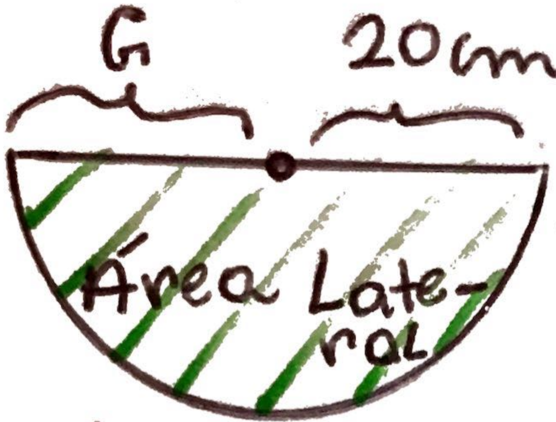
Cones

Naihara-317

1

Geratriz



$\Rightarrow$ Cartolina (meio círculo)

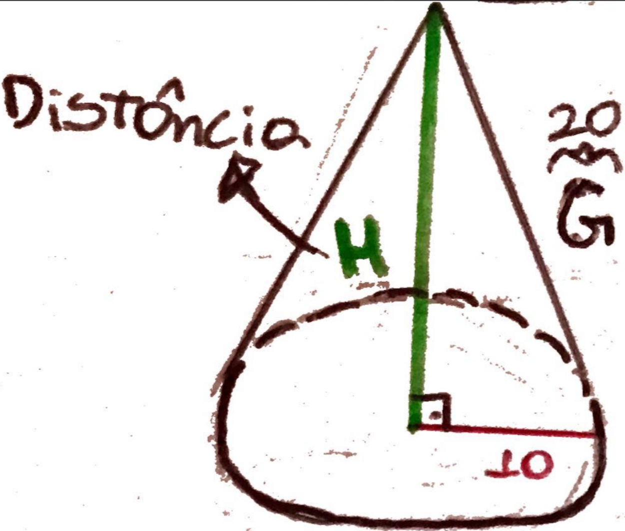
$\Rightarrow A_{setor} = \frac{1}{2}\pi G^2 = \frac{1}{2}\pi . 20^2$

$A_{setor} = A_{lateral}$

$\frac{1}{2}\pi 20^2 = \pi . R . G$

$\frac{1}{2}\cancel{\pi} 20^{\cancel{2}} = \cancel{\pi} . R . \cancel{20}$ $\Rightarrow$ Raio da cone

$\frac{1}{2} 20 = R \Rightarrow R = 10$



$$G^2 = H^2 + 10^2$$

$$G^2 = H^2 + 100$$

$$20^2 = H^2 + 100$$

$$400 = H^2 + 100$$

$$300 = H^2$$

$$\begin{array}{r|l}
300 & 2 \\
150 & 2 \\
75 & 5 \\
15 & 3 \\
5 & 5 \\
\hline
 & 10\sqrt{3}
\end{array}$$

$$H = \sqrt{300}$$

$$\boxed{H = 10\sqrt{3}} \text{ cm}$$

2

$V = \frac{1}{3}\pi R^2 . h \Rightarrow 64\cancel{\pi} = \frac{1}{3}\cancel{\pi} R^2 . 12$

$V = 64\pi \, cm^3$

$h = 12 \, cm$

$64 = \frac{1}{3} . 12 . R^2$

$64 = 4R^2$

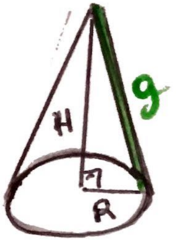
$R^2 = \frac{64}{4}$

$R^2 = 16$

$R = \sqrt{16} = 4 \, cm$

$AL = \pi . R . g$

$AL = \pi . 4 .$



$g^2 = H^2 + R^2$

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

$g^2 = 144 + 16$

$g^2 = 160$

$g = \sqrt{160} = 4\sqrt{10}$

(3)

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

$$\pi R^2 = 36 \pi \, cm^2$$

$$R = h = x$$

$$V = \frac{1}{3} \cdot 36\pi \cdot x$$

$$h = R^2 \Rightarrow 36 = R^2$$

$$R = \sqrt{36} = 6$$

$$R = h = 6$$

$$V = \frac{1}{3} \cdot 36 \cdot \pi \cdot 6$$

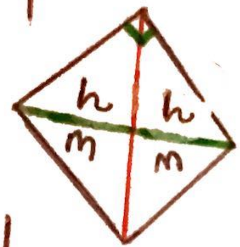
$$V = \frac{1}{36} \cdot 36 \cdot 6 \cdot \pi$$

