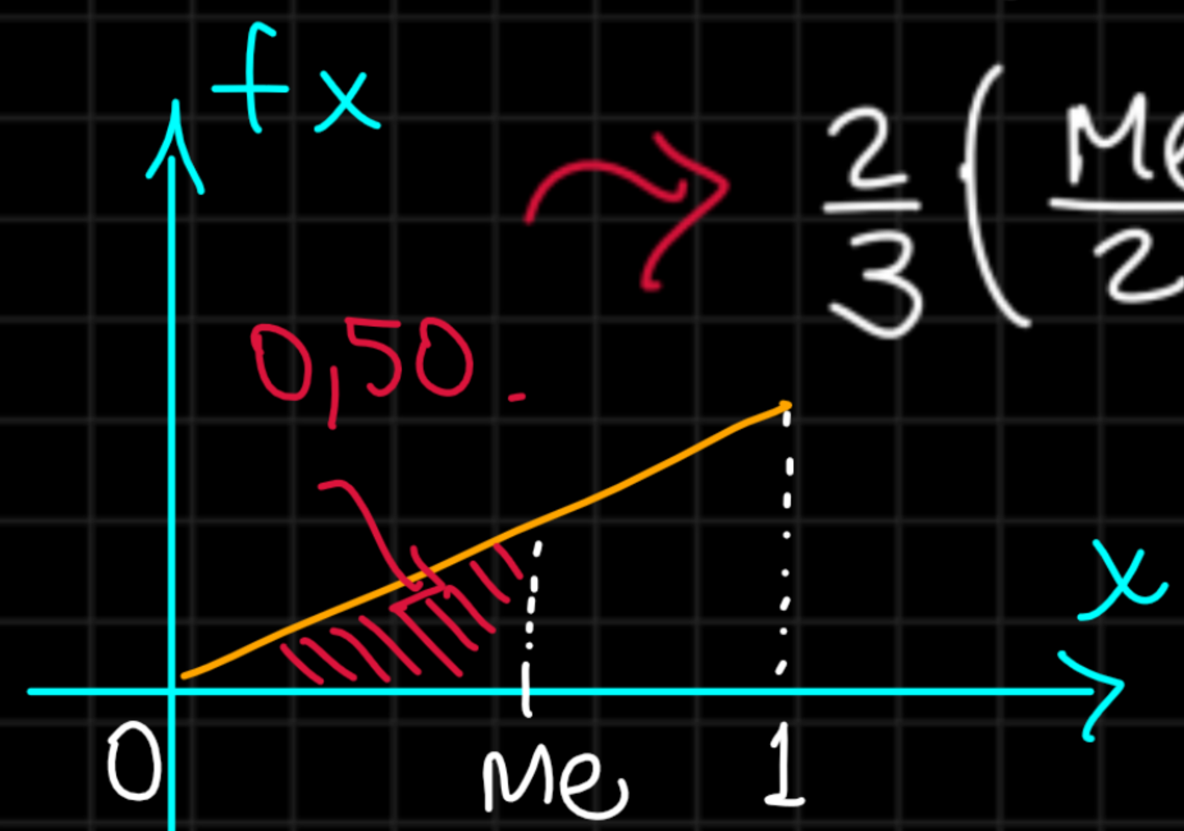
* Propiedad: $P(X \leq Me) = 0{,}50$; $\underbrace{Me \in \mathbb{R}_x = \langle 0;1\rangle}_{*}$

$\rightarrow F(Me) = 0{,}50$



$\rightarrow \frac{2}{3}\left(\frac{Me^2}{2} + Me\right) = 0{,}50 \rightarrow 2 Me^2 + 4 Me - 3 = 0$

Ec. General: $Me = \frac{-4 \pm \sqrt{40}}{4}$ → $0{,}581139$ ✓ ; $-2{,}581139$

$$P(X < c) = P(X \leq c)$$

c) $P(\underbrace{X \leq 0{,}80}_{A} / \underbrace{X \geq 0{,}20}_{B}) = \frac{P(X \leq 0{,}80 \cap X \geq 0{,}20)}{P(X \geq 0{,}20)} = \frac{P(0{,}20 \leq X \leq 0{,}80)}{1 - P(X \leq 0{,}20)}$

$$= \frac{F(0{,}80) - F(0{,}20)}{1 - F(0{,}20)} = \frac{0{,}7467 - 0{,}1467}{1 - 0{,}1467} = 0{,}7032$$

NOTA $\boxed{P(a \leq X \leq b) = F(b) - F(a)}$

$$\boxed{P(A/B) = \frac{P(A \cap B)}{P(B)}}$$

9. La demanda semanal de gas propano, en miles de galones, de una distribuidora en particular es una variable aleatoria "X" con función de densidad f(x) dada por:

$$f(x) = 2.\left(1 - \frac{1}{x^2}\right), \quad 1 \le x \le c$$

a. Determine "c" y la función de distribución acumulada de "X", F(X).
b. Calcule la media, y el percentil 80 de la demanda semanal de gas propano.

