Important Triangular Cupola Formulas PDF

Formulas
Examples
with Units

List of 20
Important Triangular Cupola Formulas

1) Edge Length of Triangular Cupola Formulas

1.1) Edge Length of Triangular Cupola given Height Formula

Evaluate Formula

Formula

$$l_e = \frac{h}{\sqrt{1 - \left(\frac{1}{4} \cdot \operatorname{cosec}\left(\frac{\pi}{3}\right)^2\right)}}$$

Example with Units

$$9.798\,\text{m} = \frac{8\,\text{m}}{\sqrt{1 - \left(\frac{1}{4} \cdot \operatorname{cosec}\left(\frac{3.1416}{3}\right)^2\right)}}$$

1.2) Edge Length of Triangular Cupola given Surface to Volume Ratio Formula

Evaluate Formula

Formula

$$l_e = \frac{\left(3 + \frac{5 \cdot \sqrt{3}}{2}\right) \cdot \left(3 \cdot \sqrt{2}\right)}{5 \cdot R_{A/V}}$$

Example with Units

$$10.3664\,\text{m} = \frac{\left(3 + \frac{5 \cdot \sqrt{3}}{2}\right) \cdot \left(3 \cdot \sqrt{2}\right)}{5 \cdot 0.6\,\text{m}^{-1}}$$

1.3) Edge Length of Triangular Cupola given Total Surface Area Formula

Evaluate Formula

Formula

$$l_e = \sqrt{\frac{TSA}{3 + \frac{5 \cdot \sqrt{3}}{2}}}$$

Example with Units

$$9.9794\,\text{m} = \sqrt{\frac{730\,\text{m}^2}{3 + \frac{5 \cdot \sqrt{3}}{2}}}$$

1.4) Edge Length of Triangular Cupola given Volume Formula

Evaluate Formula

Formula

$$l_e = \left(\frac{3 \cdot \sqrt{2} \cdot V}{5}\right)^{\frac{1}{3}}$$

Example with Units

$$10.0604\,\text{m} = \left(\frac{3 \cdot \sqrt{2} \cdot 1200\,\text{m}^3}{5}\right)^{\frac{1}{3}}$$

2) Height of Triangular Cupola Formulas

2.1) Height of Triangular Cupola Formula

Evaluate Formula

Formula

$$h = l_e \cdot \sqrt{1 - \left(\frac{1}{4} \cdot \operatorname{cosec}\left(\frac{\pi}{3}\right)^2\right)}$$

Example with Units

$$8.165\,\text{m} = 10\,\text{m} \cdot \sqrt{1 - \left(\frac{1}{4} \cdot \operatorname{cosec}\left(\frac{3.1416}{3}\right)^2\right)}$$

2.2) Height of Triangular Cupola given Surface to Volume Ratio Formula

Evaluate Formula

Formula

$$h = \frac{\left(3 + \frac{5 \cdot \sqrt{3}}{2}\right) \cdot \left(3 \cdot \sqrt{2}\right)}{5 \cdot R_{A/V}} \cdot \sqrt{1 - \left(\frac{1}{4} \cdot \operatorname{cosec}\left(\frac{\pi}{3}\right)\right)^2}$$

Example with Units

$$8.4641\,\text{m} = \frac{\left(3 + \frac{5 \cdot \sqrt{3}}{2}\right) \cdot \left(3 \cdot \sqrt{2}\right)}{5 \cdot 0.6\,\text{m}^{-1}} \cdot \sqrt{1 - \left(\frac{1}{4} \cdot \operatorname{cosec}\left(\frac{3.1416}{3}\right)\right)^2}$$

2.3) Height of Triangular Cupola given Total Surface Area Formula

Evaluate Formula

Formula

$$h = \sqrt{\frac{TSA}{3 + \frac{5 \cdot \sqrt{3}}{2}}} \cdot \sqrt{1 - \left(\frac{1}{4} \cdot \operatorname{cosec}\left(\frac{\pi}{3}\right)\right)^2}$$

Example with Units

$$8.1482\,\text{m} = \sqrt{\frac{730\,\text{m}^2}{3 + \frac{5 \cdot \sqrt{3}}{2}}} \cdot \sqrt{1 - \left(\frac{1}{4} \cdot \operatorname{cosec}\left(\frac{3.1416}{3}\right)\right)^2}$$

2.4) Height of Triangular Cupola given Volume Formula

Evaluate Formula

Formula

$$h = \left(\frac{3 \cdot \sqrt{2} \cdot V}{5}\right)^{\frac{1}{3}} \cdot \sqrt{1 - \left(\frac{1}{4} \cdot \operatorname{cosec}\left(\frac{\pi}{3}\right)\right)^2}$$

