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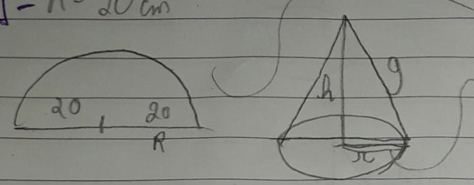
Lista de Exercícios - Cones e Troncos

Lista de Exercícios — Cones

1 - $R = 20\ cm$




Comprimento da semicircunferência $= \frac{2\pi}{2}$

Comprimento da circunferência $= 2\pi r$

$\frac{2\pi R}{2} = 2\pi r$

$\frac{20}{2} = r \rightarrow r = 10\ cm$

$g = 2R$

$g = 2 \cdot 10$

$g = 20\ cm \rightarrow$ Pitágoras

$g^2 = h^2 + r^2$

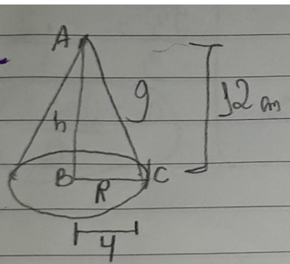
$20^2 = h^2 + 10^2$

$400 = h^2 + 100$

$h^2 = 300 \rightarrow h = 10\sqrt{3}\ cm$

Alternativa A

2 -




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

$64\cancel{\pi} = \frac{1}{3} \cdot \cancel{\pi} \cdot R^2 \cdot 12$

$64 = \frac{12R^2}{3}$

$R^2 = \frac{64}{4}$

$R = \sqrt{16}$

$R = 4\ cm$

Pitágoras

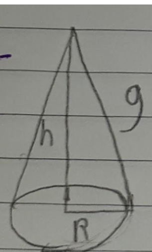
$g^2 = 12^2 + 4^2$

$g = \sqrt{160}$

$g = 4\sqrt{10}\ cm$

Alternativa B

3 -




$A = 36\pi\ cm^2$

$36\cancel{\pi} = \cancel{\pi} R^2$

$R = \sqrt{36}$

$R = 6\ cm$

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

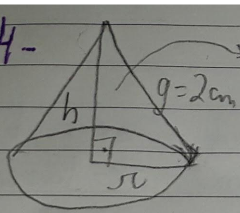
$V = \frac{1}{3} \cdot \pi \cdot 6^2 \cdot 6$

$V = \frac{216\pi}{3}$

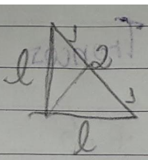
$V = 72\pi\ cm$

Alternativa A

4-




→ triângulo equilátero




$\to 2^2 = l^2 + l^2$

$2l^2 = 4$

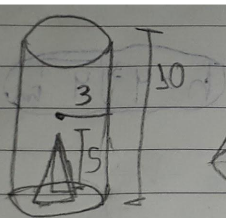
$\underbrace{l = \sqrt{2}\ \text{cm}}$

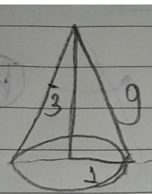
$(\sqrt{2})^2 = 1^2 + x^2 \to x^2 = 2-1 \to x = 1\ \text{cm}$

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

$\boxed{V = 2\pi/3}$ Alternativa E

5-




metade da altura do cilindro = 5

$\underbrace{V\ \text{cilindro} - V\ \text{cone}}$

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

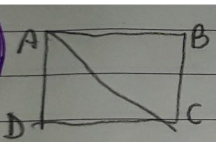
$V = 45\pi - \frac{3\pi}{3}$

$V = 45\pi - \pi \to \boxed{V = 44\pi}$ Alternativa E

6- $V\text{cone} = \frac{1}{3} \cdot \pi \cdot R^2 \cdot h$ $V\text{prisma} = \pi \cdot R^2 \cdot \frac{2}{3} \cdot R$

