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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 !\[\]\(339a16584d5da0f0a3ca4e9ec17bf6a1\_img.jpg\)](#)

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

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

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

[Open Calculator !\[\]\(6059a5aa8b4ca7bb793408023d6c6e42\_img.jpg\)](#)

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

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



### 3) Midsphere Radius of Truncated Cube

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

[Open Calculator !\[\]\(cbe80b694ebd74fcfe136a095b608235\_img.jpg\)](#)

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

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

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

[Open Calculator !\[\]\(3e2231b1ad3ca8da8658228c00dd08e0\_img.jpg\)](#)

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

### 5) Surface to Volume Ratio of Truncated Cube

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

[Open Calculator !\[\]\(0d5ec72f61334709c3fc9450209b754f\_img.jpg\)](#)

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



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

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

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

7) Total Surface Area of Truncated Cube Open Calculator 

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

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

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

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

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



## 9) Volume of Truncated Cube

[Open Calculator !\[\]\(bd1a142de767a21e5362c595f844a4ff\_img.jpg\)](#)

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

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

## 10) Volume of Truncated Cube given Cubic Edge Length

[Open Calculator !\[\]\(830769b31eeeaca920791081939ff8ba\_img.jpg\)](#)

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

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

## Edge Length of Truncated Cube

### 11) Cubic Edge Length of Truncated Cube

[Open Calculator !\[\]\(bd3b31712ad9bab5a241210fa6925cdd\_img.jpg\)](#)

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

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



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

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

[Open Calculator !\[\]\(d3fb9f94af8b26d1c844efa9a98805b0\_img.jpg\)](#)

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

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

fx

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

[Open Calculator !\[\]\(73002692dd5e7a64e60946be3158e719\_img.jpg\)](#)

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

## 14) Cubic Edge Length of Truncated Cube given Volume

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

[Open Calculator !\[\]\(104fbf564e2e5a8fbd84f31656d114c7\_img.jpg\)](#)

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



15) Edge Length of Truncated Cube given Cubic Edge Length 

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

[Open Calculator !\[\]\(9dfdaff1d86ba3c1f8353b4d1b61b8c5\_img.jpg\)](#)

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

16) Edge Length of Truncated Cube given Midsphere Radius 

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

[Open Calculator !\[\]\(2b376d1a92330ab09dad2665d2f89bf5\_img.jpg\)](#)

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

17) Edge Length of Truncated Cube given Total Surface Area 

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

[Open Calculator !\[\]\(c444627dab9fee9a1550c053ffaaaae2\_img.jpg\)](#)

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



18) Edge Length of Truncated Cube given Volume [Open Calculator](#) 

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

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



## Variables Used

- $l_e$  Edge Length of Truncated Cube (Meter)
- $l_{e(\text{Cube})}$  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 ( $m^3$ )  
*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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