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Square Cupola Formulas

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List of 20 Square Cupola Formulas

Square Cupola ⬏

Edge Length of Square Cupola ⬏

1) Edge Length of Square Cupola given Height ⬏

fx $$l_e = \frac{h}{\sqrt{1 - \left(\frac{1}{4} \cdot \cos ec\left(\frac{\pi}{4}\right)^2\right)}}$$

ex $$9.899495m = \frac{7m}{\sqrt{1 - \left(\frac{1}{4} \cdot \cos ec\left(\frac{\pi}{4}\right)^2\right)}}$$

2) Edge Length of Square Cupola given Surface to Volume Ratio ⬏

fx $$l_e = \frac{7 + \left(2 \cdot \sqrt{2}\right) + \sqrt{3}}{\left(1 + \frac{2 \cdot \sqrt{2}}{3}\right) \cdot R_{A/V}}$$

ex $$9.917322m = \frac{7 + \left(2 \cdot \sqrt{2}\right) + \sqrt{3}}{\left(1 + \frac{2 \cdot \sqrt{2}}{3}\right) \cdot 0.6m^{-1}}$$

3) Edge Length of Square Cupola given Total Surface Area 🖱

$$fx \quad l_e = \sqrt{\dfrac{\text{TSA}}{7 + \left(2 \cdot \sqrt{2}\right) + \sqrt{3}}}$$

$$ex \quad 10.01708\text{m} = \sqrt{\dfrac{1160\text{m}^2}{7 + \left(2 \cdot \sqrt{2}\right) + \sqrt{3}}}$$

4) Edge Length of Square Cupola given Volume 🖱

$$fx \quad l_e = \left(\dfrac{V}{1 + \frac{2 \cdot \sqrt{2}}{3}}\right)^{\frac{1}{3}}$$

$$ex \quad 9.926005\text{m} = \left(\dfrac{1900\text{m}^3}{1 + \frac{2 \cdot \sqrt{2}}{3}}\right)^{\frac{1}{3}}$$

Height of Square Cupola 🖱

5) Height of Square Cupola 🖱

$$fx \quad h = l_e \cdot \sqrt{1 - \left(\frac{1}{4} \cdot \cos ec\left(\frac{\pi}{4}\right)^2\right)}$$

$$ex \quad 7.071068\text{m} = 10\text{m} \cdot \sqrt{1 - \left(\frac{1}{4} \cdot \cos ec\left(\frac{\pi}{4}\right)^2\right)}$$

6) Height of Square Cupola given Surface to Volume Ratio ⤢

fx   **Open Calculator** ⤢

$$h = \frac{\left(7 + \left(2 \cdot \sqrt{2}\right) + \sqrt{3}\right) \cdot \sqrt{1 - \left(\frac{1}{4} \cdot \cos ec\left(\frac{\pi}{4}\right)^2\right)}}{\left(1 + \frac{2 \cdot \sqrt{2}}{3}\right) \cdot R_{A/V}}$$

ex $7.012606m = \dfrac{\left(7 + \left(2 \cdot \sqrt{2}\right) + \sqrt{3}\right) \cdot \sqrt{1 - \left(\frac{1}{4} \cdot \cos ec\left(\frac{\pi}{4}\right)^2\right)}}{\left(1 + \frac{2 \cdot \sqrt{2}}{3}\right) \cdot 0.6m^{-1}}$

7) Height of Square Cupola given Total Surface Area ⤢

fx   **Open Calculator** ⤢

$$h = \sqrt{\frac{TSA}{7 + \left(2 \cdot \sqrt{2}\right) + \sqrt{3}}} \cdot \sqrt{1 - \left(\frac{1}{4} \cdot \cos ec\left(\frac{\pi}{4}\right)^2\right)}$$

ex $7.083145m = \sqrt{\dfrac{1160m^2}{7 + \left(2 \cdot \sqrt{2}\right) + \sqrt{3}}} \cdot \sqrt{1 - \left(\frac{1}{4} \cdot \cos ec\left(\frac{\pi}{4}\right)^2\right)}$

8) Height of Square Cupola given Volume 🔗

fx   **Open Calculator** 🔗

$$h = \left(\frac{V}{1+\frac{2\cdot\sqrt{2}}{3}}\right)^{\frac{1}{3}} \cdot \sqrt{1-\left(\frac{1}{4}\cdot\cos ec\left(\frac{\pi}{4}\right)^{2}\right)}$$

ex $7.018746m = \left(\dfrac{1900m^{3}}{1+\frac{2\cdot\sqrt{2}}{3}}\right)^{\frac{1}{3}} \cdot \sqrt{1-\left(\dfrac{1}{4}\cdot\cos ec\left(\dfrac{\pi}{4}\right)^{2}\right)}$