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

$$V = 72\pi$$

④

giro do triângulo



dois cones

M = mediana relativa à hipotenusa

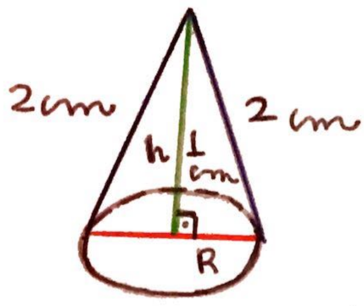
h = altura do triângulo

x = hipotenusa

$$m = h = \frac{x}{2}$$

$$m = h = \frac{2}{2}$$

$m = h = 1$ cm $\Rightarrow$ altura e mediana



$$2^2 = R^2 + 1^2$$
$$4 = R^2 + 1$$
$$3 = R^2$$
$$R = \sqrt{3}$$

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

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

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

$$V = 2\pi$$

a rotação forma 2 cones

5

$$V = \frac{V_{cilindro} - V_{cone}}{2} \Rightarrow V.cilindro = Ab \cdot h$$

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

$$V_{cilindro} = \pi \cdot 3^2 \cdot 10$$

$$'' \quad '' = 9 \cdot 10 \pi = 90\pi$$

metade do volume $= 45\pi$

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

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

$$'' \quad '' = \frac{3\pi}{3} = \pi$$

$$\Rightarrow V = 45\pi - \pi$$

$$V = 44\pi$$

⑥

$$\left.\begin{array}{l} A_{prisma} = Ab \cdot h_1 \\ A_{cone} = \frac{1}{3} Ab \cdot h_2 \end{array}\right\} \frac{A_{prisma}}{A_{cone}} = \frac{\cancel{Ab} \cdot \frac{2}{3} h_2}{\frac{1}{3} \cdot \cancel{Ab} \cdot h_2} \Rightarrow \frac{\frac{2}{3} \cdot h_2}{\frac{1}{3} \cdot h_2}$$

$$\frac{\frac{2h_2}{3}}{\frac{h_2}{3}} = \frac{2\cancel{h_2}}{3} \cdot \frac{3}{\cancel{h_2}} \qquad \Rightarrow \frac{\frac{12h_2}{3}}{h_2} = \frac{2h_2}{3} \cdot \frac{h_2}{1}$$

$$\boxed{\frac{6}{3} = 2}$$

Troncos

(1)

$(V_1)\ V_{grande} = \frac{1}{\cancel{3}}\pi \cdot 3 \cdot 3 \cdot 8 = 24\pi\ cm^3$

$(V_2)\ V_{pequeno} = \frac{1}{2} \cdot V_{grande} = \frac{1}{2} \cdot 24 = 12\pi\ cm^3$

$$\frac{V_1}{V_2} = \left(\frac{x}{8}\right)^3 \Rightarrow \frac{\cancel{12\pi}^{1}}{\cancel{24}_{2}\pi} = \frac{x^3}{8^3} \Rightarrow \frac{1}{2} = \frac{x^3}{8^3} \Rightarrow x^3 = \frac{8^3}{2} = \frac{512}{2}$$

$$\begin{array}{r|l} 256 & 2 \\ 128 & 2 \\ 64 & 2 \\ 32 & 2 \\ 16 & 2 \\ 8 & 2 \\ 4 & 2 \\ 2 & 2 \\ 1 & 4\sqrt[3]{4} \end{array} \quad \begin{array}{l} \left.\begin{array}{l}2\\2\end{array}\right\}2 \\ \left.\begin{array}{l}2\\2\end{array}\right\}2 \end{array} \Big\} 4 \qquad \left.\begin{array}{l}2\\2\end{array}\right\}4$$

$x^3 = 256$

$x = \sqrt{256}$

$x = 4\sqrt[3]{4}$

(2)

Cone maior = V_{Total} (líquido + espuma) = 20

Cone menor = $V_{líquido}$ (líquido - espuma) = 16

$$\frac{V_{líquido}}{V_{total}} = \left(\frac{\overset{\div 2}{16}}{20}\right)^3 \Rightarrow \left(\frac{8}{10}\right)^3 = \frac{512}{1000} = 51,2\%$$

