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Important Formulas of Snub Dodecahedron

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List of 11 Important Formulas of Snub Dodecahedron

Important Formulas of Snub Dodecahedron

1) Circumsphere Radius of Snub Dodecahedron

Open Calculator

fx $$r_c = \frac{\sqrt{\frac{2-0.94315125924}{1-0.94315125924}}}{2} \cdot l_e$$

ex $$21.55837\text{m} = \frac{\sqrt{\frac{2-0.94315125924}{1-0.94315125924}}}{2} \cdot 10\text{m}$$

2) Edge Length of Snub Dodecahedron given Circumsphere Radius

Open Calculator

fx $$l_e = \frac{2 \cdot r_c}{\sqrt{\frac{2-0.94315125924}{1-0.94315125924}}}$$

ex $$10.20485\text{m} = \frac{2 \cdot 22\text{m}}{\sqrt{\frac{2-0.94315125924}{1-0.94315125924}}}$$

3) Edge Length of Snub Dodecahedron given Volume

fx Open Calculator

$$l_e = \left(\frac{V \cdot 6 \cdot \left(3 - \left(\left(\frac{[phi]}{2} + \frac{\sqrt{[ph}}{2} \right.\right.\right.\right.}{\left((12 \cdot ((3 \cdot [phi]) + 1)) \cdot \left(\left(\left(\frac{[phi]}{2} + \frac{\sqrt{[phi]-\frac{5}{27}}}{2} \right)^{\frac{1}{3}} + \left(\frac{[phi]}{2} - \frac{\sqrt{[phi]-\frac{5}{27}}}{2} \right)^{\frac{1}{3}} \right)^2 \right) - \right.\right.\right.$$

ex $$10.03386\text{m} = \left(\frac{38000\text{m}^3 \cdot 6 \cdot \left(3 - \left(\left(\frac{[phi]}{2} + \frac{\sqrt{[phi]-\frac{5}{27}}}{2} \right.\right.\right.\right.}{\left((12 \cdot ((3 \cdot [phi]) + 1)) \cdot \left(\left(\left(\frac{[phi]}{2} + \frac{\sqrt{[phi]-\frac{5}{27}}}{2} \right)^{\frac{1}{3}} + \left(\frac{[phi]}{2} - \frac{\sqrt{[phi]-\frac{5}{27}}}{2} \right)^{\frac{1}{3}} \right)^2 \right) - \left(((36 \cdot [\right.\right.\right.$$

4) Midsphere Radius of Snub Dodecahedron

Open Calculator

fx $$r_m = \frac{\sqrt{\frac{1}{1-0.94315125924}}}{2} \cdot l_e$$

ex $$20.97054\text{m} = \frac{\sqrt{\frac{1}{1-0.94315125924}}}{2} \cdot 10\text{m}$$

5) Surface to Volume Ratio of Snub Dodecahedron

fx Open Calculator

$$R_{A/V} = \frac{\left(\left(20 \cdot \sqrt{3}\right) + \left(3 \cdot \sqrt{25 + \left(10 \cdot \sqrt{5}\right)}\right)\right) \cdot}{l_e \cdot \left(\left(\left(12 \cdot \left(\left(3 \cdot [\text{phi}]\right) + 1\right)\right) \cdot \left(\left(\left(\frac{[\text{phi}]}{2} + \frac{\sqrt{[\text{phi}] - \frac{5}{27}}}{2}\right)^{\frac{1}{3}} + \left(\frac{[\text{phi}]}{2} - \frac{\sqrt{[\text{phi}] - \frac{5}{27}}}{2}\right)^{\frac{1}{3}}\right)\right.\right.\right.$$

ex $$0.146974\text{m}^{-1} = \frac{\left(\left(20 \cdot \sqrt{3}\right) + \left(3 \cdot \sqrt{25 + \left(10 \cdot \sqrt{5}\right)}\right)\right) \cdot 6 \cdot \left(3 -}{10\text{m} \cdot \left(\left(\left(12 \cdot \left(\left(3 \cdot [\text{phi}]\right) + 1\right)\right) \cdot \left(\left(\left(\frac{[\text{phi}]}{2} + \frac{\sqrt{[\text{phi}] - \frac{5}{27}}}{2}\right)^{\frac{1}{3}} + \left(\frac{[\text{phi}]}{2} - \frac{\sqrt{[\text{phi}] - \frac{5}{27}}}{2}\right)^{\frac{1}{3}}\right)^{2}\right) -\right.\right.\right.$$

