

# Important Formulas of Octahedron PDF



**Formulas  
Examples  
with Units**

**List of 24  
Important Formulas of Octahedron**

## 1) Edge Length of Octahedron Formulas ↻

### 1.1) Edge Length of Octahedron given Insphere Radius Formula ↻

Formula

$$l_e = \sqrt{6} \cdot r_i$$

Example with Units

$$9.798 \text{ m} = \sqrt{6} \cdot 4 \text{ m}$$

Evaluate Formula ↻

### 1.2) Edge Length of Octahedron given Midsphere Radius Formula ↻

Formula

$$l_e = 2 \cdot r_m$$

Example with Units

$$10 \text{ m} = 2 \cdot 5 \text{ m}$$

Evaluate Formula ↻

### 1.3) Edge Length of Octahedron given Space Diagonal Formula ↻

Formula

$$l_e = \frac{d_{\text{Space}}}{\sqrt{2}}$$

Example with Units

$$9.8995 \text{ m} = \frac{14 \text{ m}}{\sqrt{2}}$$

Evaluate Formula ↻

## 2) Radius of Octahedron Formulas ↻

### 2.1) Circumsphere Radius of Octahedron Formula ↻

Formula

$$r_c = \frac{l_e}{\sqrt{2}}$$

Example with Units

$$7.0711 \text{ m} = \frac{10 \text{ m}}{\sqrt{2}}$$

Evaluate Formula ↻

### 2.2) Circumsphere Radius of Octahedron given Insphere Radius Formula ↻

Formula

$$r_c = \sqrt{3} \cdot r_i$$

Example with Units

$$6.9282 \text{ m} = \sqrt{3} \cdot 4 \text{ m}$$

Evaluate Formula ↻

### 2.3) Circumsphere Radius of Octahedron given Space Diagonal Formula ↻

Formula

$$r_c = \frac{d_{\text{Space}}}{2}$$

Example with Units

$$7 \text{ m} = \frac{14 \text{ m}}{2}$$

Evaluate Formula ↻



## 2.4) Insphere Radius of Octahedron Formula

Formula

$$r_i = \frac{l_e}{\sqrt{6}}$$

Example with Units

$$4.0825\text{ m} = \frac{10\text{ m}}{\sqrt{6}}$$

Evaluate Formula 

## 2.5) Insphere Radius of Octahedron given Midsphere Radius Formula

Formula

$$r_i = \sqrt{\frac{2}{3}} \cdot r_m$$

Example with Units

$$4.0825\text{ m} = \sqrt{\frac{2}{3}} \cdot 5\text{ m}$$

Evaluate Formula 

## 2.6) Insphere Radius of Octahedron given Total Surface Area Formula

Formula

$$r_i = \frac{\sqrt{\frac{TSA}{2 \cdot \sqrt{3}}}}{\sqrt{6}}$$

Example with Units

$$4.1036\text{ m} = \frac{\sqrt{\frac{350\text{ m}^2}{2 \cdot \sqrt{3}}}}{\sqrt{6}}$$

