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Truncated Cube Formulas

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List of 18 Truncated Cube Formulas

Truncated Cube ⤤

1) Circumsphere Radius of Truncated Cube ⤤

Open Calculator ⤤

$$fx \quad r_c = \frac{\sqrt{7 + \left(4 \cdot \sqrt{2}\right)}}{2} \cdot l_e$$

$$ex \quad 17.78824m = \frac{\sqrt{7 + \left(4 \cdot \sqrt{2}\right)}}{2} \cdot 10m$$

2) Circumsphere Radius of Truncated Cube given Cubic Edge Length ⤤

Open Calculator ⤤

$$fx \quad r_c = \frac{\sqrt{7 + \left(4 \cdot \sqrt{2}\right)}}{2} \cdot \frac{l_{e(Cube)}}{1 + \sqrt{2}}$$

$$ex \quad 17.68351m = \frac{\sqrt{7 + \left(4 \cdot \sqrt{2}\right)}}{2} \cdot \frac{24m}{1 + \sqrt{2}}$$

3) Midsphere Radius of Truncated Cube ⬈

Open Calculator ⬈

$$fx \quad r_m = \frac{2 + \sqrt{2}}{2} \cdot l_e$$

$$ex \quad 17.07107m = \frac{2 + \sqrt{2}}{2} \cdot 10m$$

4) Midsphere Radius of Truncated Cube given Cubic Edge Length ⬈

Open Calculator ⬈

$$fx \quad r_m = \frac{2 + \sqrt{2}}{2} \cdot \frac{l_{e(Cube)}}{1 + \sqrt{2}}$$

$$ex \quad 16.97056m = \frac{2 + \sqrt{2}}{2} \cdot \frac{24m}{1 + \sqrt{2}}$$

5) Surface to Volume Ratio of Truncated Cube ⬈

Open Calculator ⬈

$$fx \quad R_{A/V} = \frac{6 \cdot \left(6 + \left(6 \cdot \sqrt{2}\right) + \sqrt{3}\right)}{l_e \cdot \left(21 + \left(14 \cdot \sqrt{2}\right)\right)}$$

$$ex \quad 0.238496m^{-1} = \frac{6 \cdot \left(6 + \left(6 \cdot \sqrt{2}\right) + \sqrt{3}\right)}{10m \cdot \left(21 + \left(14 \cdot \sqrt{2}\right)\right)}$$

6) Surface to Volume Ratio of Truncated Cube given Cubic Edge Length 🔗

Open Calculator 🔗

$$fx \quad R_{A/V} = \frac{6 \cdot \left(6 + \left(6 \cdot \sqrt{2}\right) + \sqrt{3}\right)}{\frac{l_{e(Cube)}}{1+\sqrt{2}} \cdot \left(21 + \left(14 \cdot \sqrt{2}\right)\right)}$$

$$ex \quad 0.239909 \text{m}^{-1} = \frac{6 \cdot \left(6 + \left(6 \cdot \sqrt{2}\right) + \sqrt{3}\right)}{\frac{24\text{m}}{1+\sqrt{2}} \cdot \left(21 + \left(14 \cdot \sqrt{2}\right)\right)}$$

7) Total Surface Area of Truncated Cube 🔗

Open Calculator 🔗

$$fx \quad \text{TSA} = 2 \cdot \left(6 + \left(6 \cdot \sqrt{2}\right) + \sqrt{3}\right) \cdot l_e^2$$

$$ex \quad 3243.466 \text{m}^2 = 2 \cdot \left(6 + \left(6 \cdot \sqrt{2}\right) + \sqrt{3}\right) \cdot (10\text{m})^2$$

8) Total Surface Area of Truncated Cube given Cubic Edge Length 🔗

fx

Open Calculator 🔗

$$\text{TSA} = 2 \cdot \left(6 + \left(6 \cdot \sqrt{2}\right) + \sqrt{3}\right) \cdot \left(\frac{l_{e(Cube)}}{1 + \sqrt{2}}\right)^2$$

$$ex \quad 3205.387 \text{m}^2 = 2 \cdot \left(6 + \left(6 \cdot \sqrt{2}\right) + \sqrt{3}\right) \cdot \left(\frac{24\text{m}}{1 + \sqrt{2}}\right)^2$$

9) Volume of Truncated Cube 🔗

$$\textit{fx}\ V = \frac{21 + \left(14 \cdot \sqrt{2}\right)}{3} \cdot l_e^3$$

Open Calculator 🔗

$$\text{ex}\ 13599.66\text{m}^3 = \frac{21 + \left(14 \cdot \sqrt{2}\right)}{3} \cdot (10\text{m})^3$$