Example with Units

$$8.2143\,\text{m} = \left(\frac{3 \cdot \sqrt{2} \cdot 1200\,\text{m}^3}{5}\right)^{\frac{1}{3}} \cdot \sqrt{1 - \left(\frac{1}{4} \cdot \operatorname{cosec}\left(\frac{3.1416}{3}\right)\right)^2}$$

3) Surface Area of Triangular Cupola Formulas

3.1) Total Surface Area of Triangular Cupola Formulas

3.1.1) Total Surface Area of Triangular Cupola Formula

Evaluate Formula

Formula

$$TSA = \left(3 + \frac{5 \cdot \sqrt{3}}{2}\right) \cdot l_e^2$$

Example with Units

$$733.0127\,\text{m}^2 = \left(3 + \frac{5 \cdot \sqrt{3}}{2}\right) \cdot 10\,\text{m}^2$$

3.1.2) Total Surface Area of Triangular Cupola given Height Formula

Evaluate Formula

Formula

$$TSA = \left(3 + \frac{5 \cdot \sqrt{3}}{2}\right) \cdot \frac{h^2}{1 - \left(\frac{1}{4} \cdot \operatorname{cosec}\left(\frac{\pi}{3}\right)^2\right)}$$

Example with Units

$$703.6922\,\text{m}^2 = \left(3 + \frac{5 \cdot \sqrt{3}}{2}\right) \cdot \frac{8\,\text{m}^2}{1 - \left(\frac{1}{4} \cdot \operatorname{cosec}\left(\frac{3.1416}{3}\right)^2\right)}$$

3.1.3) Total Surface Area of Triangular Cupola given Surface to Volume Ratio Formula

Evaluate Formula

Formula

$$TSA = \left(3 + \frac{5 \cdot \sqrt{3}}{2}\right) \cdot \left(\frac{\left(3 + \frac{5 \cdot \sqrt{3}}{2}\right) \cdot \left(3 \cdot \sqrt{2}\right)}{5 \cdot R_{A/V}}\right)^2$$

Example with Units

$$787.7066\,\text{m}^2 = \left(3 + \frac{5 \cdot \sqrt{3}}{2}\right) \cdot \left(\frac{\left(3 + \frac{5 \cdot \sqrt{3}}{2}\right) \cdot \left(3 \cdot \sqrt{2}\right)}{5 \cdot 0.6\,\text{m}^{-1}}\right)^2$$

3.1.4) Total Surface Area of Triangular Cupola given Volume Formula

Evaluate Formula

Formula

$$TSA = \left(3 + \frac{5 \cdot \sqrt{3}}{2}\right) \cdot \left(\frac{3 \cdot \sqrt{2} \cdot V}{5}\right)^{\frac{2}{3}}$$

Example with Units

$$741.8962\,\text{m}^2 = \left(3 + \frac{5 \cdot \sqrt{3}}{2}\right) \cdot \left(\frac{3 \cdot \sqrt{2} \cdot 1200\,\text{m}^3}{5}\right)^{\frac{2}{3}}$$

4) Surface to Volume Ratio of Triangular Cupola Formulas

4.1) Surface to Volume Ratio of Triangular Cupola Formula

Evaluate Formula

Formula

$$R_{A/V} = \frac{3 + \frac{5 \cdot \sqrt{3}}{2}}{\frac{5}{3 \cdot \sqrt{2}} \cdot l_e}$$

Example with Units

$$0.622\,\text{m}^{-1} = \frac{3 + \frac{5 \cdot \sqrt{3}}{2}}{\frac{5}{3 \cdot \sqrt{2}} \cdot 10\,\text{m}}$$

4.2) Surface to Volume Ratio of Triangular Cupola given Height Formula

Evaluate Formula

Formula

$$R_{A/V} = \frac{3 + \frac{5 \cdot \sqrt{3}}{2}}{\frac{5}{3 \cdot \sqrt{2}} \cdot \left(\frac{h}{\sqrt{1 - \left(\frac{1}{4} \cdot \operatorname{cosec}\left(\frac{\pi}{3} \right) \right)^2}} \right)}$$

Example with Units

$$0.6348\,\text{m}^{-1} = \frac{3 + \frac{5 \cdot \sqrt{3}}{2}}{\frac{5}{3 \cdot \sqrt{2}} \cdot \left(\frac{8\,\text{m}}{\sqrt{1 - \left(\frac{1}{4} \cdot \operatorname{cosec}\left(\frac{3.1416}{3} \right) \right)^2}} \right)}$$

4.3) Surface to Volume Ratio of Triangular Cupola given Total Surface Area Formula

Evaluate Formula

Formula

$$R_{A/V} = \frac{3 + \frac{5 \cdot \sqrt{3}}{2}}{\frac{5}{3 \cdot \sqrt{2}} \cdot \sqrt{\frac{TSA}{3 + \frac{5 \cdot \sqrt{3}}{2}}}}$$

