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Capsule Formulas

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List of 16 Capsule Formulas

Capsule

Cylinder Height of Capsule

1) Cylinder Height of Capsule

$$\text{fx } h_{\text{Cylinder}} = l - (2 \cdot r_{\text{Sphere}})$$

[Open Calculator !\[\]\(de95854c7ee024cfadc48187bbb781b2_img.jpg\)](#)

$$\text{ex } 10\text{m} = 20\text{m} - (2 \cdot 5\text{m})$$

2) Cylinder Height of Capsule given Sphere Radius and Surface Area

$$\text{fx } h_{\text{Cylinder}} = \frac{\text{TSA}}{2 \cdot \pi \cdot r_{\text{Sphere}}} - (2 \cdot r_{\text{Sphere}})$$

[Open Calculator !\[\]\(6a9b39b98eb945faa14c645ec99e4eaa_img.jpg\)](#)

$$\text{ex } 10.05352\text{m} = \frac{630\text{m}^2}{2 \cdot \pi \cdot 5\text{m}} - (2 \cdot 5\text{m})$$

3) Cylinder Height of Capsule given Sphere Radius and Volume

$$\text{fx } h_{\text{Cylinder}} = \frac{V}{\pi \cdot r_{\text{Sphere}}^2} - \frac{4 \cdot r_{\text{Sphere}}}{3}$$

[Open Calculator !\[\]\(f1c5da15572e3e09d343161be98f508d_img.jpg\)](#)

$$\text{ex } 10.01277\text{m} = \frac{1310\text{m}^3}{\pi \cdot (5\text{m})^2} - \frac{4 \cdot 5\text{m}}{3}$$



4) Cylinder Height of Capsule given Surface Area and Length

$$\text{fx } h_{\text{Cylinder}} = l - \frac{\text{TSA}}{\pi \cdot l}$$

[Open Calculator !\[\]\(cbe80b694ebd74fcfe136a095b608235_img.jpg\)](#)

$$\text{ex } 9.973239\text{m} = 20\text{m} - \frac{630\text{m}^2}{\pi \cdot 20\text{m}}$$

Length of Capsule

5) Length of Capsule

$$\text{fx } l = h_{\text{Cylinder}} + (2 \cdot r_{\text{Sphere}})$$

[Open Calculator !\[\]\(5361750c22c4e047a52f4eac1ec2d4cc_img.jpg\)](#)

$$\text{ex } 20\text{m} = 10\text{m} + (2 \cdot 5\text{m})$$

6) Length of Capsule given Surface Area and Sphere Radius

$$\text{fx } l = \frac{\text{TSA}}{2 \cdot \pi \cdot r_{\text{Sphere}}}$$

[Open Calculator !\[\]\(b792654f2cef9719eabeb6c5be00811e_img.jpg\)](#)

$$\text{ex } 20.05352\text{m} = \frac{630\text{m}^2}{2 \cdot \pi \cdot 5\text{m}}$$

7) Length of Capsule given Volume and Sphere Radius

$$\text{fx } l = \frac{V}{\pi \cdot r_{\text{Sphere}}^2} + \frac{2 \cdot r_{\text{Sphere}}}{3}$$

[Open Calculator !\[\]\(84f47badaad7772cd95667a7c387a639_img.jpg\)](#)

$$\text{ex } 20.01277\text{m} = \frac{1310\text{m}^3}{\pi \cdot (5\text{m})^2} + \frac{2 \cdot 5\text{m}}{3}$$



Sphere Radius of Capsule

8) Sphere Radius of Capsule

$$\text{fx } r_{\text{Sphere}} = \frac{l - h_{\text{Cylinder}}}{2}$$

[Open Calculator !\[\]\(23d9fc146e83b5c3013cfa32c784f8d5_img.jpg\)](#)

$$\text{ex } 5\text{m} = \frac{20\text{m} - 10\text{m}}{2}$$

9) Sphere Radius of Capsule given Surface Area and Length

$$\text{fx } r_{\text{Sphere}} = \frac{\text{TSA}}{2 \cdot \pi \cdot l}$$

[Open Calculator !\[\]\(aa53ad6fea213b8b2226d3077e30533a_img.jpg\)](#)

$$\text{ex } 5.013381\text{m} = \frac{630\text{m}^2}{2 \cdot \pi \cdot 20\text{m}}$$

Surface Area of Capsule

Total Surface Area of Capsule

10) Surface Area of Capsule

fx
[Open Calculator !\[\]\(248b91fcdac4810ffd15cf33fb6aec6f_img.jpg\)](#)

$$\text{TSA} = (2 \cdot \pi \cdot r_{\text{Sphere}}) \cdot ((2 \cdot r_{\text{Sphere}}) + h_{\text{Cylinder}})$$

$$\text{ex } 628.3185\text{m}^2 = (2 \cdot \pi \cdot 5\text{m}) \cdot ((2 \cdot 5\text{m}) + 10\text{m})$$



