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# Triangular Cupola Formulas

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# List of 20 Triangular Cupola Formulas

## Triangular Cupola

### Edge Length of Triangular Cupola

#### 1) Edge Length of Triangular Cupola given Height

Open Calculator

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

ex $$9.797959\text{m} = \frac{8\text{m}}{\sqrt{1 - \left(\frac{1}{4} \cdot \cos ec\left(\frac{\pi}{3}\right)^2\right)}}$$

#### 2) Edge Length of Triangular Cupola given Surface to Volume Ratio

Open Calculator

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

ex $$10.36637\text{m} = \frac{\left(3 + \frac{5 \cdot \sqrt{3}}{2}\right) \cdot \left(3 \cdot \sqrt{2}\right)}{5 \cdot 0.6\text{m}^{-1}}$$

### 3) Edge Length of Triangular Cupola given Total Surface Area

Open Calculator

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

ex $$9.979429\text{m} = \sqrt{\frac{730\text{m}^2}{3 + \frac{5 \cdot \sqrt{3}}{2}}}$$

### 4) Edge Length of Triangular Cupola given Volume

Open Calculator

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

ex $$10.06041\text{m} = \left(\frac{3 \cdot \sqrt{2} \cdot 1200\text{m}^3}{5}\right)^{\frac{1}{3}}$$

## Height of Triangular Cupola

### 5) Height of Triangular Cupola

Open Calculator

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

ex $$8.164966\text{m} = 10\text{m} \cdot \sqrt{1 - \left(\frac{1}{4} \cdot \cos ec\left(\frac{\pi}{3}\right)^2\right)}$$

## 6) Height of Triangular Cupola given Surface to Volume Ratio

Open Calculator

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

ex $$8.464102\text{m} = \frac{\left(3 + \frac{5 \cdot \sqrt{3}}{2}\right) \cdot \left(3 \cdot \sqrt{2}\right)}{5 \cdot 0.6\text{m}^{-1}} \cdot \sqrt{1 - \left(\frac{1}{4} \cdot \cos ec\left(\frac{\pi}{3}\right)^2\right)}$$

## 7) Height of Triangular Cupola given Total Surface Area

Open Calculator

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

ex $$8.148169\text{m} = \sqrt{\frac{730\text{m}^2}{3 + \frac{5 \cdot \sqrt{3}}{2}}} \cdot \sqrt{1 - \left(\frac{1}{4} \cdot \cos ec\left(\frac{\pi}{3}\right)^2\right)}$$

## 8) Height of Triangular Cupola given Volume

Open Calculator

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

ex $$8.214293\text{m} = \left(\frac{3 \cdot \sqrt{2} \cdot 1200\text{m}^3}{5}\right)^{\frac{1}{3}} \cdot \sqrt{1 - \left(\frac{1}{4} \cdot \cos ec\left(\frac{\pi}{3}\right)^2\right)}$$

# Surface Area of Triangular Cupola

## Total Surface Area of Triangular Cupola

### 9) Total Surface Area of Triangular Cupola

Open Calculator

fx $$\text{TSA} = \left(3 + \frac{5 \cdot \sqrt{3}}{2}\right) \cdot \text{l}_\text{e}^2$$

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

### 10) Total Surface Area of Triangular Cupola given Height

fx

Open Calculator

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

ex $$703.6922\text{m}^2 = \left(3 + \frac{5 \cdot \sqrt{3}}{2}\right) \cdot \frac{(8\text{m})^2}{1 - \left(\frac{1}{4} \cdot \cos ec\left(\frac{\pi}{3}\right)^2\right)}$$

## 11) Total Surface Area of Triangular Cupola given Surface to Volume Ratio

Open Calculator

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

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

## 12) Total Surface Area of Triangular Cupola given Volume

Open Calculator

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

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

# Surface to Volume Ratio of Triangular Cupola

## 13) Surface to Volume Ratio of Triangular Cupola

Open Calculator

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

ex $$0.621982\text{m}^{-1} = \frac{3 + \frac{5 \cdot \sqrt{3}}{2}}{\frac{5}{3 \cdot \sqrt{2}} \cdot 10\text{m}}$$

## 14) Surface to Volume Ratio of Triangular Cupola given Height

Open Calculator

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

ex $$0.634808\text{m}^{-1} = \frac{3 + \frac{5 \cdot \sqrt{3}}{2}}{\frac{5}{3 \cdot \sqrt{2}} \cdot \left( \frac{8\text{m}}{\sqrt{1 - \left( \frac{1}{4} \cdot \cos ec\left( \frac{\pi}{3} \right)^2 \right)}} \right)}$$

## 15) Surface to Volume Ratio of Triangular Cupola given Total Surface Area

Open Calculator

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

ex $$0.623264\text{m}^{-1} = \frac{3 + \frac{5 \cdot \sqrt{3}}{2}}{\frac{5}{3 \cdot \sqrt{2}} \cdot \sqrt{\frac{730\text{m}^2}{3 + \frac{5 \cdot \sqrt{3}}{2}}}}$$

## 16) Surface to Volume Ratio of Triangular Cupola given Volume

Open Calculator

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

ex $$0.618247\text{m}^{-1} = \frac{3 + \frac{5 \cdot \sqrt{3}}{2}}{\frac{5}{3 \cdot \sqrt{2}} \cdot \left(\frac{3 \cdot \sqrt{2} \cdot 1200\text{m}^3}{5}\right)^{\frac{1}{3}}}$$

# Volume of Triangular Cupola

## 17) Volume of Triangular Cupola

Open Calculator

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

ex $$1178.511\text{m}^3 = \frac{5}{3 \cdot \sqrt{2}} \cdot (10\text{m})^3$$

## 18) Volume of Triangular Cupola given Height

Open Calculator

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

ex $$1108.513\text{m}^3 = \frac{5}{3 \cdot \sqrt{2}} \cdot \left( \frac{8\text{m}}{\sqrt{1 - \left( \frac{1}{4} \cdot \cos ec\left( \frac{\pi}{3} \right)^2 \right)}} \right)^3$$

## 19) Volume of Triangular Cupola given Surface to Volume Ratio

Open Calculator

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

**ex**
$$1312.844\text{m}^3 = \frac{5}{3 \cdot \sqrt{2}} \cdot \left( \frac{\left(3 + \frac{5 \cdot \sqrt{3}}{2}\right) \cdot \left(3 \cdot \sqrt{2}\right)}{5 \cdot 0.6\text{m}^{-1}} \right)^3$$

## 20) Volume of Triangular Cupola given Total Surface Area

Open Calculator

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

**ex**
$$1171.253\text{m}^3 = \frac{5}{3 \cdot \sqrt{2}} \cdot \left( \frac{730\text{m}^2}{3 + \frac{5 \cdot \sqrt{3}}{2}} \right)^{\frac{3}{2}}$$

# Variables Used

- **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

- 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 ($m^3$)
  *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*

## Check other formula lists

- **Pentagonal Cupola Formulas**
- **Triangular Cupola Formulas**
- **Square Cupola Formulas**

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