Evaluate Formula 

## 2.7) Midsphere Radius of Octahedron Formula

Formula

$$r_m = \frac{l_e}{2}$$

Example with Units

$$5\text{ m} = \frac{10\text{ m}}{2}$$

Evaluate Formula 

## 2.8) Midsphere Radius of Octahedron given Insphere Radius Formula

Formula

$$r_m = \sqrt{\frac{3}{2}} \cdot r_i$$

Example with Units

$$4.899\text{ m} = \sqrt{\frac{3}{2}} \cdot 4\text{ m}$$

Evaluate Formula 

## 2.9) Midsphere Radius of Octahedron given Space Diagonal Formula

Formula

$$r_m = \frac{d_{\text{Space}}}{2 \cdot \sqrt{2}}$$

Example with Units

$$4.9497\text{ m} = \frac{14\text{ m}}{2 \cdot \sqrt{2}}$$

Evaluate Formula 

## 3) Space Diagonal of Octahedron Formulas

### 3.1) Space Diagonal of Octahedron Formula

Formula

$$d_{\text{Space}} = \sqrt{2} \cdot l_e$$

Example with Units

$$14.1421\text{ m} = \sqrt{2} \cdot 10\text{ m}$$

Evaluate Formula 



### 3.2) Space Diagonal of Octahedron given Insphere Radius Formula

Formula

$$d_{\text{Space}} = 2 \cdot \sqrt{3} \cdot r_i$$

Example with Units

$$13.8564\text{m} = 2 \cdot \sqrt{3} \cdot 4\text{m}$$

Evaluate Formula 

### 3.3) Space Diagonal of Octahedron given Midsphere Radius Formula

Formula

$$d_{\text{Space}} = 2 \cdot \sqrt{2} \cdot r_m$$

Example with Units

$$14.1421\text{m} = 2 \cdot \sqrt{2} \cdot 5\text{m}$$

Evaluate Formula 

### 3.4) Space Diagonal of Octahedron given Volume Formula

Formula

$$d_{\text{Space}} = \sqrt{2} \cdot \left( \frac{3 \cdot V}{\sqrt{2}} \right)^{\frac{1}{3}}$$

Example with Units

$$14.1281\text{m} = \sqrt{2} \cdot \left( \frac{3 \cdot 470\text{m}^3}{\sqrt{2}} \right)^{\frac{1}{3}}$$

Evaluate Formula 

## 4) Total Surface Area of Octahedron Formulas

### 4.1) Total Surface Area of Octahedron Formula

Formula

$$\text{TSA} = 2 \cdot \sqrt{3} \cdot l_e^2$$

Example with Units

$$346.4102\text{m}^2 = 2 \cdot \sqrt{3} \cdot 10\text{m}^2$$

Evaluate Formula 

### 4.2) Total Surface Area of Octahedron given Circumsphere Radius Formula

Formula

$$\text{TSA} = 4 \cdot \sqrt{3} \cdot r_c^2$$

Example with Units

$$339.482\text{m}^2 = 4 \cdot \sqrt{3} \cdot 7\text{m}^2$$

Evaluate Formula 

### 4.3) Total Surface Area of Octahedron given Midsphere Radius Formula

Formula

$$\text{TSA} = 8 \cdot \sqrt{3} \cdot r_m^2$$

Example with Units

$$346.4102\text{m}^2 = 8 \cdot \sqrt{3} \cdot 5\text{m}^2$$

Evaluate Formula 

### 4.4) Total Surface Area of Octahedron given Space Diagonal Formula

Formula

$$\text{TSA} = \sqrt{3} \cdot d_{\text{Space}}^2$$

Example with Units

$$339.482\text{m}^2 = \sqrt{3} \cdot 14\text{m}^2$$

Evaluate Formula 

## 5) Volume of Octahedron Formulas

### 5.1) Volume of Octahedron Formula

Formula

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

Example with Units

$$471.4045\text{m}^3 = \frac{\sqrt{2}}{3} \cdot 10\text{m}^3$$

Evaluate Formula 



## 5.2) Volume of Octahedron given Circumsphere Radius Formula

Formula

$$V = \frac{4 \cdot r_c^3}{3}$$

Example with Units

$$457.3333 \text{ m}^3 = \frac{4 \cdot 7 \text{ m}^3}{3}$$

Evaluate Formula 

## 5.3) Volume of Octahedron given Insphere Radius Formula

Formula

$$V = 4 \cdot \sqrt{3} \cdot r_i^3$$

Example with Units

$$443.405 \text{ m}^3 = 4 \cdot \sqrt{3} \cdot 4 \text{ m}^3$$

Evaluate Formula 

## 5.4) Volume of Octahedron given Total Surface Area Formula

Formula

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

Example with Units

$$478.7512 \text{ m}^3 = \frac{\sqrt{Z}}{3} \cdot \left( \sqrt{\frac{350 \text{ m}^2}{2 \cdot \sqrt{3}}} \right)^3$$




Evaluate Formula 



## Variables used in list of Important Formulas of Octahedron above

- $d_{\text{Space}}$  Space Diagonal of Octahedron (Meter)
- $l_e$  Edge Length of Octahedron (Meter)
- $r_c$  Circumsphere Radius of Octahedron (Meter)
- $r_i$  Insphere Radius of Octahedron (Meter)
- $r_m$  Midsphere Radius of Octahedron (Meter)
- **TSA** Total Surface Area of Octahedron (Square Meter)
- **V** Volume of Octahedron (Cubic Meter)

## Constants, Functions, Measurements used in list of Important Formulas of Octahedron above

- **Functions:** **sqrt**,  $\text{sqrt}(\text{Number})$   
*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 ( $\text{m}^3$ )  
*Volume Unit Conversion* 
- **Measurement:** **Area** in Square Meter ( $\text{m}^2$ )  
*Area Unit Conversion* 



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