,1]$

$$F = \begin{cases} 0 & x < 0 \\ \frac{x}{2} & 0 \leq x < 2 \\ 1 & 2 \leq x \end{cases}$$

a) $E(X-Y) = E(X) - E(Y) = 0$ că au acc. f. de repartiție

b) $P(X^2 \leq 4 \cap Y^2 \geq 4) = P(X^2 \leq 4) \cdot P(Y^2 \geq 4) =$ (↳ asta e o pct)

$= P(-2 \leq X \leq 2) \cdot P(Y \leq -2 \cup Y \geq 2) =$

$= (F(2) - F(-2))\,(F(-2) + 1 - F(2) - P(\text{prima nu a doua}))$

$= (1 - 0) \cdot (0 + \cancel{1} - \cancel{1} - 0) = 1 \cdot 0 = 0$

c) $P(\{X^2 \leq 4\} \cup \{Y^2 \geq 4\}) = 1 + 0 - 1 \cdot 0 = 1$ (de la b)