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Lista de Exercícios - Esferas e suas partes e Inscrição e Circunscrição de sólidos

Lista de Exercícios – Esfera e Suas partes

1- Resposta: C (pela rotação de um semi-círculo em torno do seu diâmetro)

2- V maior = 1 000 000 · V menor

$$\frac{4}{3}\cdot\pi\cdot R^3 = 1000000\cdot\frac{4}{3}\cdot\pi\cdot 1^3$$

$$R^3 = 1000000\cdot\frac{\cancel{4\pi}}{\cancel{3}}\cdot\frac{\cancel{3}}{\cancel{4\pi}}$$

$$R^3 = \sqrt{10^6}$$

$$R = \sqrt[3]{(10^2)^3}$$

$$\boxed{R = 100}$$

3- $\frac{V_{esfera}}{V_{cilindro}} = ?$ [h = 2·2R = 4R]

* cilindro equilátero

H = 2R

$$\frac{4}{3}\cdot\pi\cdot R^3 \div \pi\cdot(2R)^2\cdot 4R$$

$$\left(\frac{4}{3}\cdot\pi\cdot R^3\right)\cdot\left(\frac{1}{\pi\cdot 2^2\cdot R^2\cdot 4R}\right)$$

$$\frac{\cancel{4}}{3}\cdot\cancel{\pi}\cdot\cancel{R^3}\cdot\frac{1}{\pi\cdot\cancel{4}\cdot 4\cdot\cancel{R^3}}$$

$$\frac{1}{12}$$

Alternativa E

4- R = raio cilindro = ?

V cilindro = V bola 1 + V bola 2

$$\pi\cdot R^2\cdot 3 = \frac{4}{3}\cdot\pi\cdot 1^3 + \frac{4}{3}\cdot\pi\cdot 2^3$$

$$\pi\cdot R^2\cdot 3 = 1\left(\frac{4}{3}\pi\right) + 8\left(\frac{4}{3}\pi\right)$$

$$\pi\cdot R^2\cdot 3 = 9\left(\frac{4}{3}\pi\right)$$

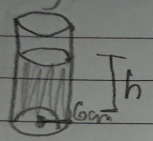
$$R^2 = \cancel{9}^{3}\cdot\frac{4\cancel{\pi}}{\cancel{3}}\cdot\frac{1}{3\cancel{\pi}}$$

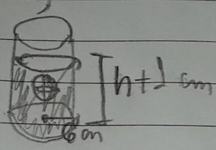
$$R^2 = \frac{3\cdot 4}{\cancel{3}}$$

$$R = \sqrt{4}$$

$$\boxed{R = 2\ cm}$$

Alternativa B

5- Situação 1: 

Situação 2: 

R = raio da esfera = ?

V situação 2 = V situação 1 + Vesfera

$\pi \cdot 6^2 \cdot (h+1) = \pi \cdot 6^2 \cdot h + \frac{4}{3} \cdot \pi \cdot R^3$

$\pi \cdot 36 (h+1) - \pi \cdot 36 \cdot h = \frac{4}{3} \cdot \pi \cdot R^3$

$36\pi (h+1-h) = \frac{4}{3} \cdot \pi \cdot R^3$

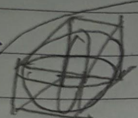
$R^3 = \frac{\overset{9}{\cancel{36}} \cdot \cancel{\pi} \cdot 3}{\cancel{4} \cdot \cancel{\pi}}$

$R^3 = 27$

$R = \sqrt[3]{27}$

$R = \sqrt[3]{3^3}$

Alternativa C $\boxed{R = 3\text{ cm}}$

6-  diâmetro esfera = Aresta do cubo

$V = 288\pi$

$\frac{4}{3}\pi \cdot R^3 = 288\pi$

$R^3 = \frac{\overset{72}{\cancel{288}} \cdot \cancel{\pi} \cdot 3}{\cancel{4}\,\cancel{\pi}}$

$R^3 = 216$

$R = \sqrt[3]{2^3 \cdot 3^3}$

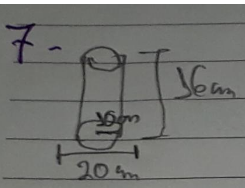
$R = \sqrt[3]{2^3} \cdot \sqrt[3]{3^3}$

$R = 2 \cdot 3$

$R = 6\text{ cm}$

$2 \cdot R = a \rightarrow a = 2 \cdot 6 = 12\text{ cm}$ Alternativa E

7 -



$V = \pi \cdot 10^2 \cdot 16$

$V = 1600\pi \text{ cm}^3$

1 doce: 2cm

$V_1 \text{ doce} = \frac{4}{3}\pi \cdot 2^3$

$V_1 \text{ doce} = \frac{32\pi}{3}$

doce	volume (cm³)
1	$\frac{32\pi}{3}$
x	1600π

$\frac{32\pi}{3} \cdot x = 1600\pi$

$x = \frac{1600\cancel{\pi} \cdot 3}{32\cancel{\pi}}$ (÷4)