- X: demanda semanal de gas propano
- $R_X = [1; C]$

a) Propiedad $\boxed{\int_{-\infty}^{\infty} f(x)\,dx = 1}$

$\to \int_1^C fx\,dx = 1 \to \int_1^C 2.\left(1 - \frac{1}{x^2}\right)dx = 1$

$\to 2.\left(x + \frac{1}{x}\right)\Big|_1^C = 1$

$\to 2.\left(C + \frac{1}{C} - 1 - \frac{1}{1}\right) = 1$

Operando

Obs: $C > 1$

$\to 2C^2 - 5C + 2 = 0$;

$2C \quad -1$

$C \quad -2$

$\to C = \frac{1}{2}$; $\underline{C = 2}$ ✓

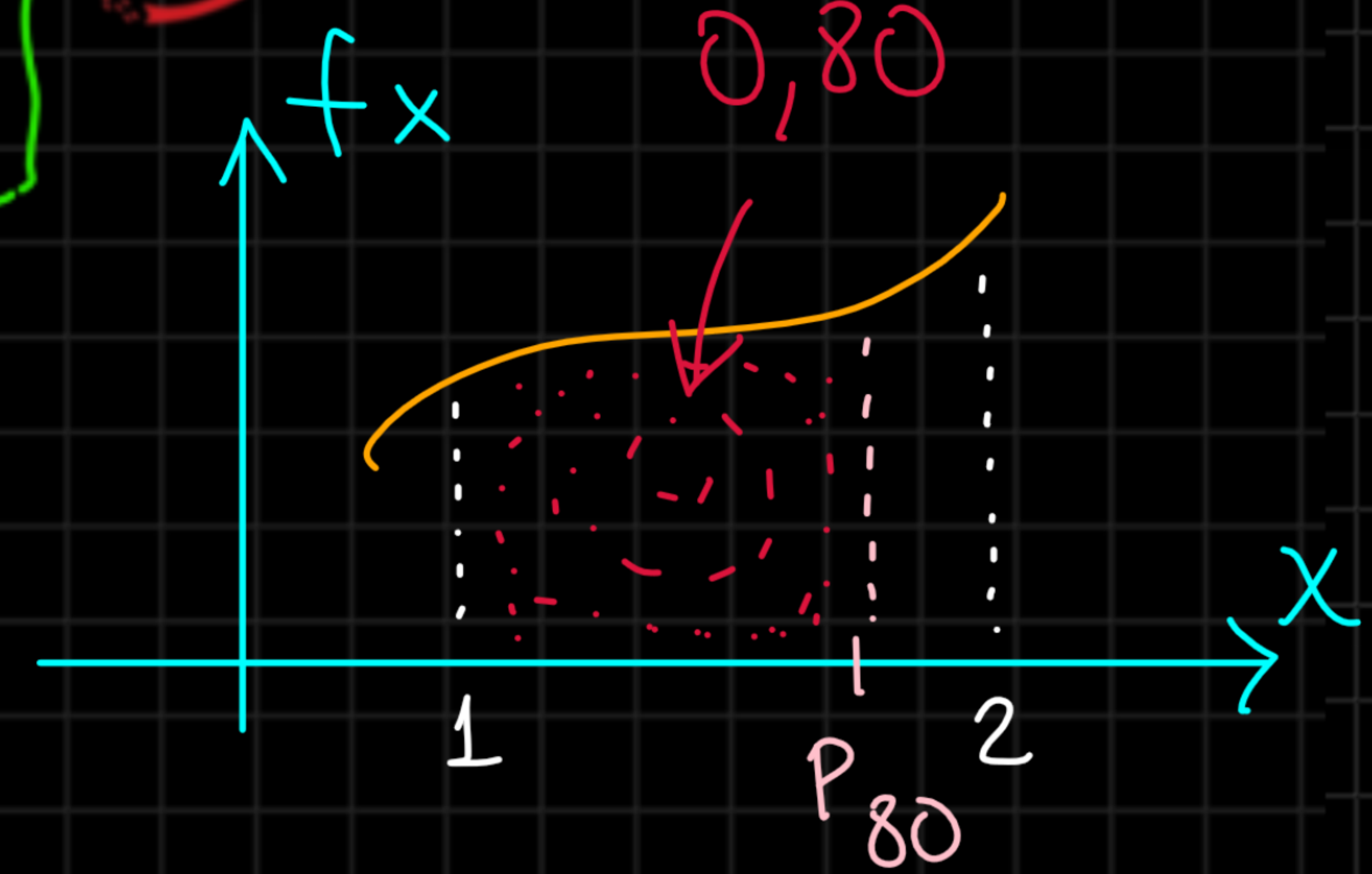
$* \boxed{F(x) = \int_{-\infty}^{x} f(t)\,dt} = \int_1^x 2.\left(1 - \frac{1}{t^2}\right)dt$

$\to F(x) = 2.\left(t + \frac{1}{t}\right)\Big|_1^x$

$\therefore F(x) = 2.\left(x + \frac{1}{x} - 2\right)$

b) Esperanza Matemática o Valor Esperado:

$$\boxed{E(x)=\int_{-\infty}^{\infty} f(x)\cdot x\,dx}$$



$$\rightarrow E(x)=\int_1^2 2\cdot\left(1-\frac{1}{x^2}\right)\cdot x\,dx = 1,613706$$

Propiedad: $P(X\leq P_{80})=0,80$

$$\rightarrow F(P_{80})=0,80 \rightarrow \cancel{2}\cdot\left(P_{80}+\frac{1}{P_{80}}-2\right)=\overset{0,40}{\cancel{0,80}}\quad ;\quad P_{80}\in R_X=[1;2]$$

$$\rightarrow 5\cdot P_{80}^2-12\cdot P_{80}+5=0$$

Ec. General: $P_{80}=\dfrac{12\pm\sqrt{44}}{10}$ → 1,863 ✓ ; → 0,537

$$\boxed{F(c)=P(X\leq c)}$$