



# Important Formulas of Octahedron

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## **List of 25 Important Formulas of Octahedron**

# Important Formulas of Octahedron

# Edge Length of Octahedron

1) Edge Length of Octahedron given Insphere Radius

fx 
$$l_{
m e} = \sqrt{6} \cdot r_{
m i}$$

Open Calculator

$$\boxed{9.797959\mathrm{m} = \sqrt{6}\cdot 4\mathrm{m}}$$

2) Edge Length of Octahedron given Midsphere Radius

fx 
$$l_{
m e} = 2 \cdot r_{
m m}$$

Open Calculator 🚰

ex 
$$10 \mathrm{m} = 2 \cdot 5 \mathrm{m}$$

3) Edge Length of Octahedron given Space Diagonal

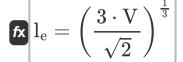
$$\mathbf{f}\mathbf{x}igg|_{\mathrm{l_e}} = rac{\mathrm{d_{Space}}}{\sqrt{2}}$$

Open Calculator

$$= \frac{9.899495 \text{m}}{\sqrt{2}}$$



#### 4) Edge Length of Octahedron given Volume

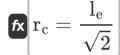


Open Calculator

$$=$$
 9.990059m  $=$   $\left(\frac{3\cdot470 \mathrm{m}^3}{\sqrt{2}}\right)^{\frac{1}{3}}$ 

#### Radius of Octahedron

# 5) Circumsphere Radius of Octahedron



Open Calculator

$$=$$
  $7.071068 \mathrm{m} = rac{10 \mathrm{m}}{\sqrt{2}}$ 

6) Circumsphere Radius of Octahedron given Insphere Radius



Open Calculator 🗗

$$\boxed{\texttt{ex}} \ 6.928203 \mathrm{m} = \sqrt{3} \cdot 4 \mathrm{m}$$



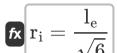
#### 7) Circumsphere Radius of Octahedron given Space Diagonal



Open Calculator 🚰

$$7m - \frac{14m}{m}$$

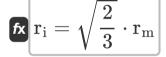
### 8) Insphere Radius of Octahedron



Open Calculator

$$= \frac{4.082483 \text{m}}{\sqrt{6}}$$

### 9) Insphere Radius of Octahedron given Midsphere Radius



$$= \sqrt{\frac{2}{3}} \cdot 5 \mathrm{m}$$

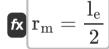


# 10) Insphere Radius of Octahedron given Total Surface Area



$$ext{ex} \ 4.103582 ext{m} = rac{\sqrt{rac{350 ext{m}^2}{2 \cdot \sqrt{3}}}}{\sqrt{6}}$$

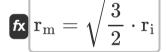
#### 11) Midsphere Radius of Octahedron



Open Calculator 2

$$= \frac{10m}{2}$$

#### 12) Midsphere Radius of Octahedron given Insphere Radius 🗗



$$\boxed{\textbf{ex}} \boxed{4.898979 \text{m} = \sqrt{\frac{3}{2}} \cdot 4 \text{m}}$$



#### 13) Midsphere Radius of Octahedron given Space Diagonal

 ${
m fx} \ {
m r}_{
m m} = rac{{
m d}_{
m Space}}{2 \cdot \sqrt{2}}$ 

Open Calculator

ex  $4.949747 \mathrm{m} = rac{14 \mathrm{m}}{2 \cdot \sqrt{2}}$ 

## Space Diagonal of Octahedron

## 14) Space Diagonal of Octahedron

fx  $m d_{Space} = \sqrt{2} \cdot l_e$ 

Open Calculator

 $[14.14214 ext{m}] = \sqrt{2} \cdot 10 ext{m}$ 

15) Space Diagonal of Octahedron given Insphere Radius

fx  $d_{
m Space} = 2 \cdot \sqrt{3} \cdot r_{
m i}$ 

Open Calculator

 $\texttt{ex} \left[ 13.85641 \text{m} = 2 \cdot \sqrt{3} \cdot 4 \text{m} \right]$ 

