Tarea 2 **Calculo 3**

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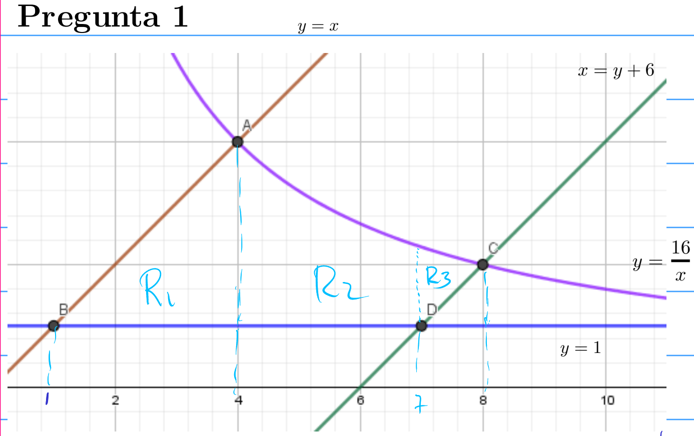
Pregunta 1



Calculamos intersecciones.

A: $x = \frac{16}{x} \rightarrow x^2 = 16$

$x = \pm 4 \rightarrow x = 4$

A: $(4,4)$

B: $(1,1)$ $x=1$ $y=1$ ✓

C: $\frac{16}{x} = x-6 \rightarrow x = 8$ $y = 2$

$(8,2)$

D: $1 = x-6 \rightarrow x = 7$ $(7,1)$

$$\int_a^b \frac{x}{y}\,dy = x\ln(y)\Big|_a^b$$

$$I_{R_1} = \int_1^4 \int_1^x \frac{x}{y}\,dy\,dx$$

$$I_{R_2} = \int_4^7 \int_1^{\frac{16}{x}} \frac{x}{y}\,dy\,dx$$

$$I_{R_3} = \int_7^8 \int_{x-6}^{\frac{16}{x}} \frac{x}{y}\,dy\,dx$$

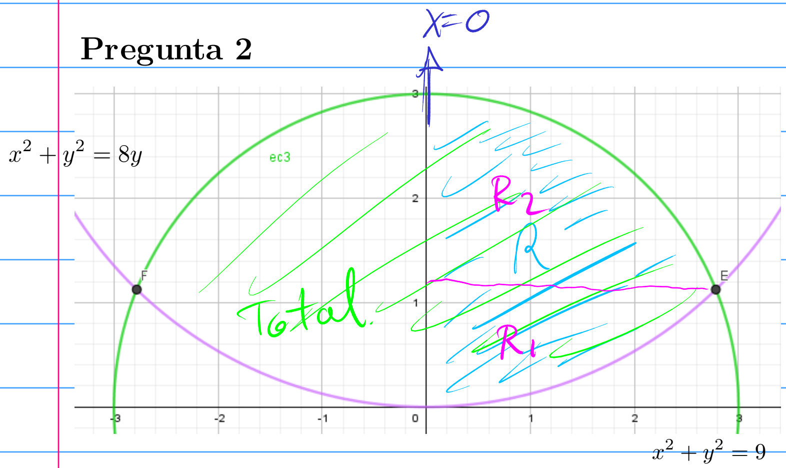
$$R_1 = \int_1^4 x\ln(x)\Big|_1^x dx \quad R_2 = \int_4^7 x\ln(x)\Big|_1^{\frac{16}{x}} dx \quad R_3 \int_7^8 x\ln(x)\Big|_{x-6}^{\frac{16}{x}} dx$$

$$I_R = \int_1^4 [x\ln x - \ln(1)]\,dx + \int_4^7 \left[\frac{16}{x}\ln\left(\frac{16}{x}\right) - \ln(1)\right] dx + \int_7^8 \left[\frac{16}{x}\ln\left(\frac{16}{x}\right) - (x-6)\ln(x-6)\right] dx$$

$$I_R = 7{,}34 + 17{,}41 + 2{,}72$$

$$\boxed{I_R = 27{,}47}$$

Pregunta 2



tenemos

$x^2+y^2=8y$ $\qquad$ $8y=9$

$x^2+y^2=9$ $\qquad$ $y=\frac{9}{8}$

Por simetria se puede calcular solo un lado y diplicar,

$A_{Tot} = 2 \cdot A_R$ $\qquad$ calc. x en funcion de y.

La region R esta limitada por 2 Regiones

$x=\sqrt{9-y^2}$ $\quad$ $x=\sqrt{8y-y^2}$

$R_1 = \begin{cases} 0 \leq x \leq \sqrt{8y-y^2} \\ 0 \leq y \leq 9/8 \end{cases}$ $\qquad$ $R_2 = \begin{cases} 0 \leq x \leq \sqrt{9-y^2} \\ 9/8 \leq y \leq 3 \end{cases}$

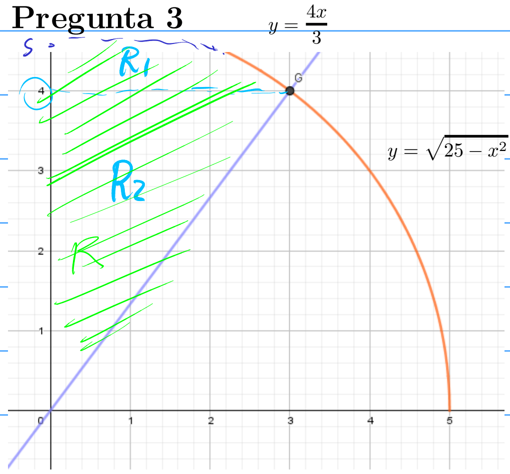
$$\therefore A_{tot} = 2 \cdot \left[\int_0^{9/8} \int_0^{\sqrt{8y-y^2}} dx\,dy + \int_{9/8}^{3} \int_0^{\sqrt{9-y^2}} dx\,dy \right]$$

$$A = 2 \cdot \left[\int_0^{9/8} \sqrt{8y-y^2}\,dy + \int_{9/8}^{3} \sqrt{9-y^2}\,dy \right]$$

$$A = 2 \cdot [2{,}152 + 3{,}774]$$

$$\boxed{A = 11{,}852\ u^2}$$

Pregunta 3



R: $0 \leq x \leq 3$

$\frac{4x}{3} \leq y \leq \sqrt{25-x^2}$

$f(3) = \frac{4 \cdot 3}{3} = 4$

Despejamos x : $\frac{3}{4}y = x$; $x = \sqrt{25-y^2}$

R_1: $0 \leq x \leq \sqrt{25-y^2}$

$0 \leq y \leq 4$

R_2: $0 \leq x \leq \frac{3}{4}y$

$4 \leq y \leq 5$

→ Al cambiar el orden tenemos

$$I = \int_0^4 \int_0^{\frac{3}{4}y} dx\,dy + \int_4^5 \int_0^{\sqrt{25-y^2}} dx\,dy$$

$$I = \int_0^4 \frac{3}{4}y \, dy + \int_4^5 \sqrt{25-y^2}$$

$$I = 6 + 2{,}04$$

$$\boxed{I = 8{,}04}$$