Surface Area of Square Cupola 🔗

Total Surface Area of Square Cupola 🔗

9) Total Surface Area of Square Cupola 🔗

fx   **Open Calculator** 🔗

$$TSA = \left(7 + \left(2\cdot\sqrt{2}\right) + \sqrt{3}\right) \cdot l_{e}^{2}$$

ex $1156.048m^{2} = \left(7 + \left(2\cdot\sqrt{2}\right) + \sqrt{3}\right) \cdot (10m)^{2}$

10) Total Surface Area of Square Cupola given Height 🔗

fx

$$\text{TSA} = \left(7 + \left(2 \cdot \sqrt{2}\right) + \sqrt{3}\right) \cdot \left(\frac{h^2}{1 - \left(\frac{1}{4} \cdot \cos ec\left(\frac{\pi}{4}\right)^2\right)}\right)$$

ex $1132.927 \text{m}^2 = \left(7 + \left(2 \cdot \sqrt{2}\right) + \sqrt{3}\right) \cdot \left(\frac{(7\text{m})^2}{1 - \left(\frac{1}{4} \cdot \cos ec\left(\frac{\pi}{4}\right)^2\right)}\right)$

11) Total Surface Area of Square Cupola given Surface to Volume Ratio 🔗

fx

$$\text{TSA} = \left(7 + \left(2 \cdot \sqrt{2}\right) + \sqrt{3}\right) \cdot \left(\frac{7 + \left(2 \cdot \sqrt{2}\right) + \sqrt{3}}{\left(1 + \frac{2 \cdot \sqrt{2}}{3}\right) \cdot R_{A/V}}\right)^2$$

ex $1137.011 \text{m}^2 = \left(7 + \left(2 \cdot \sqrt{2}\right) + \sqrt{3}\right) \cdot \left(\frac{7 + \left(2 \cdot \sqrt{2}\right) + \sqrt{3}}{\left(1 + \frac{2 \cdot \sqrt{2}}{3}\right) \cdot 0.6\text{m}^{-1}}\right)^2$

12) Total Surface Area of Square Cupola ⤤

fx **Open Calculator** ⤤

$$\text{TSA} = \left(7 + \left(2 \cdot \sqrt{2}\right) + \sqrt{3}\right) \cdot \left(\frac{V}{1 + \frac{2 \cdot \sqrt{2}}{3}}\right)^{\frac{2}{3}}$$

ex $1139.003\text{m}^2 = \left(7 + \left(2 \cdot \sqrt{2}\right) + \sqrt{3}\right) \cdot \left(\frac{1900\text{m}^3}{1 + \frac{2 \cdot \sqrt{2}}{3}}\right)^{\frac{2}{3}}$

Surface to Volume Ratio of Square Cupola ⤤

13) Surface to Volume Ratio of Square Cupola ⤤

Open Calculator ⤤

fx $R_{A/V} = \dfrac{7 + \left(2 \cdot \sqrt{2}\right) + \sqrt{3}}{\left(1 + \frac{2 \cdot \sqrt{2}}{3}\right) \cdot l_e}$

ex $0.595039\text{m}^{-1} = \dfrac{7 + \left(2 \cdot \sqrt{2}\right) + \sqrt{3}}{\left(1 + \frac{2 \cdot \sqrt{2}}{3}\right) \cdot 10\text{m}}$

14) Surface to Volume Ratio of Square Cupola given Height ⤡

Open Calculator ⤡

$$fx \ R_{A/V} = \frac{7 + \left(2 \cdot \sqrt{2}\right) + \sqrt{3}}{\left(1 + \frac{2 \cdot \sqrt{2}}{3}\right) \cdot \left(\frac{h}{\sqrt{1 - \left(\frac{1}{4} \cdot \cos ec\left(\frac{\pi}{4}\right)^2\right)}}\right)}$$

$$ex \ 0.60108\text{m}^{-1} = \frac{7 + \left(2 \cdot \sqrt{2}\right) + \sqrt{3}}{\left(1 + \frac{2 \cdot \sqrt{2}}{3}\right) \cdot \left(\frac{7\text{m}}{\sqrt{1 - \left(\frac{1}{4} \cdot \cos ec\left(\frac{\pi}{4}\right)^2\right)}}\right)}$$