16) Space Diagonal of Octahedron given Midsphere Radius

fx  $m d_{Space} = 2 \cdot \sqrt{2} \cdot r_{m}$ 

Open Calculator 🗗

 $\texttt{ex} \ 14.14214 \text{m} = 2 \cdot \sqrt{2} \cdot 5 \text{m}$ 





#### 17) Space Diagonal of Octahedron given Volume 🗗

 $\left| \mathrm{d}_{\mathrm{Space}} = \sqrt{2} \cdot \left( rac{3 \cdot \mathrm{V}}{\sqrt{2}} 
ight)^{rac{1}{3}} 
ight|$ 

Open Calculator

ex  $14.12808 \mathrm{m} = \sqrt{2} \cdot \left( rac{3 \cdot 470 \mathrm{m}^3}{\sqrt{2}} 
ight)^{rac{1}{3}}$ 

## Total Surface Area of Octahedron

18) Total Surface Area of Octahedron

 $extbf{TSA} = 2 \cdot \sqrt{3} \cdot l_{
m e}^2$ 

Open Calculator

 $\texttt{ex} \left[ 346.4102 \text{m}^{_2} = 2 \cdot \sqrt{3} \cdot \left( 10 \text{m} \right)^2 \right]$ 

fx  $ext{TSA} = 4 \cdot \sqrt{3} \cdot ext{r}_c^2$ 

19) Total Surface Area of Octahedron given Circumsphere Radius

Open Calculator 2

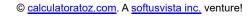
ex  $339.482 ext{m}^2 = 4 \cdot \sqrt{3} \cdot (7 ext{m})^2$ 

20) Total Surface Area of Octahedron given Midsphere Radius

 $ag{TSA} = 8 \cdot \sqrt{3} \cdot 
m{r}_{m}^{2}$ 

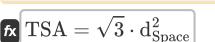
Open Calculator

 $\texttt{ex} \ 346.4102 \text{m}^{_2} = 8 \cdot \sqrt{3} \cdot (5 \text{m})^2$ 





# 21) Total Surface Area of Octahedron given Space Diagonal



\_\_\_\_

Open Calculator

$$\boxed{\textbf{ex}} \ 339.482 \text{m}^2 = \sqrt{3} \cdot (14 \text{m})^2$$

## Volume of Octahedron 🗗

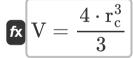
#### 22) Volume of Octahedron

$$V = rac{\sqrt{2}}{3} \cdot l_{
m e}^3$$

Open Calculator 🗗

$$= \frac{471.4045 \text{m}^3}{3} \cdot (10 \text{m})^3$$

## 23) Volume of Octahedron given Circumsphere Radius



Open Calculator

$$=$$
  $457.3333 \mathrm{m}^{_{3}} = rac{4\cdot (7\mathrm{m})^{3}}{3}$ 

## 24) Volume of Octahedron given Insphere Radius 🖒

$$V = 4 \cdot \sqrt{3} \cdot r_{i}^{3}$$

$$\mathbf{ex} \ 443.405 \mathrm{m}^{_3} = 4 \cdot \sqrt{3} \cdot (4 \mathrm{m})^3$$

#### 25) Volume of Octahedron given Total Surface Area 🛂

Open Calculator

$$ext{V} = rac{\sqrt{2}}{3} \cdot \left( \sqrt{rac{ ext{TSA}}{2 \cdot \sqrt{3}}} 
ight)^3$$

$$ext{ex} \ 478.7512 ext{m}^3 = rac{\sqrt{2}}{3} \cdot \left( \sqrt{rac{350 ext{m}^2}{2 \cdot \sqrt{3}}} 
ight)^3$$



#### Variables Used

- d<sub>Space</sub> Space Diagonal of Octahedron (Meter)
- In Edge Length of Octahedron (Meter)
- r<sub>c</sub> Circumsphere Radius of Octahedron (Meter)
- r<sub>i</sub> Insphere Radius of Octahedron (Meter)
- rm Midsphere Radius of Octahedron (Meter)
- TSA Total Surface Area of Octahedron (Square Meter)
- **V** Volume of Octahedron (Cubic Meter)





## Constants, Functions, Measurements used

- 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





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- Cube Formulas
- Dodecahedron Formulas
- Icosahedron Formulas
- Octahedron Formulas
- Tetrahedron Formulas

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