Particiones...

$$S^* = \sum_{i=1}^{n} (a_{i+1} - a_i) \sup(f, [a_i, a_{i+1}])$$

1a $\quad f(x) = 3x - 2 \qquad P = \{-2, 0, 1, 2\}$

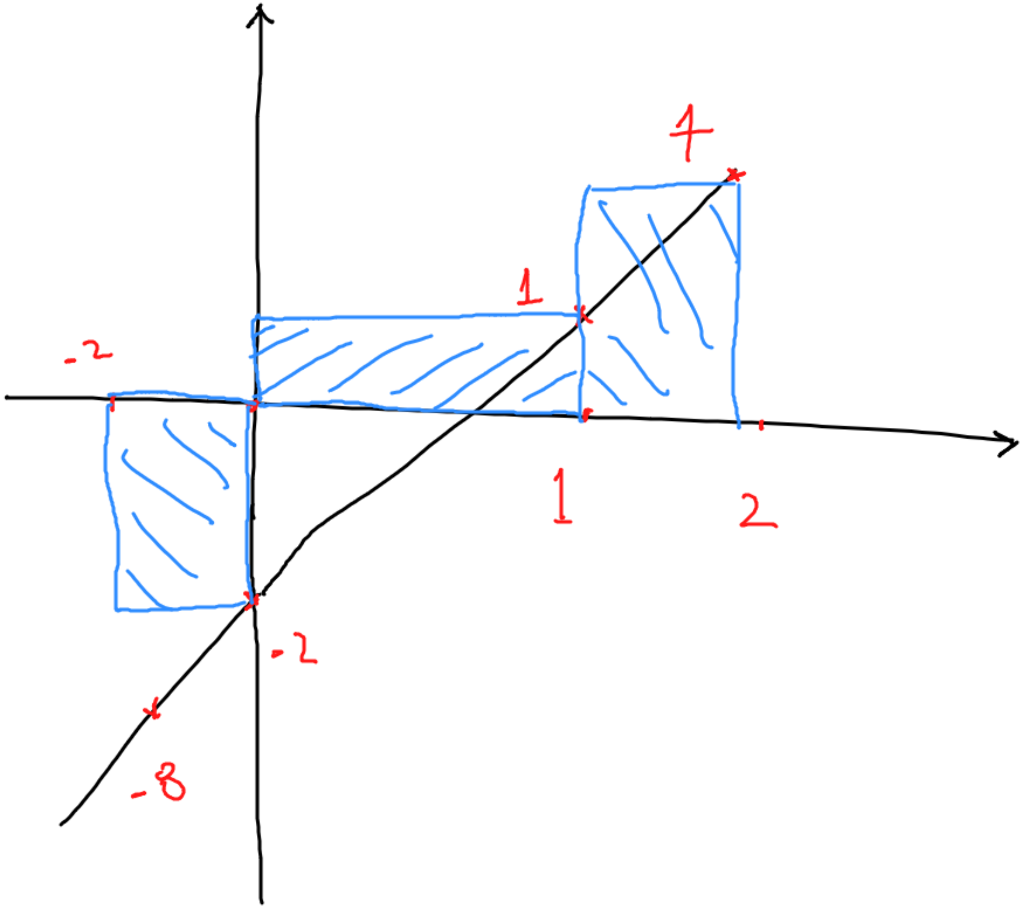
$$S^*(f,P) = (2-1)\underbrace{f(2)}_{4} + (1-0)\underbrace{f(1)}_{1} + (0+2)\underbrace{f(0)}_{-2}$$

$$S^*(f,P) = 1$$

$$S_*(f,P) = (2-1)\underbrace{f(1)}_{1} + (1-0)\underbrace{f(0)}_{-2} + (0+2)\underbrace{f(-2)}_{-8}$$