$x = \frac{400 \cdot 3}{8}$ (÷4) $\longrightarrow x = \frac{\cancel{100}^{50} \cdot 3}{\cancel{2}}$

$x = 50 \cdot 3$

150 doces Alternativa D

8 - $\underbrace{V_{\text{semiesfera}} = V_{\text{cilindro}}}$ (R, H) $= V_{\text{cone}}$ (R, h)

$* V_{\text{semiesfera}} = \frac{V_{\text{esfera}}}{2}$

$* \frac{1}{2}\left(\frac{4}{3}\pi R^3\right) = \pi \cdot R^2 \cdot H$

$H = \frac{1}{\cancel{2}}\left(\frac{\cancel{4}^2}{3} \cdot \cancel{\pi} \cdot \cancel{R^3}\right) \cdot \frac{1}{\cancel{\pi} \cdot \cancel{R^2}} \longrightarrow H = \frac{2R}{3}$

$3H = 3 \cdot \frac{2R}{3}$

$3H = 2R$

Alternativa D

$* \pi \cdot R^2 \cdot H = \frac{1}{3} \cdot \pi \cdot R^2 \cdot h$

$H = \frac{1}{3} \cdot \cancel{\pi} \cdot \cancel{R^2} \cdot h \cdot \frac{1}{\cancel{\pi} \cdot \cancel{R^2}} \longrightarrow H = \frac{h}{3}$

$3 \cdot H = \frac{\cancel{3} \cdot h}{\cancel{3}}$

$3H = h$

Lista de Exercícios - Inscrição e Circunscrição de Sólidos.

1 - A superfície esférica $= 100\pi m^2$ $g = \sqrt{30}$ m $h = ?$

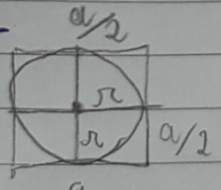
$\cancel{100\pi} = 4\cancel{\pi} r^2$ $R^2 = r^2 + (h - R^2)$ → $g^2 = h^2 + r^2$

$r^2 = 25$ $\cancel{R^2} = r^2 + h^2 - 2h \cdot \cancel{R} + R$ $(\sqrt{30})^2 = h^2 + r^2$

$r = 5$ m $5 = \frac{30}{2h}$ $30 = h^2 + r^2$

$h = 3$ m

2 -

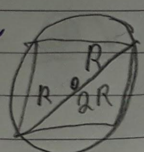


$S_{cubo} = 6 \cdot l^2$ $S_{esfera} = 4 \cdot \pi \cdot r^2$ → $S_e = 4\pi \cdot \frac{a^2}{4}$

$S_c = 6 \cdot a^2$ $S_{esfera} = 4 \cdot \pi \cdot (a/2)^2$ $S_e = \pi a^2$

razão → $\frac{S_e}{S_c} = \frac{\pi \cancel{a^2}}{6 \cancel{a^2}}$ → Razão $= \frac{\pi}{6}$ Alternativa A

3 -



$V_{esfera} = \frac{4}{3}\pi \cdot R^3$ $V_{cubo} = l^3$

$V_{cubo} = \left(\frac{2R}{\sqrt{3}}\right)^3$ → $\frac{8R^3}{3\sqrt{3}}$

$l\sqrt{3} = 2R$

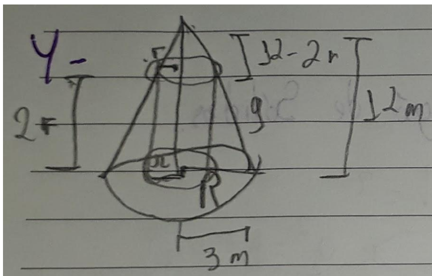
$l = \frac{2R}{\sqrt{3}}$

Razão: $\frac{V_e}{V_c}$ → $\frac{\frac{4}{3} \cdot \pi \cdot \cancel{R^3}}{\frac{8\cancel{R^3}}{3\sqrt{3}}}$ → $\frac{\pi}{\frac{2}{\sqrt{3}}}$ → $\pi \cdot \frac{\sqrt{3}}{2}$

Razão $= \frac{\sqrt{3}\pi}{2}$

Alternativa B

4 -



$V_c = A_b \cdot h$

$V_c = \pi \cdot r^2 \cdot 2r$

$V_c = \pi \, 2^2 \cdot 2 \cdot 2$

$V_c = 16\pi \, m^3$

$\frac{r}{R} = \frac{12-2r}{12}$

$\frac{r}{3} = \frac{12-2r}{12}$

$12r = 36 - 6r$

$r = \frac{36}{18}$

$r = 2$

5. $V = \pi \cdot 1^2 \cdot 2 + 2 \cdot \frac{\pi \cdot 1^2 \cdot 1}{3}$

$V = 2\pi + \frac{2\pi}{3}$

$V = \frac{6\pi + 2\pi}{3}$

$V = \frac{8\pi}{3} \, cm^3$