Example with Units

$$0.6233\,\text{m}^{-1} = \frac{3 + \frac{5 \cdot \sqrt{3}}{2}}{\frac{5}{3 \cdot \sqrt{2}} \cdot \sqrt{\frac{730\,\text{m}^2}{3 + \frac{5 \cdot \sqrt{3}}{2}}}}$$

4.4) Surface to Volume Ratio of Triangular Cupola given Volume Formula

Evaluate Formula

Formula

$$R_{A/V} = \frac{3 + \frac{5 \cdot \sqrt{3}}{2}}{\frac{5}{3 \cdot \sqrt{2}} \cdot \left(\frac{3 \cdot \sqrt{2} \cdot V}{5} \right)^{\frac{1}{3}}}$$

Example with Units

$$0.6182\,\text{m}^{-1} = \frac{3 + \frac{5 \cdot \sqrt{3}}{2}}{\frac{5}{3 \cdot \sqrt{2}} \cdot \left(\frac{3 \cdot \sqrt{2} \cdot 1200\,\text{m}^3}{5} \right)^{\frac{1}{3}}}$$

5) Volume of Triangular Cupola Formulas

5.1) Volume of Triangular Cupola Formula

Evaluate Formula

Formula

$$V = \frac{5}{3 \cdot \sqrt{2}} \cdot l_e^{\,3}$$

Example with Units

$$1178.5113\,\text{m}^3 = \frac{5}{3 \cdot \sqrt{2}} \cdot 10\,\text{m}^{\,3}$$

5.2) Volume of Triangular Cupola given Height Formula

Evaluate Formula

Formula

$$V = \frac{5}{3 \cdot \sqrt{2}} \cdot \left(\frac{h}{\sqrt{1 - \left(\frac{1}{4} \cdot \operatorname{cosec}\left(\frac{\pi}{3} \right)^2 \right)}} \right)^3$$

Example with Units

$$1108.5125\,\text{m}^3 = \frac{5}{3 \cdot \sqrt{2}} \cdot \left(\frac{8\,\text{m}}{\sqrt{1 - \left(\frac{1}{4} \cdot \operatorname{cosec}\left(\frac{3.1416}{3} \right)^2 \right)}} \right)^3$$

5.3) Volume of Triangular Cupola given Surface to Volume Ratio Formula

Evaluate Formula

Formula

$$V = \frac{5}{3 \cdot \sqrt{2}} \cdot \left(\frac{\left(3 + \frac{5 \cdot \sqrt{3}}{2} \right) \cdot \left(3 \cdot \sqrt{2} \right)}{5 \cdot R_{A/V}} \right)^3$$

Example with Units

$$1312.8444\,\text{m}^3 = \frac{5}{3 \cdot \sqrt{2}} \cdot \left(\frac{\left(3 + \frac{5 \cdot \sqrt{3}}{2} \right) \cdot \left(3 \cdot \sqrt{2} \right)}{5 \cdot 0.6\,\text{m}^{-1}} \right)^3$$

5.4) Volume of Triangular Cupola given Total Surface Area Formula

Evaluate Formula

Formula

$$V = \frac{5}{3 \cdot \sqrt{2}} \cdot \left(\frac{TSA}{3 + \frac{5 \cdot \sqrt{3}}{2}} \right)^{\frac{3}{2}}$$

Example with Units

$$1171.2532\,\text{m}^3 = \frac{5}{3 \cdot \sqrt{2}} \cdot \left(\frac{730\,\text{m}^2}{3 + \frac{5 \cdot \sqrt{3}}{2}} \right)^{\frac{3}{2}}$$

Variables used in list of Triangular Cupola Formulas above

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

Constants, Functions, Measurements used in list of Triangular Cupola Formulas above

- constant(s): **pi**, 3.14159265358979323846264338327950288 *Archimedes' constant*
- Functions: **cosec**, cosec(Angle) *The cosecant function is a trigonometric function that is the reciprocal of the sine function.*
- Functions: **sec**, sec(Angle) *Secant is a trigonometric function that is defined ratio of the hypotenuse to the shorter side adjacent to an acute angle (in a right-angled triangle); the reciprocal of a cosine.*
- Functions: **sqrt**, sqrt(Number) *A square root function is a function that takes a non-negative number as an input and returns the square root of the given input number.*
- Measurement: **Length** in Meter (m) *Length Unit Conversion*
- Measurement: **Volume** in Cubic Meter (m^3) *Volume Unit Conversion*
- Measurement: **Area** in Square Meter (m^2) *Area Unit Conversion*
- Measurement: **Reciprocal Length** in 1 per Meter (m^{-1}) *Reciprocal Length Unit Conversion*

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