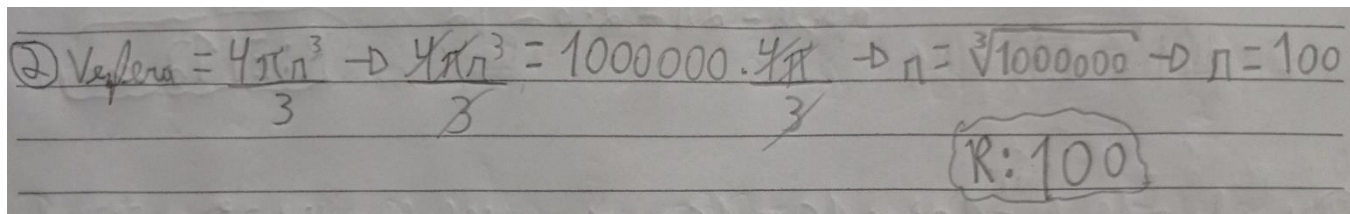


Esferas e suas partes – Inscrição e Circunscrição de Sólidos:

Esferas e suas partes:

1. R: c) pela rotação de um semi-círculo em torno do seu diâmetro.

2.



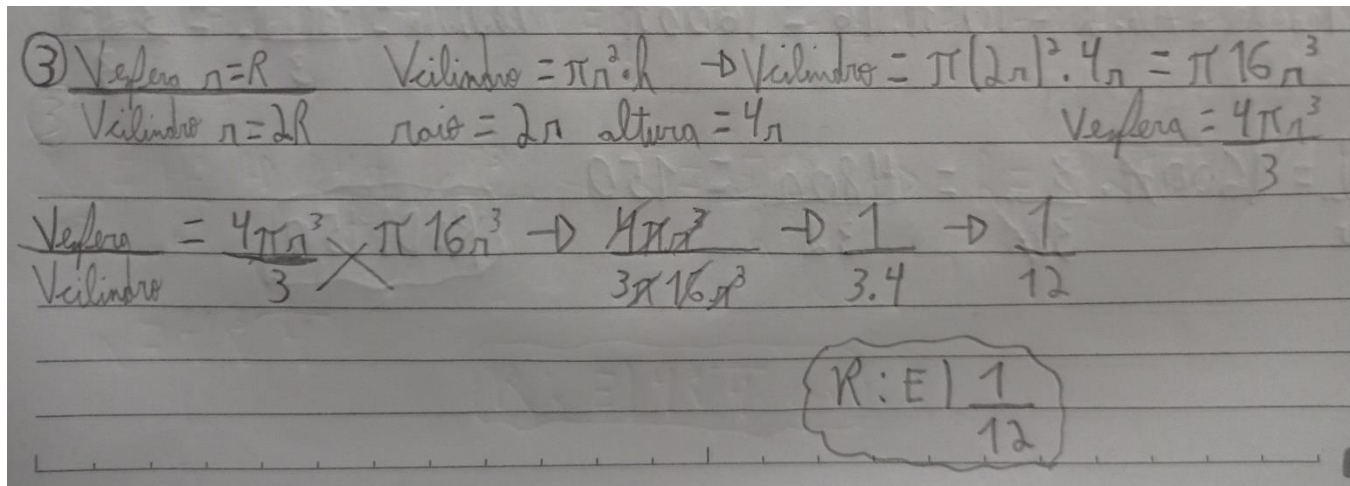
Handwritten solution for problem 2:

$$\textcircled{2} V_{\text{sfera}} = \frac{4\pi r^3}{3} \rightarrow \frac{4\pi r^3}{3} = 1000000 \cdot \frac{4\pi}{3} \rightarrow r = \sqrt[3]{1000000} \rightarrow r = 100$$

R: 100

R: 100

3.



Handwritten solution for problem 3:

$$\textcircled{3} \begin{array}{l} V_{\text{sfera}} r=R \\ V_{\text{cilindro}} r=2R \end{array} \quad \begin{array}{l} V_{\text{cilindro}} = \pi r^2 \cdot h \\ \text{raio} = 2r \quad \text{altura} = 4r \end{array} \rightarrow V_{\text{cilindro}} = \pi (2r)^2 \cdot 4r = \pi 16r^3$$
$$\frac{V_{\text{sfera}}}{V_{\text{cilindro}}} = \frac{\frac{4\pi r^3}{3}}{\pi 16r^3} \rightarrow \frac{4\pi r^3}{3\pi 16r^3} \rightarrow \frac{1}{3 \cdot 4} \rightarrow \frac{1}{12}$$

R: E) $\frac{1}{12}$

R: e) $\frac{1}{12}$

4.

$$\textcircled{4} V_{\text{esfera } 1} = \frac{4\pi \cdot 1^3}{3} = \frac{4\pi}{3} \quad V_{\text{esfera } 2} = \frac{4\pi \cdot 1^3}{3} = \frac{32\pi}{3}$$

$$V_{\text{total}} = V_1 + V_2 \rightarrow V_{\text{total}} = \frac{4\pi}{3} + \frac{32\pi}{3} = \frac{36\pi}{3} \rightarrow V_{\text{total}} = 12\pi \text{ cm}^3$$

$$V_{\text{cilindro}} = A_{\text{base}} \cdot h \quad 12\pi = \pi r^2 \cdot h \rightarrow 12\pi = \pi \cdot r^2 \cdot 3 \rightarrow r^2 = \frac{12}{3}$$

$$V_{\text{cilindro}} = V_{\text{total}} \quad r = \sqrt{4} \rightarrow r = 2$$

R: B | 2

R: b) 2

5.

