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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

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

Open Calculator 

$$ex \quad 9.797959m = \sqrt{6} \cdot 4m$$

2) Edge Length of Octahedron given Midsphere Radius

$$fx \quad l_e = 2 \cdot r_m$$

Open Calculator 

$$ex \quad 10m = 2 \cdot 5m$$


3) Edge Length of Octahedron given Space Diagonal

$$fx \quad l_e = \frac{d_{Space}}{\sqrt{2}}$$

Open Calculator 

$$ex \quad 9.899495m = \frac{14m}{\sqrt{2}}$$




4) Edge Length of Octahedron given Volume 

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

Open Calculator 


$$\text{ex } 9.990059\text{m} = \left(\frac{3 \cdot 470\text{m}^3}{\sqrt{2}} \right)^{\frac{1}{3}}$$

Radius of Octahedron 5) Circumsphere Radius of Octahedron 

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

Open Calculator 

$$\text{ex } 7.071068\text{m} = \frac{10\text{m}}{\sqrt{2}}$$

6) Circumsphere Radius of Octahedron given Insphere Radius 

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

Open Calculator 

$$\text{ex } 6.928203\text{m} = \sqrt{3} \cdot 4\text{m}$$




7) Circumsphere Radius of Octahedron given Space Diagonal 

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

[Open Calculator !\[\]\(e78f798d4ea5c530c9db49e7d26e6b95_img.jpg\)](#)

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

8) Insphere Radius of Octahedron 

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

[Open Calculator !\[\]\(05be7c7a8995decd503647c99211f7c2_img.jpg\)](#)

$$\text{ex } 4.082483\text{m} = \frac{10\text{m}}{\sqrt{6}}$$

9) Insphere Radius of Octahedron given Midsphere Radius 

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

[Open Calculator !\[\]\(fe3aebe81acea8d45108cd2768939da7_img.jpg\)](#)


$$\text{ex } 4.082483\text{m} = \sqrt{\frac{2}{3}} \cdot 5\text{m}$$



10) Insphere Radius of Octahedron given Total Surface Area Open Calculator 


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

$$\text{ex } 4.103582\text{m} = \frac{\sqrt{\frac{350\text{m}^2}{2 \cdot \sqrt{3}}}}{\sqrt{6}}$$

11) Midsphere Radius of Octahedron Open Calculator 

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

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

12) Midsphere Radius of Octahedron given Insphere Radius Open Calculator 

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

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



13) Midsphere Radius of Octahedron given Space Diagonal

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

[Open Calculator !\[\]\(d3fb9f94af8b26d1c844efa9a98805b0_img.jpg\)](#)

$$ex \quad 4.949747m = \frac{14m}{2 \cdot \sqrt{2}}$$

Space Diagonal of Octahedron

14) Space Diagonal of Octahedron

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

[Open Calculator !\[\]\(73002692dd5e7a64e60946be3158e719_img.jpg\)](#)

$$ex \quad 14.14214m = \sqrt{2} \cdot 10m$$

15) Space Diagonal of Octahedron given Insphere Radius

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

[Open Calculator !\[\]\(104fbf564e2e5a8fbd84f31656d114c7_img.jpg\)](#)

$$ex \quad 13.85641m = 2 \cdot \sqrt{3} \cdot 4m$$

16) Space Diagonal of Octahedron given Midsphere Radius

$$fx \quad d_{Space} = 2 \cdot \sqrt{2} \cdot r_m$$

[Open Calculator !\[\]\(21226b58c700e5231ab98d27101bac58_img.jpg\)](#)

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



17) Space Diagonal of Octahedron given Volume 

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

Open Calculator 

$$\text{ex } 14.12808\text{m} = \sqrt{2} \cdot \left(\frac{3 \cdot 470\text{m}^3}{\sqrt{2}} \right)^{\frac{1}{3}}$$

Total Surface Area of Octahedron 18) Total Surface Area of Octahedron 

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

Open Calculator 

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

19) Total Surface Area of Octahedron given Circumsphere Radius 

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

Open Calculator 

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


20) Total Surface Area of Octahedron given Midsphere Radius 

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

Open Calculator 

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




21) Total Surface Area of Octahedron given Space Diagonal 

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

[Open Calculator !\[\]\(6605b201d6f14d9b3bcb8ab5f274d107_img.jpg\)](#)


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

Volume of Octahedron 22) Volume of Octahedron 

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

[Open Calculator !\[\]\(f95dab70c751fda7d824b8b03650f7aa_img.jpg\)](#)

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

23) Volume of Octahedron given Circumsphere Radius 

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

[Open Calculator !\[\]\(e9474ce1d70442456f8fe9c393ea149c_img.jpg\)](#)

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


24) Volume of Octahedron given Insphere Radius 

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

[Open Calculator !\[\]\(9db214d549b9aeebe72aa11d3a5c4b1a_img.jpg\)](#)

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



25) Volume of Octahedron given Total Surface Area [Open Calculator](#) 

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

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






Variables Used

- **d_{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

- **Function:** **sqrt**, $\text{sqrt}(\text{Number})$
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 



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