$$P(A_1 \cap A_2 \cap \ldots \cap A_n) > 0$$

$$P(A_1 \cap A_2 \cap \ldots \cap A_n) =$$
$$= P(A_{i_1}) P(A_{i_2} | A_{i_1}) P(A_{i_3} | A_{i_1} \cap A_{i_2})$$
$$\ldots P(A_{i_n} | A_{i_{n-1}} \cap \ldots \cap A_{i_1})$$

$i_1 \ldots i_n$ PERMUTAZIONE DI $1 \ldots n$

ALGEBRA $\neq$ σ- ALGEBRA

$\mathcal{F} = \{ A \subset \mathbb{N} \mid A$ FINITO o $\overline{A}$ FINITO$\}$

$B = \{$NUMERI PARI$\} \notin \mathcal{F}$

$$= \underbrace{\{0\}}_{\in \mathcal{F}} \cup \underbrace{\{2\}}_{\in \mathcal{F}} \cup \underbrace{\{4\}}_{\in \mathcal{F}} \cup \{6\} \cup \dots$$

RICOMPOSIZIONE

$A' \in \mathcal{F}'$ $\qquad f^{-1}(A') \in \mathcal{F}$

$$f^{-1}(A') \cap \Omega = f^{-1}(A') \cap \bigcup_n D_n$$

$$= \bigcup_n \left(f^{-1}(A') \cap D_n \right)$$

$$f^{-1}(A') \cap D_n = \{ \omega \in \Omega \mid f(\omega) \in A', \ \omega \in D_n \}$$

$$= \{ \omega \in D_n \mid f(\omega) \in A' \} =$$

$$= \{\omega \in D_n \mid f_n(\omega) \in A'\}$$

$$= f_n^{-1}(A') \in \mathcal{F}_{D_n} = \{A \cap D_n \mid A \in \mathcal{F}\}$$

$$= A_n \cap D_n$$

$$\underline{\underline{D_n \in \mathcal{F} \ \forall n}}$$

$$f^{-1}(A') = \bigcup_n (\underbrace{A_n}_{\in \mathcal{F}} \cap \underbrace{D_n}_{\in \mathcal{F}}) \in \mathcal{F}$$

$$G = \lambda F_1 + (1-\lambda) F_2$$

$$\lim_{x \to +\infty} G(x) = \lambda \underbrace{\lim_{x \to +\infty} F_1(x)}_{=1} + (1-\lambda) \underbrace{\lim_{x \to +\infty} F_2(x)}_{=1}$$

$$= \lambda + (1-\lambda) = 1$$

$$Y = \begin{cases} X_1 & \lambda \\ X_2 & 1-\lambda \end{cases}$$

$$= \begin{cases} X_1 & \text{SE } A \text{ È V} \\ X_2 & \text{F} \end{cases}$$

$$= 1_A X_1 + 1_{\overline{A}} X_2$$

$P(A) = \lambda$

A INDIP. DA X_1, X_2 (DA $\sigma(X_1, X_2)$)

