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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

Open Calculator

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

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

2) Edge Length of Octahedron given Midsphere Radius

Open Calculator

fx $l_e = 2 \cdot r_m$

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

3) Edge Length of Octahedron given Space Diagonal

Open Calculator

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

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

4) Edge Length of Octahedron given Volume

Open Calculator

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

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

Open Calculator

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

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

6) Circumsphere Radius of Octahedron given Insphere Radius

Open Calculator

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

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

7) Circumsphere Radius of Octahedron given Space Diagonal

Open Calculator

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

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

8) Insphere Radius of Octahedron

Open Calculator

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

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

9) Insphere Radius of Octahedron given Midsphere Radius

Open Calculator

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

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

10) Insphere Radius of Octahedron given Total Surface Area

Open Calculator

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

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

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

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

12) Midsphere Radius of Octahedron given Insphere Radius

Open Calculator

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

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

13) Midsphere Radius of Octahedron given Space Diagonal

Open Calculator

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

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

Space Diagonal of Octahedron

14) Space Diagonal of Octahedron

Open Calculator

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

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

15) Space Diagonal of Octahedron given Insphere Radius

Open Calculator

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

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

16) Space Diagonal of Octahedron given Midsphere Radius

Open Calculator

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

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

17) Space Diagonal of Octahedron given Volume

Open Calculator

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

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

Open Calculator

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

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

19) Total Surface Area of Octahedron given Circumsphere Radius

Open Calculator

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

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

20) Total Surface Area of Octahedron given Midsphere Radius

Open Calculator

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

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

fx $$\mathrm{TSA} = \sqrt{3} \cdot \mathrm{d}_{\mathrm{Space}}^2$$

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

Volume of Octahedron

22) Volume of Octahedron

Open Calculator

fx $$\mathrm{V} = \frac{\sqrt{2}}{3} \cdot \mathrm{l}_{\mathrm{e}}^3$$

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

23) Volume of Octahedron given Circumsphere Radius

Open Calculator

fx $$\mathrm{V} = \frac{4 \cdot \mathrm{r}_{\mathrm{c}}^3}{3}$$

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

24) Volume of Octahedron given Insphere Radius

Open Calculator

fx $$\mathrm{V} = 4 \cdot \sqrt{3} \cdot \mathrm{r}_{\mathrm{i}}^3$$

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

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

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**, sqrt(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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