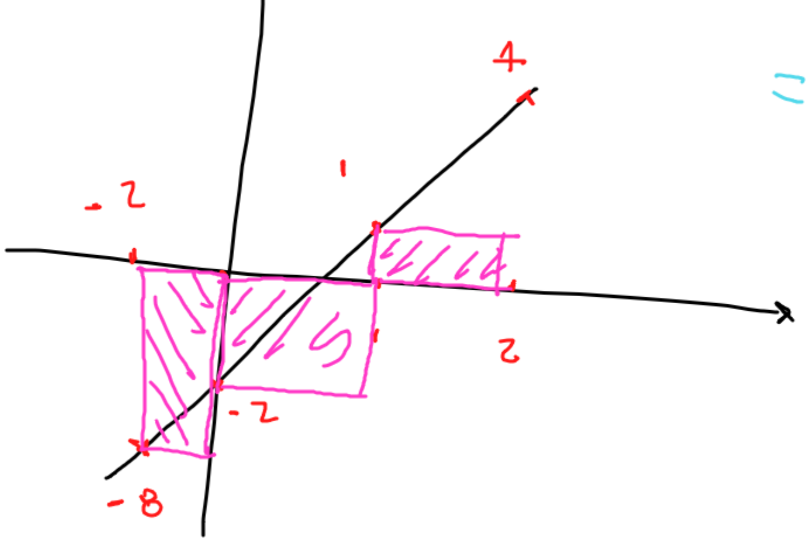
$$S_*(f,P) = -17$$

$$-17 \le \underbrace{\int_{-2}^{2} 3x - 2}_{} \le 1$$



$$\frac{4.2}{3}\cdot\frac{1}{2} - \left(2+\frac{2}{3}\right)\frac{8}{2} = \frac{4}{3} - \frac{32}{3}$$

$$= \frac{-28}{3}$$



ejercicio 7

$$F(x) = \int_{-1}^{\operatorname{sen}(x)} 1\,dt = \operatorname{sen}(x) + 1$$

$$\int_a^b 1\,dt = (b-a)1$$

Cambio de variable

$$x < y \Rightarrow \log(x) < \log(y)$$

③ $\log(x) = \int_1^x \frac{1}{t}\,dt$

función creciente

⊛ $\int_a^b f(x)\,dx = -\int_b^a f(x)\,dx$

prop ⊛ $\int_a^b f(x)\,dx = \int_a^c f(x)\,dx + \int_c^b f(x)$ $\quad a<c<b$

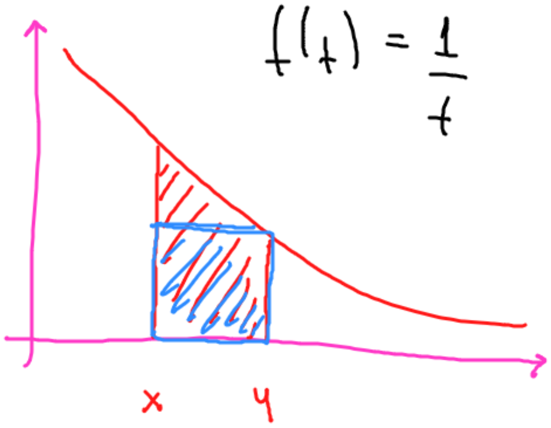
$\log\ R^+ \to R$ es creciente

Dem. $x, y > 0 \ /\ x < y$

$$\log y - \log x = \int_1^y \frac{1}{t}\,dt - \int_1^x \frac{1}{t}\,dt = \int_1^y \frac{1}{t}\,dt + \int_x^1 \frac{1}{t}\,dt = \int_x^y \frac{1}{t}\,dt$$

$$\int_x^y \frac{1}{t}\,dt \geq (y-x)f(y)$$

$$\frac{1}{t} \geq \frac{1}{y} \quad \forall t \in [x,y]$$



$$\int_x^y \frac{1}{t}\,dt \geq (y-x)\frac{1}{y} > 0$$

$$\log(y) - \log(x) > 0 \Rightarrow \log(y) > \log(x)$$

Probar $\log(n(a-1)+1) \leq n\log(a)$ prop. $n\log(a) = \log(a^n)$

$\log(n(a-1)+1) \leq \log(a^n)$ al ser creciente es eq. a dem.

