x·atomo
actividade: Dúvida Pontual
instituição:
cursos:
disciplina: Complementos de Matemática
tipologia: Exercício
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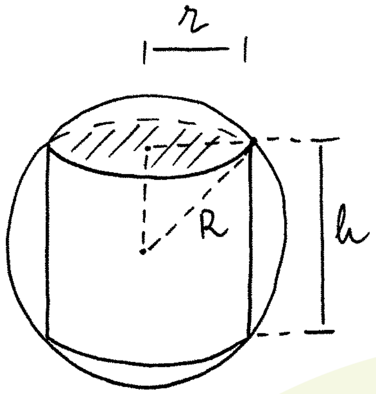

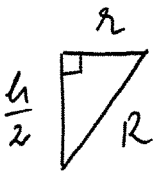

$$\therefore \left(\frac{h}{2}\right)^2 + r^2 = R^2$$

$$\Leftrightarrow \frac{h^2}{4} + r^2 = R^2 \Leftrightarrow$$

$$\Leftrightarrow r^2 = R^2 - \frac{h^2}{4}$$

$$V_{CILINDRO} = A_{BASE} \times h =$$

$$= \pi r^2 h = \pi\left(R^2 - \frac{h^2}{4}\right)h$$

$$V_{CILINDRO} = \pi\left(R^2 h - \frac{h^3}{4}\right) \text{ com } h \in \left]0, 2R\right[$$

$$\boxed{\frac{dV}{dh} = \pi\left(R^2 - \frac{3}{4}h^2\right)} = 0 \Leftrightarrow R^2 - \frac{3}{4}h^2 = 0$$

$$\Leftrightarrow h^2 = \frac{4}{3}R^2 \Leftrightarrow h = \frac{2}{\sqrt{3}}R$$

	0		$\frac{2}{\sqrt{3}}R$		$2R$
V'		$+$	0	$-$	
V		$\nearrow$	MÁX	$\searrow$	

$$\therefore V_{MÁX} = \pi\left(R^2 \frac{2}{\sqrt{3}}R - \frac{1}{4}\left(\frac{2}{\sqrt{3}}R\right)^3\right)$$

$$V_{MÁX} = \pi\left(\frac{2}{\sqrt{3}}R^3 - \frac{8}{4\cdot 3\sqrt{3}}R^3\right) = \pi R^3\left(\frac{2}{\sqrt{3}} - \frac{2}{3\sqrt{3}}\right)$$

$$V_{MÁX} = \pi R^3 \frac{4}{3\sqrt{3}} = \frac{4\pi}{3\sqrt{3}}R^3$$