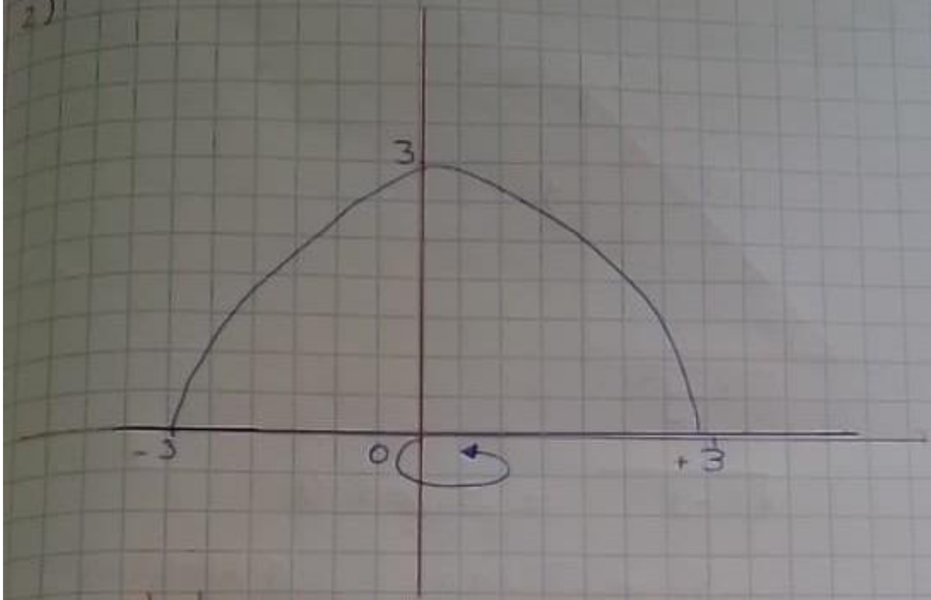
2)



- Metodo por Arandela en y

$$\rightarrow V = \pi \int_a^b (g(y))^2 \, dy$$

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

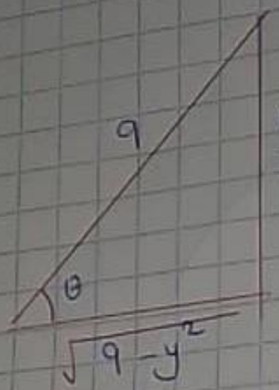
$$y^2 = 9 - x^2$$

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

$$\rightarrow V = \pi \int_0^3 \sqrt{9 - y^2} \quad dy$$

$\mu = 9 - y^2$ X no se puede con sustitución simple

→ Sustitución trigonometrica



$$\sqrt{9-y^2} = 9\cos\theta$$

$$y = 9\,\text{sen}\,\theta \qquad \theta = \text{arcsen}\left(\frac{y}{9}\right)$$

$$dy = 9\cos\theta\, d\theta$$

$$\rightarrow \quad V = \pi \int_0^3 9\cos\theta \cdot 9\cos\theta \; d\theta$$

$$V = 81\pi \int_0^3 \cos^2\theta \; d\theta$$

$$V = 81\pi \int_0^3 \frac{1}{2}(1+\cos 2\theta)\; d\theta$$

$$V = \frac{81}{2}\pi \int 1 + \cos 2\theta \quad d\theta$$

$$V = \frac{81}{2}\pi \left(\int_0^3 1\, d\theta + \int_0^3 \cos 2\theta \; d\theta \right)$$

$$u = 2\theta \qquad du = 2\,d\theta$$

$$V = \frac{81}{2}\pi \left(\theta + \frac{1}{2}\int_0^3 \cos u \, du \right.$$

$$V = \frac{81}{2}\pi \left(\theta + \frac{1}{2}\int_0^3 \cos u \, du \right.$$

$$V = \frac{81}{2}\pi \left(\theta + \frac{1}{2} \sin 2\theta \right)\Big|_0^3$$

$$V = \frac{81}{2}\pi\left(\arcsen\left(\frac{y}{9}\right)\right) + \frac{81}{2}\frac{1}{2}\,2\,\sen\theta\,\cos\theta$$

$$V = \frac{81}{2}\pi\left(\arcsen\left(\frac{y}{9}\right)\right) + \frac{81\pi}{4}\cancel{2}\cdot\frac{y}{9}\cdot\frac{\sqrt{9-y^2}}{9}$$

$$V = \left.\frac{81}{2}\pi\left(\arcsen\left(\frac{y}{9}\right)\right) + \frac{\pi\cdot y\sqrt{9-y^2}}{2}\right|_0^3$$

$$V = \frac{81}{2}\pi\left(\arcsen\left(\frac{1}{3}\right)\right) - \frac{81}{2}\pi\left(\arcsen(0)\right)$$

$$V = \frac{81}{2}\pi\left(\arcsen\left(\frac{1}{3}\right)\right)\ u^3$$

- Volumen de la perforación

$$V_{perforación} = \frac{V}{3}\ curva$$

$$V = \frac{81}{2}\pi\left(\arcsen\left(\frac{1}{3}\right)\right)/3$$

$$V = \frac{27}{2}\pi\left(\arcsen\left(1/3\right)\right)$$

Rpta $\frac{27}{2}\pi\left(\arcsen\left(1/3\right)\right)$