$n(a-1)+1 \leq a^n$

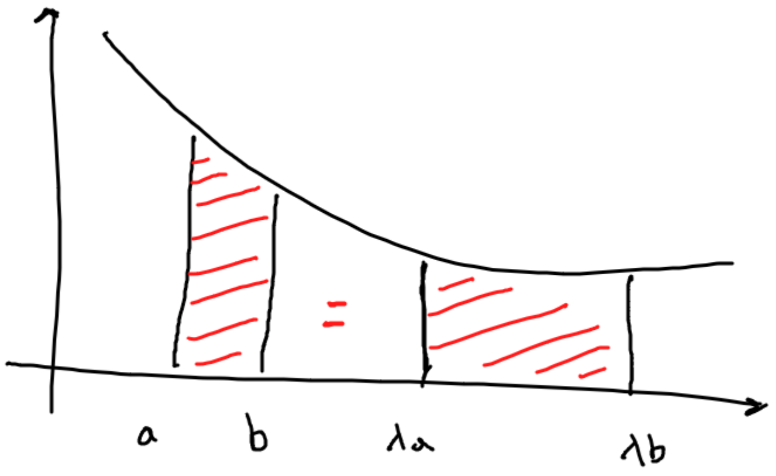
Teo. de Bernoulli: $(1+x)^n \geq 1+nx \quad \forall \; x \geq -1 \quad n \geq 1$

cambio de variable $a-1 = x \Rightarrow a-1 \geq -1 \Rightarrow a \geq 0$

$n(a-1)+1 \leq a^n$ lqqd

Probar $\log(a) = \int_x^{ax} \frac{1}{t}\,dt \quad \forall a, x \in \mathbb{R}^+$

$$\int_1^a \frac{1}{t}\,dt = \int_x^{ax} \frac{1}{t}\,dt \qquad \left(\int_{\lambda a}^{\lambda b} 1/t\,dt = \int_a^b 1/t\,dt \quad \text{de manera generica} \right)$$



$$\boxed{g(t) = f(t/\lambda) = \frac{\lambda}{t}}$$

$$\int_{\lambda a}^{\lambda b} g(t)\,dt = \lambda \int_a^b f(t)\,dt = \lambda \int_a^b \frac{1}{t}\,dt$$

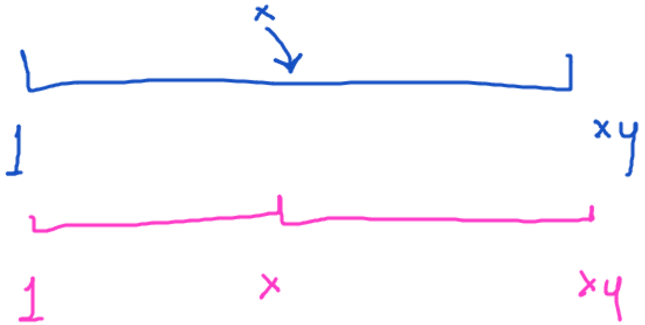
$$\int_{\lambda a}^{\lambda b} g(t)\,dt = \int_{\lambda a}^{\lambda b} \frac{\lambda}{t}\,dt = \lambda \int_{\lambda a}^{\lambda b} \frac{1}{t}\,dt$$

$$\int_{\lambda a}^{\lambda b} g(t)\,dt = \lambda \int_a^b \frac{1}{t}\,dt = \underbrace{\lambda \int_{\lambda a}^{\lambda b} \frac{1}{t}\,dt}$$

$$\Longrightarrow \int_a^b \frac{1}{t}\,dt = \int_{\lambda a}^{\lambda b} \frac{1}{t}\,dt$$

$\blacksquare$

Probar $\log(xy) = \log(x) + \log(y)$



Dem.
$$\int_1^{xy} \frac{1}{t}\,dt = \int_1^{x} \frac{1}{t}\,dt + \int_1^{y} \frac{1}{t}\,dt$$

$$\int_1^{xy} \frac{1}{t}\,dt = \int_1^{x} \frac{1}{t}\,dt + \underbrace{\int_x^{xy} \frac{1}{t}\,dt}_{= \int_1^{y} \frac{1}{t}\,dt} = \int_1^{x} \frac{1}{t}\,dt + \int_1^{y} \frac{1}{t}\,dt$$

$\blacksquare$