Ex: FDP

2.49)

$$f_X(x) = \begin{cases} cx^2, & 1 \leq x \leq 2 \\ cx, & 2 < x < 3 \\ 0, & \text{caso contrário} \end{cases}$$

$$\int_{-\infty}^{\infty} f_x \, dx = 1 \implies \int_{-\infty}^{\infty} \overset{0}{\cancel{0 dx}} + \int_{1}^{2} cx^2 \, dx + \int_{2}^{3} cx \, dx = 1$$

Porque é a probabilidade máxima

$$\frac{cx^3}{3}\Big|_1^2 + \frac{cx^2}{2}\Big|_2^3 = 1$$

$$\left(\frac{c(2)^3}{3} - \frac{c(1)^3}{3}\right) + \left(\frac{c(3)^2}{2} - \frac{c(2)^2}{2}\right) = 1$$

$$\left(\frac{8c}{3} - \frac{c}{3}\right) + \left(\frac{9c}{2} - \frac{4c}{2}\right) = 1$$

$$\frac{7c}{3} + \frac{5c}{2} = 1$$

$$\frac{14c + 15c}{6} = 1$$

$$\frac{29c}{6} = 1$$

$$c = \frac{6}{29}$$

a) valor da constante c

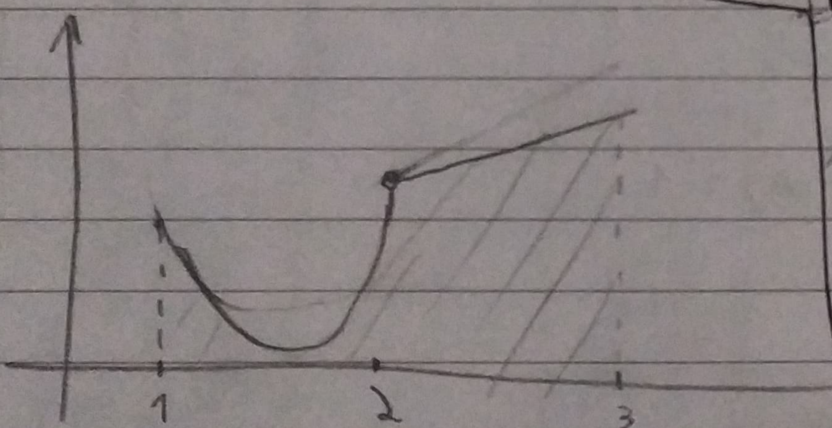
b) $P(x > 2)$

$$\int_2^3 \frac{6}{29} x \, dx$$

$$\frac{6}{29} \cdot \frac{x^2}{2} \Big|_2^3$$

$$\frac{6}{58} \cdot 3^2 - \frac{6}{58} \cdot 2^2$$

$$\frac{54}{58} - \frac{24}{58} = \frac{30}{58}$$



~~[illegible]~~

Para saber o valor exato dessa probabilidade faremos:

$$P(x > 2) = 1 - \frac{30}{58} \cong 48\%$$