$$\textcircled{5} V_1 = \pi r^2 \cdot h = \pi 36 \cdot h \quad V_2 = \pi r^2 \cdot (h+1) = \pi 36h + \pi 36 - \pi 36h = 36\pi$$

$$V_3 = \frac{4\pi r^3}{3} \rightarrow 36\pi = \frac{4\pi r^3}{3} \rightarrow r^3 = \frac{108}{4} \rightarrow r = \sqrt[3]{27} \rightarrow r = 3$$

R: C | 3 cm

R: c) 3cm

6.

$$\textcircled{6} 288\pi = \frac{4\pi r^3}{3} \rightarrow 864 = r^3 \rightarrow r = \sqrt[3]{216} \rightarrow r = 6$$

$$\text{aresta} = 2r = 2 \cdot 6 = 12$$

R: E | 12 cm

R: e) 12cm

7.

$$\textcircled{7} V_{\text{paralelo}} = A_{\text{b}} \cdot h = 10^2 \pi \cdot 16 = 1600\pi \quad V_{\text{bolinha}} = \frac{4\pi \cdot 2^3}{3} = \frac{32\pi}{3}$$

$$\frac{V}{v} = \frac{1600\pi \cdot \frac{3}{32\pi}}{1} = \frac{4800}{32} = 150 \quad \boxed{R: D1150}$$

R: d) 150

8.

$$\textcircled{8} V_{\text{hemisfério}} = \frac{2\pi R^3}{3} \quad \frac{2\pi R^3}{3} = \frac{1\pi R^3}{3} \cdot h \rightarrow 2R = h$$

$$V_{\text{cilindro}} = \pi R^2 \cdot H$$

$$V_{\text{cone}} = \frac{1\pi R^2 \cdot h}{3} \quad \frac{2\pi R^3}{3} = \frac{1\pi R^2 \cdot h}{3} \rightarrow 2R = h$$

$$2R = h = 3H \quad \boxed{R: D12R = h = 3H}$$

R: d) $2R = h = 3H$

Inscrição e Circunscrição de Sólidos:

1.

$$\begin{aligned}
 \textcircled{1} \quad A &= 4\pi R^2 & R^2 &= r^2 + (h-R)^2 & \rightarrow g^2 &= h^2 + r^2 \\
 R^2 &= \frac{100\pi}{4\pi} & R^2 &= r^2 + h^2 - 2h \cdot R + R^2 & (\sqrt{30})^2 &= h^2 + r^2 \\
 R &= \sqrt{25} & R &= r^2 + h^2 & h^2 + r^2 &= 30 \\
 R &= 5 & 5 &= \frac{30}{2h} \rightarrow 5h = 15 \rightarrow h = \frac{15}{5} \rightarrow h = 3 \text{ m} \\
 & & & & \boxed{R: 3 \text{ m}}
 \end{aligned}$$

R: 3m

2.

$$\begin{aligned}
 \textcircled{2} \quad \text{Superfície esférica} & \quad \text{Superfície da esfera} = 4\pi r^2 = 4\pi \left(\frac{a}{2}\right)^2 = \pi a^2 \\
 \text{A cubo circunscrito} & \quad \text{raio esfera} = \frac{a}{2} & \text{Superfície do cubo} &= 6a^2 \\
 \downarrow & & & \\
 \frac{\pi a^2}{6a^2} & \rightarrow \frac{\pi}{6} & \boxed{R: \frac{a}{6}\pi} &
 \end{aligned}$$

R: a) $\frac{\pi}{6}$

3.

③ $V_{\text{esfera de } r=R}$ $V_{\text{cubo inscrito}}$ $\text{diagonal cubo} = 2R$ $\text{diagonal cubo} = a\sqrt{3}$ $2R = a\sqrt{3} \rightarrow R = \frac{a\sqrt{3}}{2}$

$$\frac{V_e}{V_c} = \frac{4\pi r^3}{3} \times a^3 \rightarrow \frac{4\pi r^3}{3a^3} \rightarrow \frac{4\pi \left(\frac{a\sqrt{3}}{2}\right)^3}{3a^3} \rightarrow \frac{4\pi a^3 3\sqrt{3}}{3a^3 \cdot 8} \rightarrow \frac{12\sqrt{3}\pi}{24} \rightarrow \frac{\sqrt{3}\pi}{2}$$

R: $\frac{\sqrt{3}\pi}{2}$

R: b) $\frac{\sqrt{3}}{2}\pi$

4.

④ $V_{\text{cilindro}} = \text{Área} \cdot h$ $V_{\text{cilindro}} = \pi r^2 \cdot 2r$ $V_{\text{cilindro}} = \pi \cdot 2^2 \cdot 2 \cdot 2$ $V_{\text{cilindro}} = 16\pi$

$\pi = 12 - 2r$ $\rightarrow \pi = 12 - 2r$

R 12 3 12

$12r = 3 \cdot (12 - 2r)$

$12r = 36 - 6r$

$12r + 6r = 36$

$r = \frac{36}{18} \rightarrow r = 2$

R: $16\pi \text{ m}^3$

R: $16\pi \text{ m}^3$

5.

$$\textcircled{5} V = \frac{1}{3} \pi \cdot (R^2 + R \cdot r + r^2) \rightarrow V = \frac{1}{3} \pi \cdot (4^2 + 4 \cdot 2 + 2^2)$$
$$V = \frac{1}{3} \pi \cdot (16 + 8 + 4) \rightarrow V = \frac{1}{3} \pi \cdot 28 \rightarrow V = \frac{28\pi}{3}$$

$R: \frac{28\pi}{3} \text{ cm}^3$

$$R: \frac{28\pi}{3} \text{ cm}^3$$