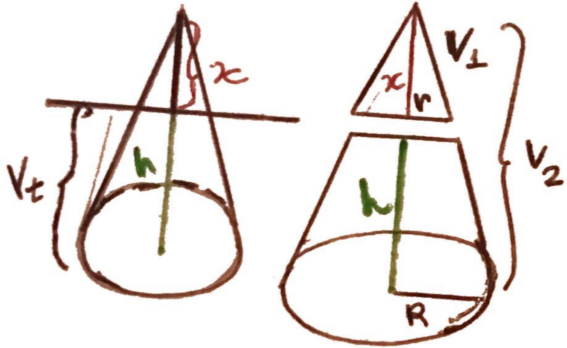
$V_{líquido} = 51,2\%$ de V_{TOTAL}

$V_{espuma} + V_{líquido} = 100\%$ de V_{total}

$V_{espuma} = 100 - 51,2\%$

$V_{espuma} = 48,8 \cong 50\%$

3



$$\frac{x}{r} = \frac{h}{R} \Rightarrow R = \frac{h \cdot r}{x}$$

$$V_t = V_2 - V_1$$

$$V_1 = \pi r^2 \cdot x$$

$$V_2 = \pi R^2 \cdot h$$

$$V_t = \pi R^2 \cdot h - \pi r^2 \cdot x$$

$$V_t = \pi \left(\frac{hr}{x}\right)^2 \cdot h - \pi r^2 \cdot x$$

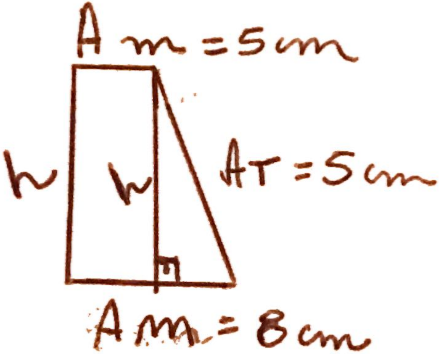
$$V_t = V_1$$

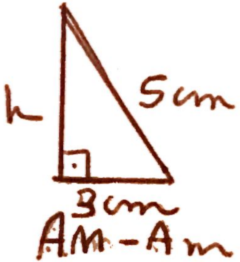
$$\pi \left(\frac{hr}{x}\right)^2 \cdot h$$

$$V_t = V_1$$

$$\pi \left(\frac{hr}{x}\right)^2 - \pi r^2 x = \pi r^2 x$$

(4)





$$\Rightarrow 5^2 = h^2 + 3^2$$

$$25 = h^2 + 9$$

$$25 - 9 = h^2$$

$$16 = h^2$$

$$h = \sqrt{16}$$

$$\boxed{h = 4\,cm}$$

5

$$V_t = \frac{\pi x}{3}(R^2 + r^2 + R.r) \Rightarrow V_t = \frac{\pi .4}{3}(5^2 + 2^2 + 5.2)$$

$x = 4m$

$R = 5m$

$r = 2m$

$$V_t = \frac{4\pi}{3}(25 + 4 + 10)$$

$$V_t = \frac{4\pi . 39}{3} \Rightarrow \frac{156\pi}{3} = 52\pi$$

$$At = Ab + AB + AL$$

$$AL = \pi \cdot g\,(R+r) \Rightarrow AL = \pi \cdot 12\,(5+2)$$

$$g^2 = h^2 + (R-r)^2$$

$\hookrightarrow$ geratriz

$$g^2 = 4^2 (5-2)^2$$

$$g^2 = 16 \cdot 3^2$$

$$g^2 = 16 \cdot 9$$

$$g^2 = 144$$

$$g = \sqrt{144} = 12$$

$$AL = 12\pi \cdot 7$$

$$AL = 84\pi$$

$$AB = \pi R^2$$

$$AB = \pi 5^2$$

$$AB = 25\pi$$

$$Ab = \pi r^2$$

$$Ab = \pi 2^2$$

$$Ab = 4\pi$$

$$At = 25\pi + 4\pi + 84\pi$$

$$At = 113\pi$$

6

$h = ?$

$g^2 = h^2 + (R-r)^2$

$5^2 = h^2 + (7-3)^2$

$25 = h^2 + 4^2$

$25 = h^2 + 16$

$9 = h^2$

$h = \sqrt{9} = 3$

$V_t = \frac{\pi . h}{3} (R^2 + r^2 + R.r)$

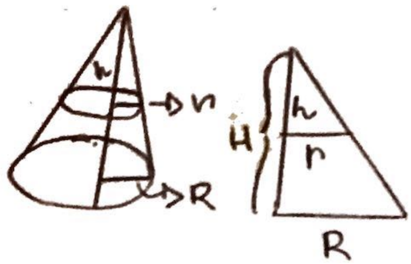
$Vt = \frac{\pi . \cancel{3}}{\cancel{3}} (7^2 + 3^2 + 7.3)$

$Vt = \pi . (49 + 9 + 21)$

$Vt = \pi (79)$

$\boxed{Vt = 79\pi}$

7



$$\frac{R}{H} = \frac{r}{h} \Rightarrow r = \frac{Rh}{H}$$

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

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

$$V_{tc} = V_{cg} - V_{cp}$$

$$\frac{\pi R^2 H^3}{3} - \frac{\pi R^2 h^3}{3H^2}$$

$$= \frac{\pi R^2 (H^3 - h^3)}{3H^2}$$

$$V_{cp} = V_{tc}$$

$$\frac{\pi R^2 h^3}{3H^2} = \frac{\pi R^2 (H^3 - h^3)}{3H^2} \Rightarrow \pi R^2 (H^3 - h^3)$$

$$h^3 = H^2 - h^3 \Rightarrow 2h^3 = H^3 \Rightarrow h^3 = \frac{H^3}{2} \Rightarrow h = \frac{\sqrt[3]{H^3}}{\sqrt[3]{2}}$$

$$h = \frac{\sqrt[3]{H^3} \cdot \sqrt[3]{2^2}}{\sqrt[3]{2} \cdot \sqrt[3]{2^2}} \Rightarrow h = \frac{H\sqrt[3]{4}}{2}$$