Razão $\frac{V\text{prisma}}{V\text{cone}}$ $\frac{\cancel{\pi \cdot R^2} \cdot \frac{2}{3} \cdot \cancel{h}}{\frac{1}{3} \cdot \cancel{\pi \cdot R^2} \cdot \cancel{h}} = \frac{\frac{2}{3}}{\frac{1}{3}} = \frac{6}{3} = 2$ A Alternativa

7




$V_{ABC} = \frac{1}{3} \cdot \pi \cdot x^2 \cdot y$

$V_{ABCD} = \pi \cdot x^2 \cdot y$

$V_{ADC} = \pi \cdot x^2 \cdot y - \frac{\pi \cdot x^2 \cdot y}{3}$

$V_{ADC} = \frac{3\pi \cdot x^2 \cdot y - \pi \cdot x^2 \cdot y}{3}$

$V_{ADC} = \frac{2\pi \cdot x^2 \cdot y}{3}$

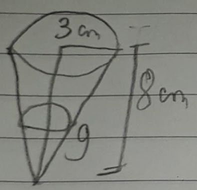
$R = \frac{\frac{\cancel{\pi} \cdot \cancel{x^2} \cdot \cancel{y}}{\cancel{3}}}{\frac{2\cancel{\pi} \cdot \cancel{x^2} \cdot \cancel{y}}{\cancel{3}}}$

$\boxed{R = \frac{1}{2}}$

Alternativa E

# Lista de Exercícios — Troncos

1 -




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

$V_{cone} = \frac{1}{3} \cdot \pi \cdot 3^2 \cdot h$

$V_{cone} = \frac{72\pi}{3} \rightarrow 24\pi\ cm^3$

Cada líquido ocupará metade do volume do cone $\rightarrow v = 12\pi\ cm^3$

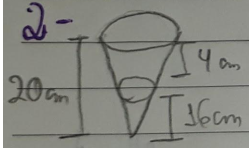
$\frac{V}{v} = \frac{H^3}{h^3} \rightarrow \frac{24\pi}{12\pi} = \frac{8^3}{h^3}$

$\rightarrow 2 = \frac{512}{h^3} = h^3 = \frac{512}{2}$

$\rightarrow h = \sqrt[3]{256} \rightarrow h = \sqrt[3]{2^3 \cdot 2^3 \cdot 2^2}$

Alternativa E $\leftarrow$ $h = 4\sqrt[3]{4}\ cm$

2 -




$\frac{V_{sorvete}}{V_{copo}} = \left(\frac{16}{20}\right)^3$

$V_s = \frac{64}{125} \cdot V_c$

$V_{espuma} = V_c - V_s$

$V_e = V_c - \frac{64}{125} \cdot V_c$

$V_e = \frac{125V_c - 64V_c}{125} \rightarrow V_e = \frac{61V_c}{125}$

$V_e = 0,488 \cdot V_c$

Alternativa C $V_e \cong 50\%\ V_c$

3 - $\frac{R}{h} = \frac{r}{x} \rightarrow r = \frac{R \cdot x}{h}$

$V_{cg} = \frac{\pi \cdot R^2 \cdot h}{3}$

$V_{cp} = \frac{\pi \cdot r^2 \cdot x}{3} \rightarrow \frac{\pi \cdot \left(\frac{R \cdot x}{h}\right)^2 \cdot x}{3} = \frac{\pi \cdot R^2 \cdot x^3}{3h^2}$

$V_T = \frac{\pi \cdot R^2 \cdot h}{3} - \frac{\pi \cdot R^2 \cdot x^3}{3h^2} \rightarrow V_T = \frac{\pi \cdot R^2 \cdot h^3 - \pi \cdot R^2 \cdot x^3}{3h^2}$

$V_T = \frac{\pi \cdot R^2 (h^3 - x^3)}{3h^2} \rightarrow \frac{\pi \cdot R^2 \cdot x^3}{\cancel{3h^2}} = \frac{\pi \cdot R^2 (h^3 - x^3)}{\cancel{3h^2}}$

