EJERCICIO M2BE2235:

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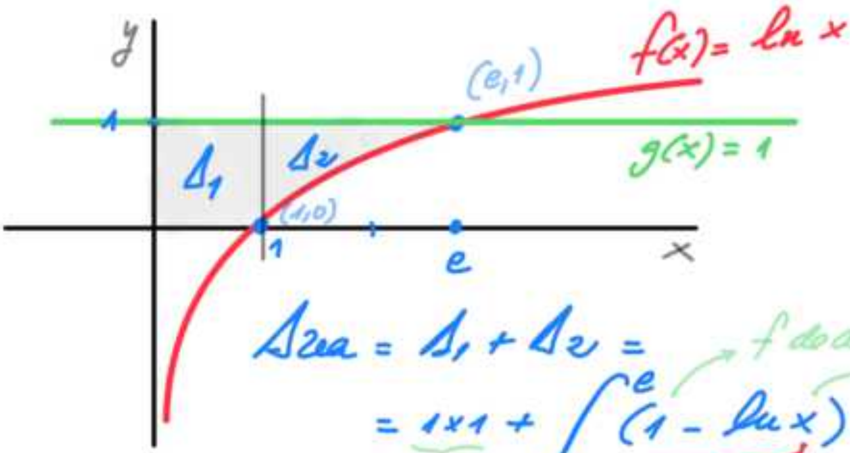
Área encerrada por $f(x) = \ln x$; $g(x) = 1$; ejes

$\boxed{f(x) = \ln x}$

- Definida de $(0, \infty)$
- Cuando $x \to 0$; $y \to -\infty$ (As. Vert $x=0$)
- Creciente de $(0, \infty)$

x	1	e	e^2
y	0	1	2

$\boxed{y = 1}$ · Recta horizontal



$$\text{Área} = A_1 + A_2 = $$

$$= \underbrace{1 \times 1}_{\text{cuadrado}} + \int_1^e (\overset{\text{f. de arriba}}{1} - \overset{\text{f. de abajo}}{\ln x})\, dx = \ldots$$

$-x \ln x$

$$\int (1 - \ln x)\, dx = \int dx - \int \ln x = x - \underbrace{\int \ln x\, dx}_{\text{por partes}}$$

$$\int \underbrace{\ln x}_{u}\, \underbrace{dx}_{dv} = \ln x \cdot x - \int \cancel{x} \cdot \frac{1}{\cancel{x}}\, dx = x \ln x - x + C$$

$\int dv = \int dx \Rightarrow v = x$

$u = \ln x \Rightarrow du = \frac{1}{x}\, dx$

$$\int (1 - \ln x) = \cancel{x} - (x \ln x - \cancel{x}) = -x \ln x + C$$

$$\ldots = \text{Área} = 1 + \left[-x \cdot \ln x\right]_1^e = 1 + \left[-e \cdot \ln e - (-1 \cdot \ln 1)\right] =$$

$$= 1 + \left[-e \cdot 1 + 1 \cdot 0\right] = 1 - e$$

$$\boxed{\text{Área} = (1 - e)\ u^2}$$