1)

a) a?

$$5a\sum_{x=1}^{3} x + a\sum_{x=4}^{7} x^3 = 1$$

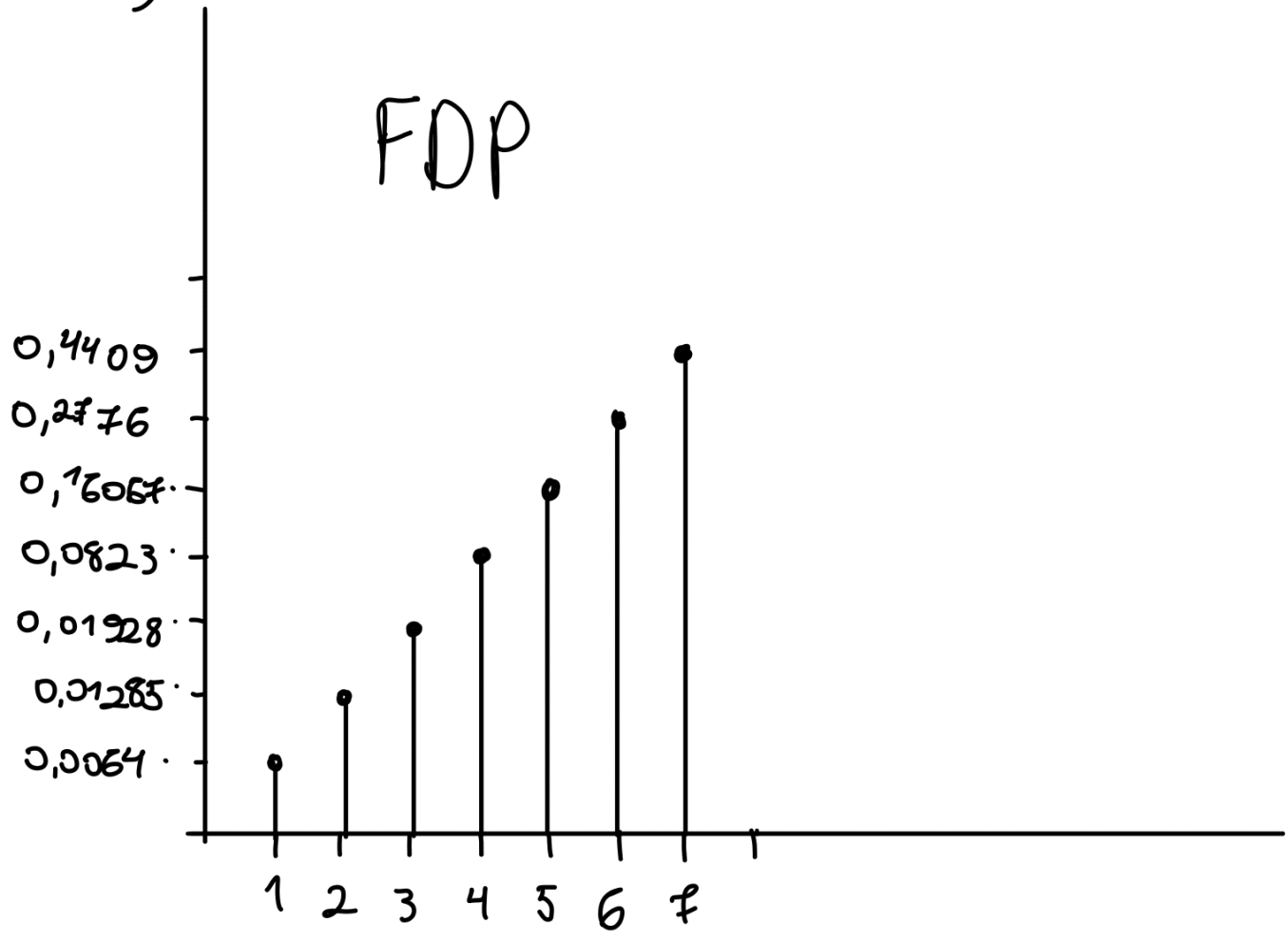
$$5a(6) + a(748) = 1$$

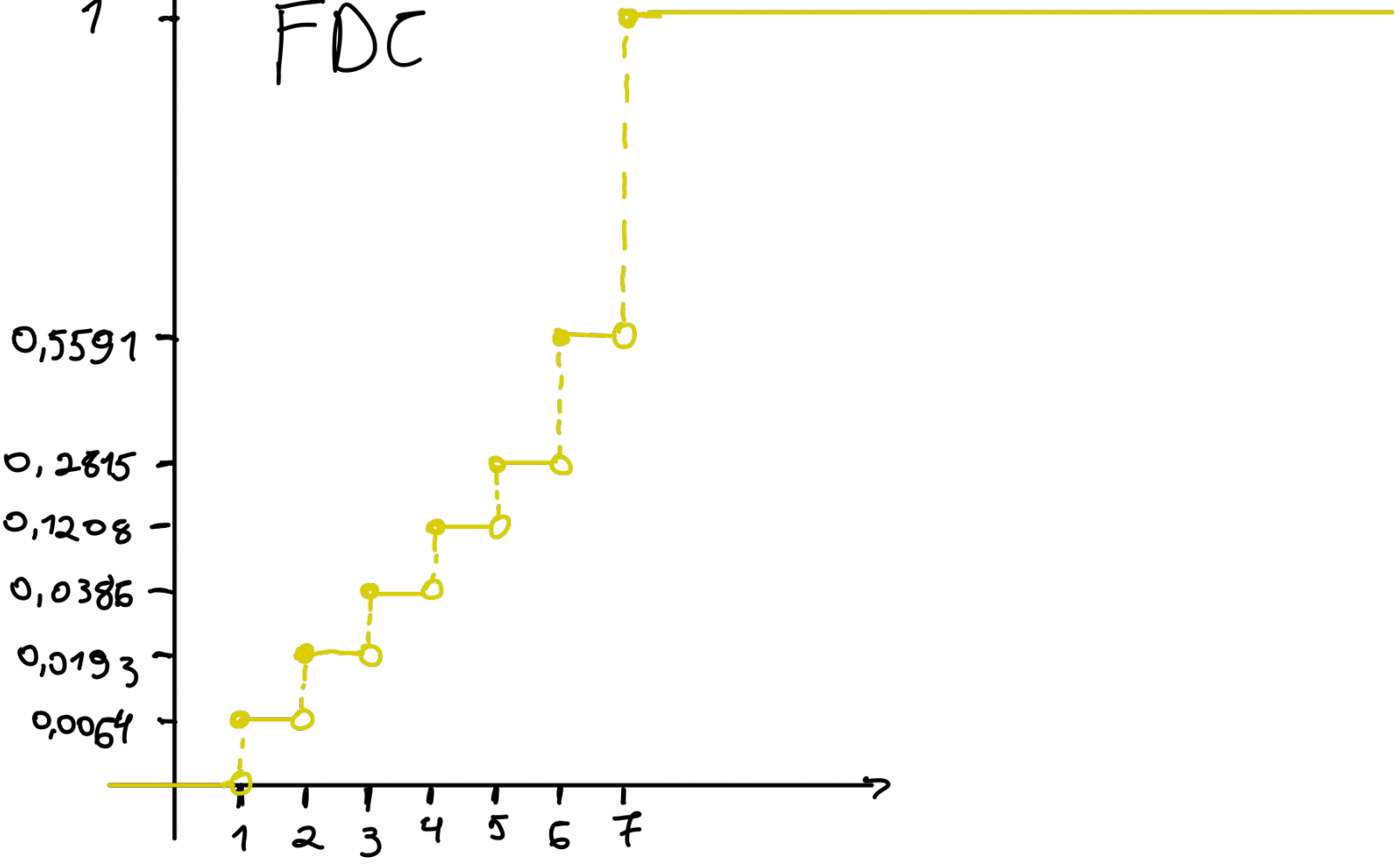
$$a = \frac{1}{778}$$

b) $P(3 \leq x \leq 5)$

$$\frac{5}{778} \cdot 3 + \frac{1}{778} \cdot (4^3 + 5^3) = \frac{102}{389}$$

c)




2)

a) $P(X \leq 1) = F_x(1) = 0,72$

b) $P(X \geq 2) = 1 - P(X < 2) = 1 - F_x(1) = 0,28$

c) $P(X = 1) = F_x(1) - F_x(0) = 0,31$

3)

a) $c \int_0^{10} x(10-x)\,dx = 1 \rightarrow c \cdot \frac{500}{3} = 1 \therefore c = \frac{3}{500}$

b) $P(x = 8) =$ zero

c) $P(5 \leq X \leq 8)$

$$\frac{3}{500}\int_5^8 x(10-x)\,dx = \frac{99}{250}$$

d) $f_x(x) \xrightarrow{\int dx} F_x(x)$

$$\frac{3}{500}\int_0^x x(10-x)\,dx = \frac{3}{500}\left[5x^2 - \frac{x^3}{3}\right]_{x=0}^{x}$$

$$F_x(x) = \begin{cases} 0, & x<0 \\ \frac{3}{500}\cdot x^2\left(5-\frac{x}{3}\right), & 0\le x\le 10 \\ 1, & x>10 \end{cases}$$