$$G(x) = P(Y \leq x) =$$

$$= P(A)\, P(Y \leq x \mid A) + P(\bar{A})\, P(Y \leq x \mid \bar{A})$$

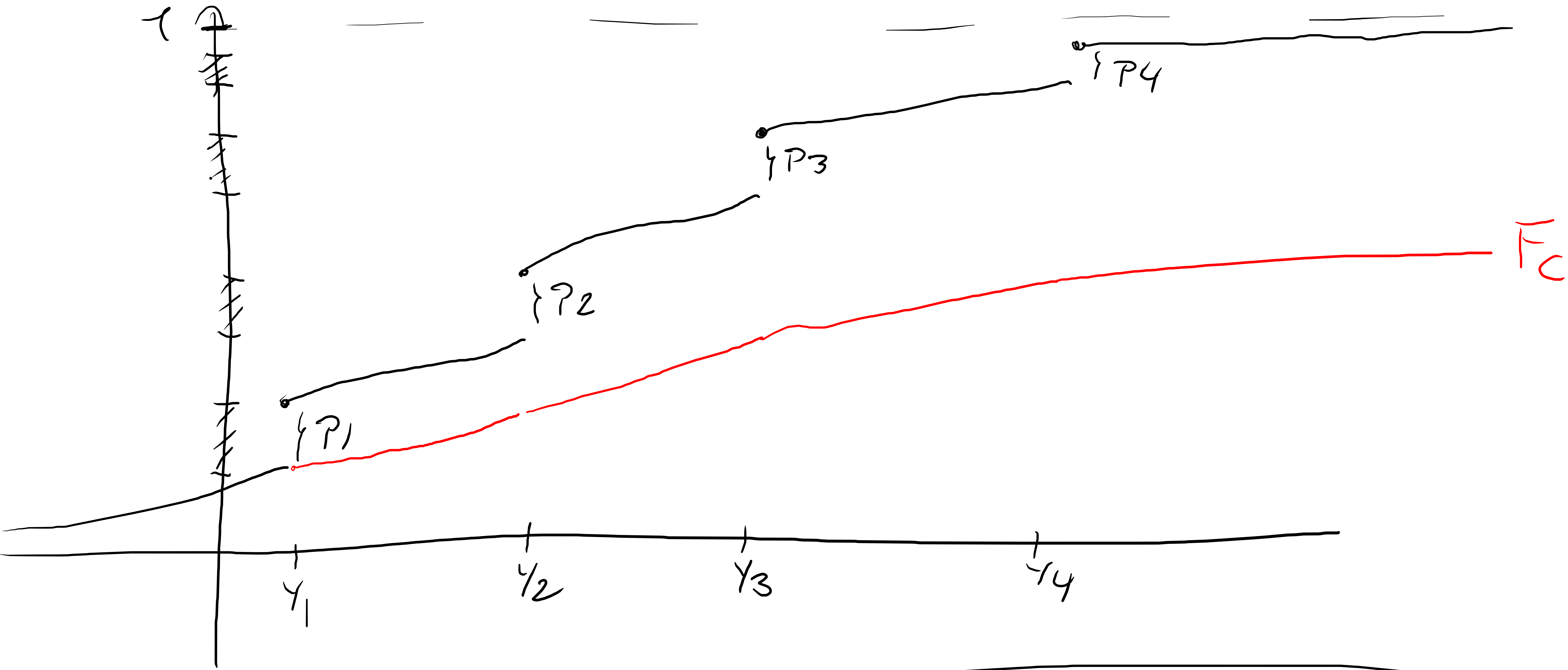
$$= \lambda\, P(X_1 \leq x \mid \cancel{A}) + (1-\lambda)\, P(X_2 \leq x \mid \cancel{\bar{A}})$$

$$= \lambda\, F_1(x) + (1-\lambda)\, F_2(x)$$

$$G = \sum_{i=1}^{m} \lambda_i F_i \qquad \lambda_i \geq 0 \qquad \sum_{i=1}^{m} \lambda_i = 1$$

$$\downarrow$$

$$Y = \left\{ \begin{array}{ll} x_1 & \lambda_1 \\ x_2 & \lambda_2 \\ \vdots & \\ x_m & \lambda_m \\ \vdots & \vdots \end{array} \right.$$



$$F_d(x) = \sum_{y_i \leq x} p_i$$

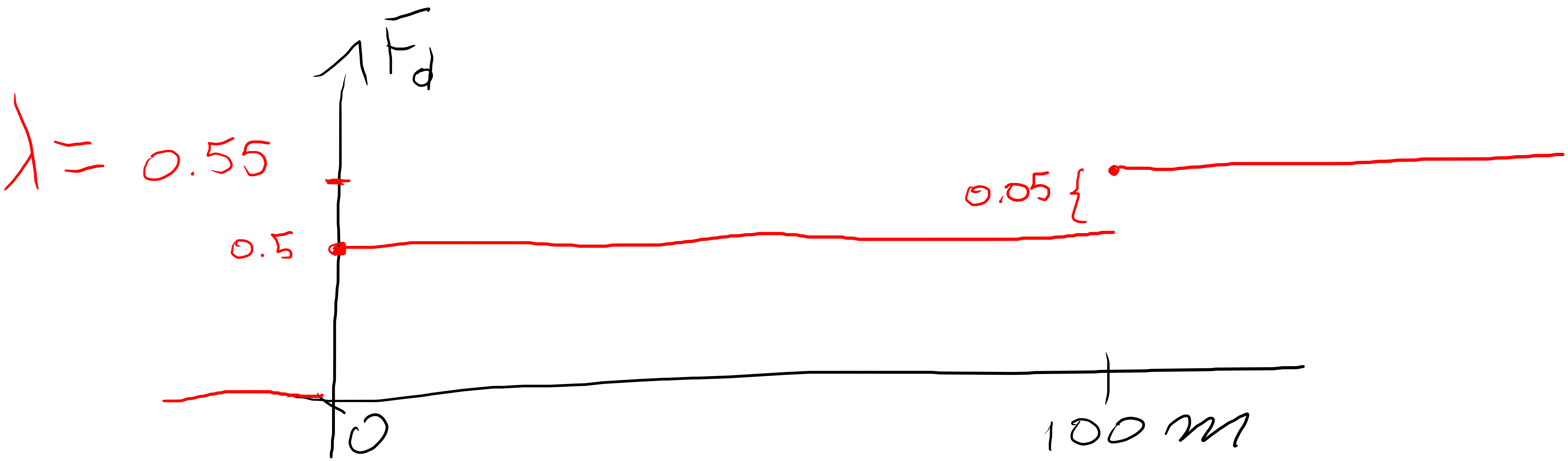
$$\boxed{\lim_{x \to +\infty} F_d(x) = p_1 + p_2 + p_3 + p_4 = \lambda < 1}$$

