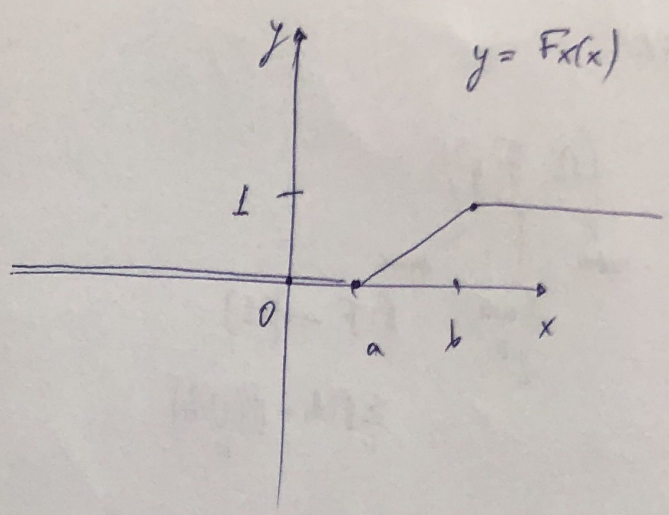
$$F_X(t) = \mathbb{P}(X \le t) = \begin{cases} 0 & t < a \\ \int_a^t \frac{1}{b-a}\,dy = \frac{t-a}{b-a} & t \in [a,b] \\ 1 & t > b \end{cases}$$



Zad $X \sim U([0,7])$

$Y = X\mathbb{1}_{\{X<5\}} + 5\mathbb{1}_{\{X \ge 5\}}$

1) $\mathbb{P}(Y<4) = \mathbb{P}(X<4) = \frac{4}{7}$

2) $\mathbb{E}Y = \mathbb{E}X\mathbb{1}_{\{X<5\}} + 5\mathbb{1}_{\{X \ge 5\}} = \mathbb{E}X\mathbb{1}_{\{X<5\}} + \mathbb{E}5\mathbb{1}_{\{X \ge 5\}} = \int_0^7 t\mathbb{1}_{\{t<5\}}\,dt + \int_5^7 5\frac{1}{7}\,dt =$

$= \int_0^5 t\frac{1}{7}\,dt + \frac{10}{7} = \frac{45}{14}$

3) $\mathbb{D}Y = \mathbb{E}Y^2 - (\mathbb{E}Y)^2$

$\mathbb{E}Y^2 = \mathbb{E}$