15) Surface to Volume Ratio of Square Cupola given Total Surface Area ⤡

Open Calculator ⤡

$$fx \ R_{A/V} = \frac{7 + \left(2 \cdot \sqrt{2}\right) + \sqrt{3}}{\left(1 + \frac{2 \cdot \sqrt{2}}{3}\right) \cdot \sqrt{\frac{\text{TSA}}{7 + \left(2 \cdot \sqrt{2}\right) + \sqrt{3}}}}$$

$$ex \ 0.594025\text{m}^{-1} = \frac{7 + \left(2 \cdot \sqrt{2}\right) + \sqrt{3}}{\left(1 + \frac{2 \cdot \sqrt{2}}{3}\right) \cdot \sqrt{\frac{1160\text{m}^2}{7 + \left(2 \cdot \sqrt{2}\right) + \sqrt{3}}}}$$

16) Surface to Volume Ratio of Square Cupola given Volume ⬀

fx $$R_{A/V} = \cfrac{7 + \left(2 \cdot \sqrt{2}\right) + \sqrt{3}}{\left(1 + \frac{2 \cdot \sqrt{2}}{3}\right) \cdot \left(\cfrac{V}{1 + \frac{2 \cdot \sqrt{2}}{3}}\right)^{\frac{1}{3}}}$$

ex $$0.599475 \text{m}^{-1} = \cfrac{7 + \left(2 \cdot \sqrt{2}\right) + \sqrt{3}}{\left(1 + \frac{2 \cdot \sqrt{2}}{3}\right) \cdot \left(\cfrac{1900 \text{m}^3}{1 + \frac{2 \cdot \sqrt{2}}{3}}\right)^{\frac{1}{3}}}$$

Volume of Square Cupola ⬀

17) Volume of Square Cupola ⬀

fx $$V = \left(1 + \frac{2 \cdot \sqrt{2}}{3}\right) \cdot l_e^3$$

ex $$1942.809 \text{m}^3 = \left(1 + \frac{2 \cdot \sqrt{2}}{3}\right) \cdot (10 \text{m})^3$$

18) Volume of Square Cupola given Height 🔗

fx **Open Calculator** 🔗

$$V = \left(1 + \frac{2 \cdot \sqrt{2}}{3}\right) \cdot \left(\frac{h}{\sqrt{1 - \left(\frac{1}{4} \cdot \cos ec\left(\frac{\pi}{4}\right)^2\right)}}\right)^3$$

ex $1884.817 \text{m}^3 = \left(1 + \frac{2 \cdot \sqrt{2}}{3}\right) \cdot \left(\frac{7\text{m}}{\sqrt{1 - \left(\frac{1}{4} \cdot \cos ec\left(\frac{\pi}{4}\right)^2\right)}}\right)^3$

19) Volume of Square Cupola given Surface to Volume Ratio 🔗

fx **Open Calculator** 🔗

$$V = \left(1 + \frac{2 \cdot \sqrt{2}}{3}\right) \cdot \left(\frac{7 + \left(2 \cdot \sqrt{2}\right) + \sqrt{3}}{\left(1 + \frac{2 \cdot \sqrt{2}}{3}\right) \cdot R_{A/V}}\right)^3$$

ex $1895.018 \text{m}^3 = \left(1 + \frac{2 \cdot \sqrt{2}}{3}\right) \cdot \left(\frac{7 + \left(2 \cdot \sqrt{2}\right) + \sqrt{3}}{\left(1 + \frac{2 \cdot \sqrt{2}}{3}\right) \cdot 0.6\text{m}^{-1}}\right)^3$

20) Volume of Square Cupola given Total Surface Area

fx

$$V = \left(1 + \frac{2 \cdot \sqrt{2}}{3}\right) \cdot \left(\frac{\text{TSA}}{7 + \left(2 \cdot \sqrt{2}\right) + \sqrt{3}}\right)^{\frac{3}{2}}$$

ex $1952.78\text{m}^3 = \left(1 + \frac{2 \cdot \sqrt{2}}{3}\right) \cdot \left(\frac{1160\text{m}^2}{7 + \left(2 \cdot \sqrt{2}\right) + \sqrt{3}}\right)^{\frac{3}{2}}$

Variables Used

- **h** Height of Square Cupola *(Meter)*
- **l$_e$** Edge Length of Square Cupola *(Meter)*
- **R$_{A/V}$** Surface to Volume Ratio of Square Cupola *(1 per Meter)*
- **TSA** Total Surface Area of Square Cupola *(Square Meter)*
- **V** Volume of Square Cupola *(Cubic Meter)*

Constants, Functions, Measurements used

- Constant: **pi**, 3.14159265358979323846264338327950288
  Archimedes' constant

- Function: **cosec**, cosec(Angle)
  Trigonometric cosecant function

- Function: **sec**, sec(Angle)
  Trigonometric secant function

- Function: **sqrt**, sqrt(Number)
  Square root function

- 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 ↗

Check other formula lists

- **Pentagonal Cupola Formulas** ⬀ • **Triangular Cupola Formulas** ⬀
- **Square Cupola Formulas** ⬀

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