TUTORIA N°2
CALCULO 1

❖ Sean $y = -\sqrt{\frac{16-x^2}{12}}$, $x^2 = -4y$, $y = -4$. Identificar cada una de las curvas en un mismo sistema coordenado, graficarlas, achurarla región que ellas encierran y obtener los puntos de intersección correspondientes a la región achurada.

i) Ident. C.

$y = -\sqrt{\frac{16-x^2}{12}}\ /()^2$

$y^2 = \frac{16-x^2}{12}$

$12y^2 = 16 - x^2$

$x^2 + 12y^2 = 16/16$

$\frac{x^2}{16} + \frac{34^2}{4} = 1$

$C_1: \frac{x^2}{16} + \frac{y^2}{\frac{4}{3}} = 1$ → la curva C_1 es la mitad de una elipse

$C_1(0,0)$

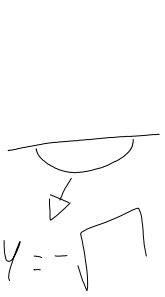
$a^2 = 16 \to a = 4$

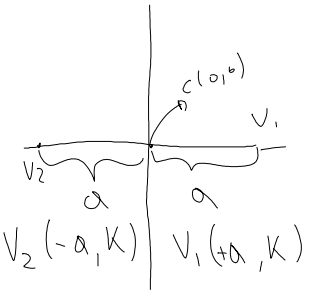
$b^2 = \frac{4}{3} \to b = \frac{2}{\sqrt{3}} \approx 1{,}15$

$a^2 = b^2 + c^2$

$c^2 = 16 - \frac{4}{3} = \frac{48-4}{3} = \frac{44}{3}$

$c = \sqrt{\frac{44}{3}}$





$V_2(-a, k)$ $V_1(+a, k)$

$V_2(-4, 0)$

$V_1(4, 0)$

$C_2: x^2 = -4y$ ∩

Parab. con $C_2(0,0)$

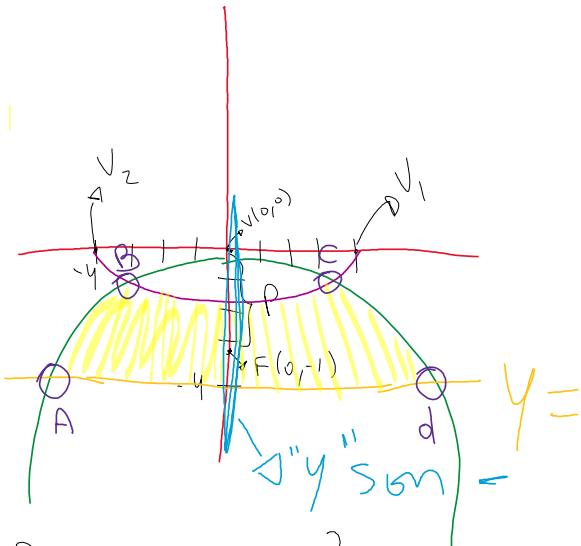
· Se abre hacia abajo

LLR: $4p = 4 \to p = 1$

$C_3: y = -4$ → Recta

Graficos

$(y-k)^2 = 4p(x-h)$



$y =$ ∫"y" sup − ∫"y" inf

$y = k + \sqrt{4p(x-h)}$ ⇒

$y = k - \sqrt{4p(x-h)}$ ⇒

Ptos C_2 $x^2 = -4(y)$

C_3 $y = -4$

$x^2 = -4(-4)$

$x^2 = 16 / \sqrt{\ }$

$$x^2 = 16 \quad /\sqrt{\ }$$

$$x = \pm 4$$

Pto A $(-4, -4)$ ✓

Pto $(4, -4)$ ✓

Pto b $\begin{cases} x^2 = -4y \\ y = -\sqrt{\dfrac{16 - x^2}{12}} \end{cases}$

$$y = -\sqrt{\frac{16 - x^2}{12}} \quad /(\ )^2$$

$$y^2 = \frac{16 - x^2}{12}$$

$$y^2 = \frac{16 - (-4y)}{12}$$

$$12y^2 = 16 + 4y$$

$$12y^2 - 4y - 16 = 0 \quad /:12$$

$$y^2 - \frac{y}{3} - \frac{4}{3} = 0$$

$$y_{12} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$a = 1$; $b = -1/3$ $c = -4$

$$y_{1,2} = \frac{-\frac{1}{3} \pm \sqrt{\frac{1}{9} - 4 \cdot 1 \cdot \left(-\frac{4}{3}\right)}}{2}$$

$$y_{12} = \frac{\frac{1}{3} \pm \sqrt{\frac{1}{9} + \frac{16}{3}}}{2}$$

$$y_{12} = \frac{\frac{1}{3} \pm \sqrt{\frac{1 + 48}{9}}}{2}$$

$$y_{12} = \frac{\frac{1}{3} \pm \frac{7}{3}}{2}$$

$$y_1 = \frac{\frac{1}{3} + \frac{7}{3}}{2} = \frac{8}{3 \cdot 2} = \frac{4}{3}$$ ✗

$$y_2 = \frac{\frac{1}{3} - \frac{7}{3}}{2} = \frac{-6}{3 \cdot 2} = -1$$ ✓

Reemp. $y_2 = -1$ en

$$x^2 = -4y$$

$$\Rightarrow x^2 = -4(-1)$$

$$x^2 = 4 \quad / \sqrt{\ }$$

$$x = \pm 2$$

Pto B $= (-2, -1)$ ✓

Pto C = (2, -1) ✓

∴ Area achurada por las 3 curvas

∴ sus ptos de Interes son:

Pto A (-4, -4)

Pto B (-2, -1)

Pto C (2, -1)

Pto D (4, -4)