

## Corto #11 Cálculo Integral (15 min)

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1. (20 pts.) Encuentre el área de la región encerrada por la curva  $x = t^2 - 4$ ,  $y = \sqrt{t}$ , el eje  $x$  y el eje  $y$ .

$$x = t^2 - 4$$

$$y^2 = t$$

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

$$x = y^4 - 4$$

$$\sqrt[4]{x+4} = y$$

$$\sqrt{x+4} = t$$

$$y = \sqrt{\sqrt{x+4}}$$

~~$$\begin{aligned}
 t^2 - 4 &= \sqrt{t} \\
 (t^2 - 4)^2 &= t \\
 t^4 - 8t^2 + 16 &= t \\
 t^4 - 8t^2 + t + 16 &= 0
 \end{aligned}$$~~

$$I_x \Rightarrow y = 0$$

$$\sqrt[4]{x+4} = 0$$

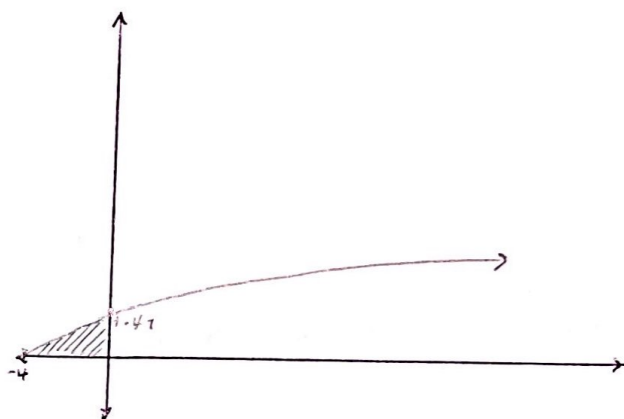
$$x + 4 = 0$$

$$x = -4$$

$$I_y \Rightarrow x = 0$$

$$\sqrt[4]{0+4} = y$$

$$\sqrt[4]{4} = y$$



$$A = \int_{-4}^0 \sqrt[4]{x+4} dx = \int_{u(-4)}^{u(0)} (u)^{\frac{1}{4}} du =$$

$$u = x + 4 \quad du = dx \quad \left| \quad = \left[ \frac{\frac{1}{4} + 1}{\frac{1}{4} + 1} u^{\frac{1}{4} + 1} \right]_{u(-4)}^{u(0)} = \frac{4}{5} u^{\frac{5}{4}} \right|_{u(-4)}^{u(0)}$$

$$u(0) = 4$$

$$u(-4) = 0$$

$$= \frac{4}{5} \left[ \left\{ \sqrt[4]{(4)^5} \right\} - \left\{ 0 \right\} \right]$$

$$= \frac{4}{5} \cdot 4^{\frac{5}{4}} = \frac{4^{\frac{9}{4}}}{5}$$