$$\lambda \tilde{F}_d + (1-\lambda)\tilde{F}_c = \lambda \frac{F_d}{\lambda} + (1-\lambda)\frac{F_c}{1-\lambda}$$

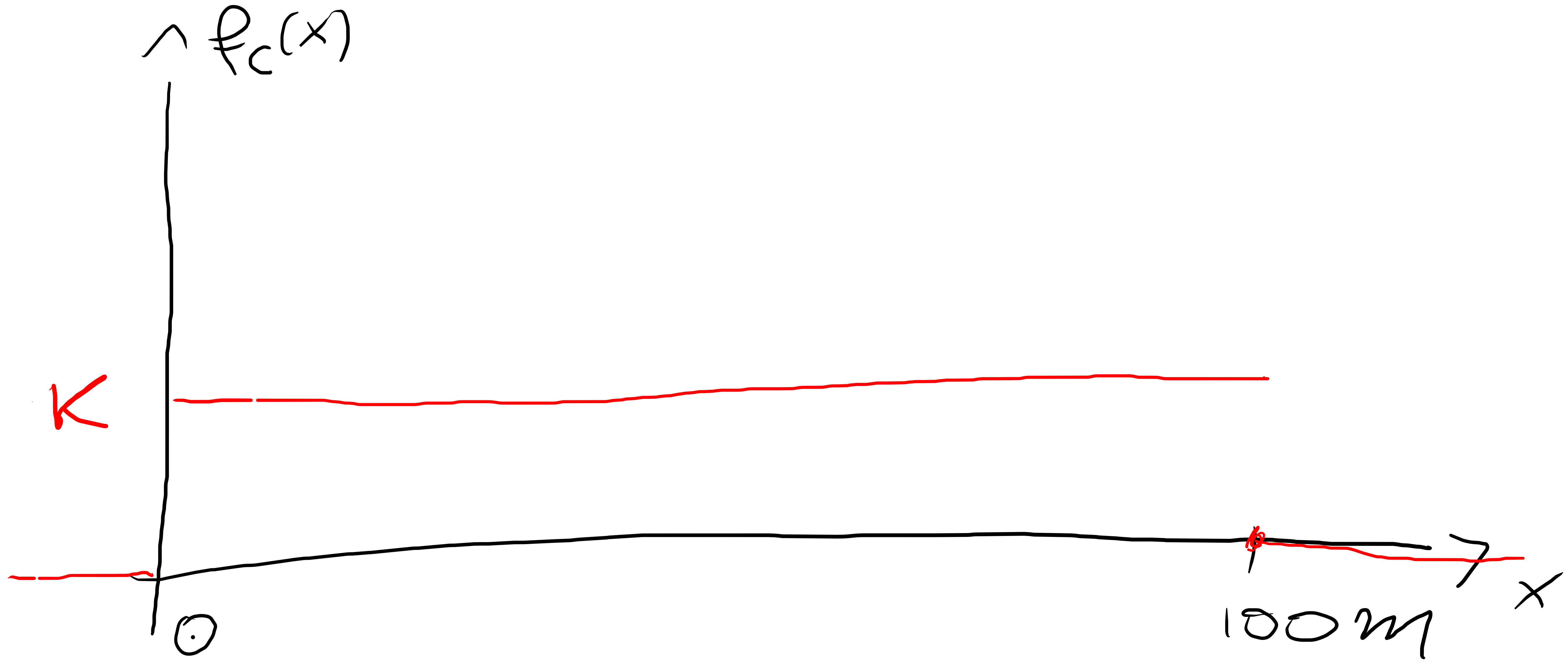
$$= F_d + \underbrace{F_c}_{F_x - F_d} = F_x$$