$\pi \cdot R^2 \cdot x^3 = \pi \cdot R^2 (h^3 - x^3) \rightarrow x^3 = h^3 - x^3$

$2x^3 = h^3 \rightarrow x = \frac{\sqrt[3]{x^3}}{\sqrt[3]{2}} \rightarrow x = \frac{h}{\sqrt[3]{2}} \cdot \frac{\sqrt[3]{2^2}}{\sqrt[3]{2^2}} \rightarrow x = \frac{h\sqrt[3]{4}}{2}$

4 - $5^2 = h^2 + 3^2 \rightarrow h^2 = 25 - 9 \rightarrow h = \sqrt{16} \rightarrow h = 4\ cm$

5- $A_b = \pi \cdot 2^2$

$A_b = 4\pi \, m^2$

$A_B = \pi \cdot 5^2$

$A_B = 25\pi \, m^2$

$A_L = \pi (5+2) \cdot 5$

$A_L = 35\pi \, m^2$

$g^2 = 4^2 + 3^2 \rightarrow g^2 = 16 + 9 \rightarrow g = \sqrt{25} \rightarrow g = 5m$

$A_T = \underbrace{4\pi + 25\pi + 35\pi}$

$A_T = 64\pi \, m^2$

Área Total

$V = \dfrac{\pi \cdot 4}{3} (5^2 + 2^2 + 5 \cdot 2)$

$V = \underbrace{\dfrac{\pi \cdot 4 \cdot 39}{3}}$

$V = \dfrac{52\pi \, m^3}{3}$ Volume

6- $5^2 = h^2 + 4^2$

$h^2 = 25 - 16$

$h = \sqrt{9}$

$h = 3 \, cm$

$V = \dfrac{\pi \cdot 3}{3} (7^2 + 3^2 + 7 \cdot 3)$

$V = \pi (49 + 9 + 21)$

$V = 79\pi \, cm^2$

Alternativa D

7- $\dfrac{R}{H} = \dfrac{x}{h} \rightarrow x = \dfrac{Rh}{H}$

$V_{cg} = \dfrac{\pi \cdot R^2 \cdot H}{3}$

$V_{cp} = \dfrac{\pi \cdot x^2 \cdot h}{3} \rightarrow V_{cp} = \dfrac{\pi \cdot \left(\frac{Rh}{H}\right)^2 \cdot h}{3} \rightarrow V_{cp} = \dfrac{\pi \cdot R^2 \cdot h^3}{3H^2}$

$V_T = \dfrac{\pi \cdot R^2 \cdot H}{3} - \dfrac{\pi \cdot R^2 \cdot h^3}{3H^2} \rightarrow V_T = \dfrac{\pi \cdot R^2 \cdot H^3 - \pi \cdot R^2 \cdot h^3}{3H^2}$

$V_T = \dfrac{\pi \cdot R^2 \cdot (H^3 - h^3)}{3H^2} \rightarrow \dfrac{\pi \cdot R^2 \cdot h^3}{3H^2} = \dfrac{\pi \cdot R^2 (H^3 - h^3)}{3H^2}$

$\pi \cdot R^2 \cdot h^3 = \pi \cdot R^2 \cdot (H^3 - h^3) \rightarrow h^3 = H^3 - h^3$

$2h^3 = H^3$

$h^3 = \dfrac{H^3}{2}$

$h = \dfrac{\sqrt[3]{H^3}}{\sqrt[3]{2}}$

$h = \dfrac{H}{\sqrt[3]{2}}$

$h = \dfrac{H}{\sqrt[3]{2}} \cdot \dfrac{\sqrt[3]{2^2}}{\sqrt[3]{2^2}}$

$h = \dfrac{H\sqrt[3]{4}}{2}$ Alternativa A