10) Volume of Truncated Cube given Cubic Edge Length 🔗

$$\textit{fx}\ V = \frac{21 + \left(14 \cdot \sqrt{2}\right)}{3} \cdot \left(\frac{l_{e(Cube)}}{1 + \sqrt{2}}\right)^3$$

Open Calculator 🔗

$$\text{ex}\ 13360.87\text{m}^3 = \frac{21 + \left(14 \cdot \sqrt{2}\right)}{3} \cdot \left(\frac{24\text{m}}{1 + \sqrt{2}}\right)^3$$

Edge Length of Truncated Cube 🔗

11) Cubic Edge Length of Truncated Cube 🔗

$$\textit{fx}\ l_{e(Cube)} = l_e \cdot \left(1 + \sqrt{2}\right)$$

Open Calculator 🔗

$$\text{ex}\ 24.14214\text{m} = 10\text{m} \cdot \left(1 + \sqrt{2}\right)$$

12) Cubic Edge Length of Truncated Cube given Midsphere Radius ⬀

Open Calculator ⬀

_fx_ $l_{e(\text{Cube})} = \dfrac{2 \cdot r_m}{2 + \sqrt{2}} \cdot \left(1 + \sqrt{2}\right)$

ex $24.04163\text{m} = \dfrac{2 \cdot 17\text{m}}{2 + \sqrt{2}} \cdot \left(1 + \sqrt{2}\right)$

13) Cubic Edge Length of Truncated Cube given Total Surface Area ⬀

_fx_　　　　　　　　　　　　　　　　　　**Open Calculator** ⬀

$l_{e(\text{Cube})} = \sqrt{\dfrac{\text{TSA}}{2 \cdot \left(6 + \left(6 \cdot \sqrt{2}\right) + \sqrt{3}\right)} \cdot \left(1 + \sqrt{2}\right)}$

ex $23.97982\text{m} = \sqrt{\dfrac{3200\text{m}^2}{2 \cdot \left(6 + \left(6 \cdot \sqrt{2}\right) + \sqrt{3}\right)} \cdot \left(1 + \sqrt{2}\right)}$

14) Cubic Edge Length of Truncated Cube given Volume ⬀

Open Calculator ⬀

_fx_ $l_{e(\text{Cube})} = \left(\dfrac{3 \cdot V}{21 + \left(14 \cdot \sqrt{2}\right)}\right)^{\frac{1}{3}} \cdot \left(1 + \sqrt{2}\right)$

ex $24.37674\text{m} = \left(\dfrac{3 \cdot 14000\text{m}^3}{21 + \left(14 \cdot \sqrt{2}\right)}\right)^{\frac{1}{3}} \cdot \left(1 + \sqrt{2}\right)$

15) Edge Length of Truncated Cube given Cubic Edge Length ↗

$$fx \quad l_e = \frac{l_{e(Cube)}}{1 + \sqrt{2}}$$

$$ex \quad 9.941125m = \frac{24m}{1 + \sqrt{2}}$$

16) Edge Length of Truncated Cube given Midsphere Radius ↗

$$fx \quad l_e = \frac{2 \cdot r_m}{2 + \sqrt{2}}$$

$$ex \quad 9.958369m = \frac{2 \cdot 17m}{2 + \sqrt{2}}$$

17) Edge Length of Truncated Cube given Total Surface Area ↗

$$fx \quad l_e = \sqrt{\frac{TSA}{2 \cdot \left(6 + \left(6 \cdot \sqrt{2}\right) + \sqrt{3}\right)}}$$

$$ex \quad 9.932768m = \sqrt{\frac{3200m^2}{2 \cdot \left(6 + \left(6 \cdot \sqrt{2}\right) + \sqrt{3}\right)}}$$

18) Edge Length of Truncated Cube given Volume 🔗

Open Calculator 🔗

fx $l_e = \left(\dfrac{3 \cdot V}{21 + \left(14 \cdot \sqrt{2} \right)} \right)^{\frac{1}{3}}$

ex $10.09718m = \left(\dfrac{3 \cdot 14000m^3}{21 + \left(14 \cdot \sqrt{2} \right)} \right)^{\frac{1}{3}}$

Variables Used

- l_e Edge Length of Truncated Cube *(Meter)*
- $l_{e(Cube)}$ Cubic Edge Length of Truncated Cube *(Meter)*
- $R_{A/V}$ Surface to Volume Ratio of Truncated Cube *(1 per Meter)*
- r_c Circumsphere Radius of Truncated Cube *(Meter)*
- r_m Midsphere Radius of Truncated Cube *(Meter)*
- **TSA** Total Surface Area of Truncated Cube *(Square Meter)*
- **V** Volume of Truncated Cube *(Cubic Meter)*

Constants, Functions, Measurements used

- Function: **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 (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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- **Rhombicuboctahedron Formulas** ⬈
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- **Snub Dodecahedron Formulas** ⬈
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