INCENDIO	PROB
0	50%
100 m	5%

PARTE DISCRETA



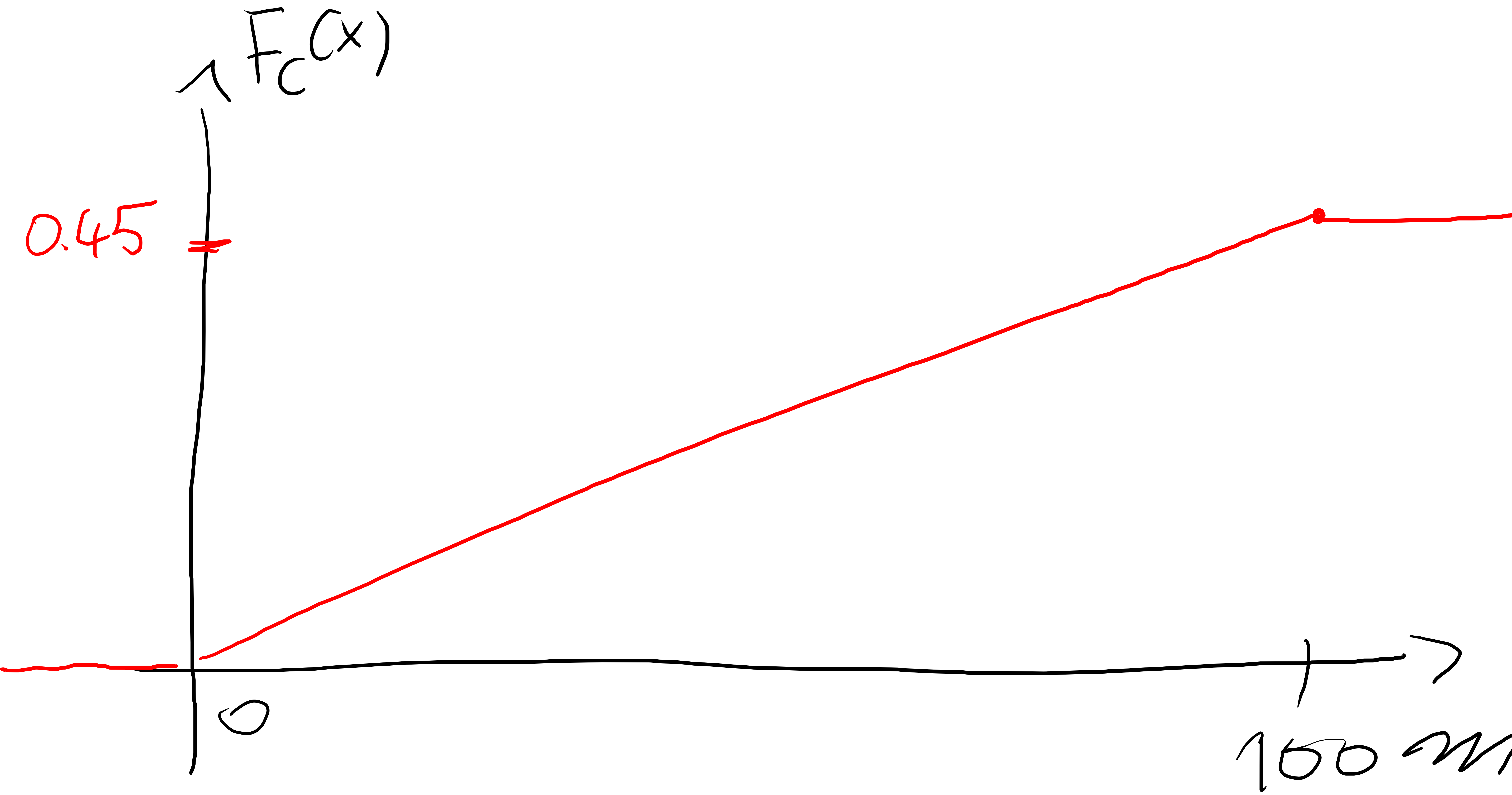
PARTE CONTINUA: UNIFORME TRA 0 E 100 m
TALE CHE LA PROB. È PARI A 45%



$K \cdot 100m =$