11) Surface Area of Capsule given Length and Cylinder Height

$$\text{fx } \text{TSA} = \pi \cdot l \cdot (1 - h_{\text{Cylinder}})$$

[Open Calculator !\[\]\(e2376d476d06eb31946dc01a69a4403a_img.jpg\)](#)

$$\text{ex } 628.3185\text{m}^2 = \pi \cdot 20\text{m} \cdot (20\text{m} - 10\text{m})$$

12) Surface Area of Capsule given Length and Sphere Radius

$$\text{fx } \text{TSA} = 2 \cdot \pi \cdot l \cdot r_{\text{Sphere}}$$

[Open Calculator !\[\]\(0b5e7e25e8775f7e7e80906ada4f0021_img.jpg\)](#)

$$\text{ex } 628.3185\text{m}^2 = 2 \cdot \pi \cdot 20\text{m} \cdot 5\text{m}$$

Surface to Volume Ratio of Capsule

13) Surface to Volume Ratio of Capsule

$$\text{fx } R_{A/V} = \frac{2 \cdot ((2 \cdot r_{\text{Sphere}}) + h_{\text{Cylinder}})}{r_{\text{Sphere}} \cdot \left(\frac{4 \cdot r_{\text{Sphere}}}{3} + h_{\text{Cylinder}} \right)}$$

[Open Calculator !\[\]\(0fb13ad0bfa3d86868cdd3883e5665b3_img.jpg\)](#)

$$\text{ex } 0.48\text{m}^{-1} = \frac{2 \cdot ((2 \cdot 5\text{m}) + 10\text{m})}{5\text{m} \cdot \left(\frac{4 \cdot 5\text{m}}{3} + 10\text{m} \right)}$$



Volume of Capsule

14) Volume of Capsule

$$\text{fx } V = \pi \cdot r_{\text{Sphere}}^2 \cdot \left(\frac{4 \cdot r_{\text{Sphere}}}{3} + h_{\text{Cylinder}} \right)$$

[Open Calculator !\[\]\(950a62bbddad88d64435fd35607dfc42_img.jpg\)](#)

$$\text{ex } 1308.997\text{m}^3 = \pi \cdot (5\text{m})^2 \cdot \left(\frac{4 \cdot 5\text{m}}{3} + 10\text{m} \right)$$

15) Volume of Capsule given Cylinder Height and Length

fx

[Open Calculator !\[\]\(73002692dd5e7a64e60946be3158e719_img.jpg\)](#)

$$V = \pi \cdot \left(\frac{1 - h_{\text{Cylinder}}}{2} \right)^2 \cdot \left(\frac{2 \cdot (1 - h_{\text{Cylinder}})}{3} + h_{\text{Cylinder}} \right)$$

$$\text{ex } 1308.997\text{m}^3 = \pi \cdot \left(\frac{20\text{m} - 10\text{m}}{2} \right)^2 \cdot \left(\frac{2 \cdot (20\text{m} - 10\text{m})}{3} + 10\text{m} \right)$$

16) Volume of Capsule given Sphere Radius and Length

$$\text{fx } V = \pi \cdot r_{\text{Sphere}}^2 \cdot \left(1 - \frac{2 \cdot r_{\text{Sphere}}}{3} \right)$$

[Open Calculator !\[\]\(aab88c0d099e5d18d6533a97b13ec28d_img.jpg\)](#)

$$\text{ex } 1308.997\text{m}^3 = \pi \cdot (5\text{m})^2 \cdot \left(20\text{m} - \frac{2 \cdot 5\text{m}}{3} \right)$$







Variables Used

- **h_{Cylinder}** Cylinder Height of Capsule (Meter)
- **l** Length of Capsule (Meter)
- **$R_{A/V}$** Surface to Volume Ratio of Capsule (1 per Meter)
- **r_{Sphere}** Sphere Radius of Capsule (Meter)
- **TSA** Total Surface Area of Capsule (Square Meter)
- **V** Volume of Capsule (Cubic Meter)



Constants, Functions, Measurements used

- **Constant:** **pi**, 3.14159265358979323846264338327950288
Archimedes' constant
- **Measurement:** **Length** in Meter (m)
Length Unit Conversion 
- **Measurement:** **Volume** in Cubic Meter (m³)
Volume Unit Conversion 
- **Measurement:** **Area** in Square Meter (m²)
Area Unit Conversion 
- **Measurement:** **Reciprocal Length** in 1 per Meter (m⁻¹)
Reciprocal Length Unit Conversion 



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