$= 0.45$

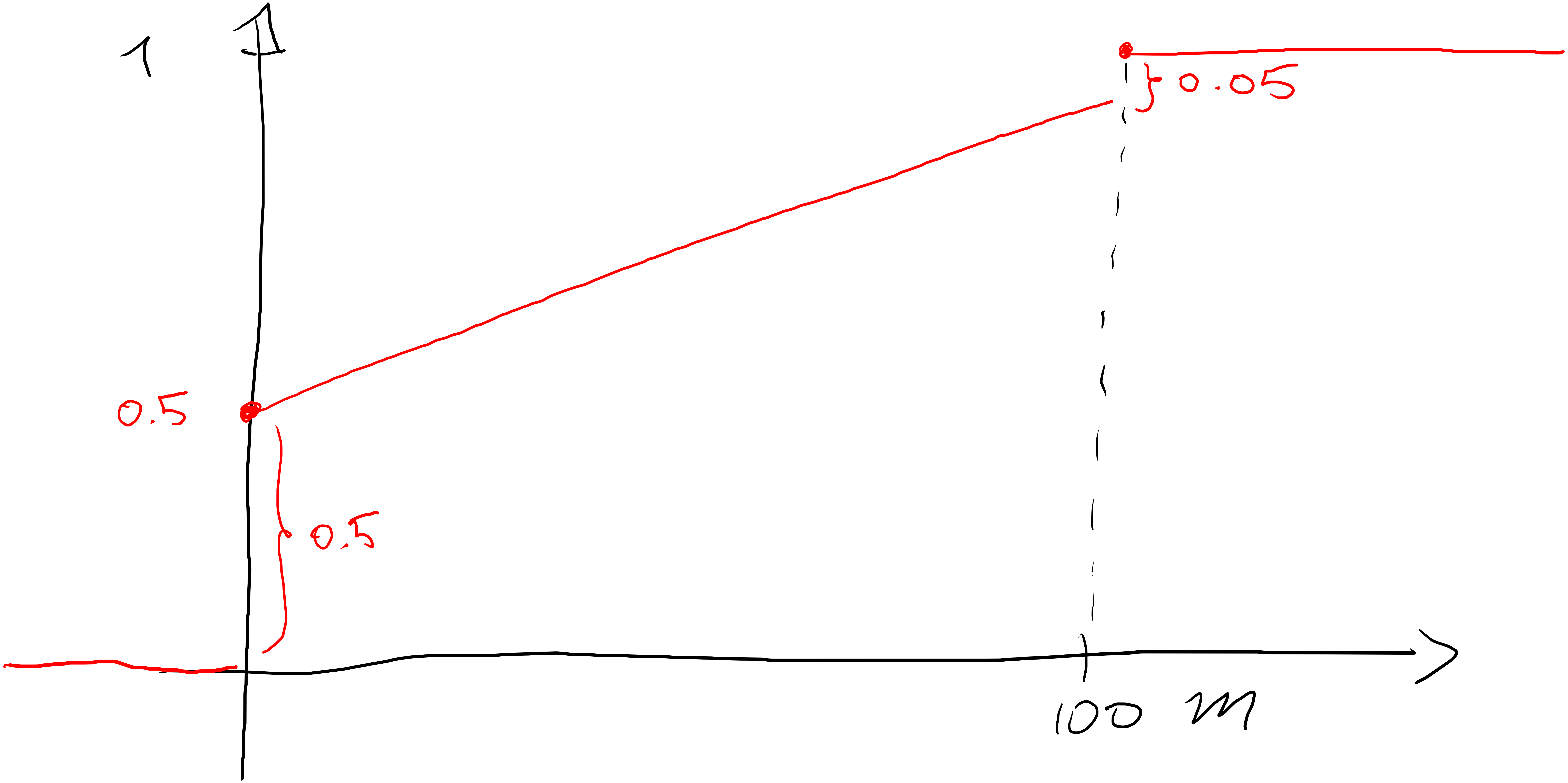
$K = \frac{0.45}{100m}$



$$F_C(x) = \begin{cases} 0 & x < 0 \\ Kx & 0 \leq x \leq 100\,m \\ 0.45 & x > 100\,m \end{cases}$$

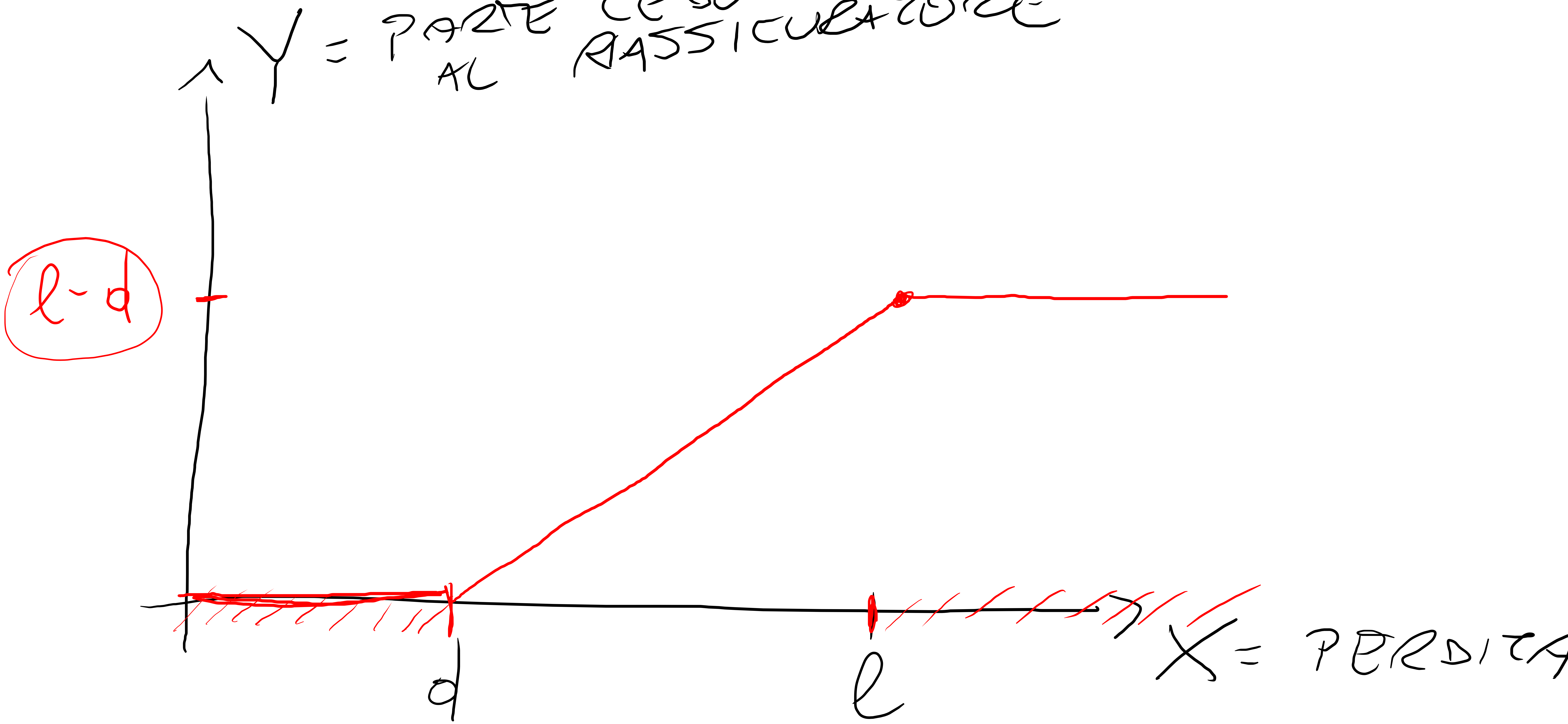
INFINE, $F_X = ?$

$$F_X(x) = \begin{cases} 0 & x < 0 \\ 0.5 + \frac{0.45}{100m} x & 0 \leq x < 100 \text{ m} \\ 1 & x \geq 100 \text{ m} \end{cases}$$



1
0.5
0.5
0.05
100 m

RIASSICURAZIONE



$X \sim EXP(\lambda)$

2 MASSE DI PROB.

$0 \qquad P(X \leq d) = 1 - e^{-\lambda d}$

$l - d \qquad P(X > l) = e^{-\lambda l}$

MASSA DISCRETA

$1 - e^{-\lambda d} + e^{-\lambda l}$

PARTE CONTINUA : $1 - (1 - e^{-\lambda d} + e^{-\lambda l})$

$= e^{-\lambda d} - e^{-\lambda l}$

!! "DENSITÀ" TRA 0 E $\ell - d$:

$$f_c(x) = K e^{-\lambda x}$$ TALE CHE

$$\int_0^{\ell - d} f_c(x)\, dx = e^{-\lambda d} - e^{-\lambda \ell}$$