6) Surface to Volume Ratio of Snub Dodecahedron given Circumsphere Radius

fx Open Calculator

$$R_{A/V} = \frac{\left(\left(20 \cdot \sqrt{3}\right) + \left(3 \cdot \sqrt{25 + \left(10 \cdot \sqrt{5}\right)}\right.\right.}{\frac{2 \cdot r_c}{\sqrt{\frac{2-0.94315125924}{1-0.94315125924}}} \cdot \left(\left(\left(12 \cdot \left(\left(3 \cdot [phi]\right) + 1\right)\right) \cdot \left(\left(\left(\left(\frac{[phi]}{2} + \frac{\sqrt{[phi] - \frac{5}{27}}}{2}\right)^{\frac{1}{3}} + \left(\frac{[phi]}{2} - \frac{\sqrt{[}}{}\right.\right.\right.\right.\right.\right.}$$

ex

$$0.144024 m^{-1} = \frac{\left(\left(20 \cdot \sqrt{3}\right) + \left(3 \cdot \sqrt{25 + \left(10 \cdot \sqrt{5}\right)}\right)\right) \cdot 6 \cdot \left(3\right.}{\frac{2 \cdot 22m}{\sqrt{\frac{2-0.94315125924}{1-0.94315125924}}} \cdot \left(\left(\left(12 \cdot \left(\left(3 \cdot [phi]\right) + 1\right)\right) \cdot \left(\left(\left(\left(\frac{[phi]}{2} + \frac{\sqrt{[phi] - \frac{5}{27}}}{2}\right)^{\frac{1}{3}} + \left(\frac{[phi]}{2} - \frac{\sqrt{[phi] - \frac{5}{27}}}{2}\right)^{\frac{1}{3}}\right)\right.\right.\right.\right.\right.}$$

7) Total Surface Area of Snub Dodecahedron

Open Calculator

fx $$TSA = \left(\left(20 \cdot \sqrt{3}\right) + \left(3 \cdot \sqrt{25 + \left(10 \cdot \sqrt{5}\right)}\right)\right) \cdot l_e^2$$

ex $$5528.674 m^2 = \left(\left(20 \cdot \sqrt{3}\right) + \left(3 \cdot \sqrt{25 + \left(10 \cdot \sqrt{5}\right)}\right)\right) \cdot (10m)^2$$

8) Total Surface Area of Snub Dodecahedron given Midsphere Radius

Open Calculator

fx $$TSA = \left(\left(20 \cdot \sqrt{3}\right) + \left(3 \cdot \sqrt{25 + \left(10 \cdot \sqrt{5}\right)}\right)\right) \cdot \left(\frac{2 \cdot r_m}{\sqrt{\frac{1}{1-0.94315125924}}}\right)^2$$

ex $$5544.22 m^2 = \left(\left(20 \cdot \sqrt{3}\right) + \left(3 \cdot \sqrt{25 + \left(10 \cdot \sqrt{5}\right)}\right)\right) \cdot \left(\frac{2 \cdot 21m}{\sqrt{\frac{1}{1-0.94315125924}}}\right)^2$$

9) Total Surface Area of Snub Dodecahedron given Volume

Open Calculator

$$TSA = \left(\left(20 \cdot \sqrt{3}\right) + \left(3 \cdot \sqrt{25 + \left(10 \cdot \sqrt{5}\right)}\right)\right) \cdot \left(\frac{}{\left((12 \cdot ((3 \cdot [phi]) + 1)) \cdot \left(\left(\left(\frac{[phi]}{2} +$$

ex

$$5566.173\text{m}^2 = \left(\left(20 \cdot \sqrt{3}\right) + \left(3 \cdot \sqrt{25 + \left(10 \cdot \sqrt{5}\right)}\right)\right) \cdot \left(\frac{}{\left((12 \cdot ((3 \cdot [phi]) + 1)) \cdot \left(\left(\left(\frac{[phi]}{2} + \frac{\sqrt{[phi] - \frac{5}{27}}}{2}\right)\right.\right.\right.\right.$$

10) Volume of Snub Dodecahedron

Open Calculator

$$V = \frac{\left((12 \cdot ((3 \cdot [phi]) + 1)) \cdot \left(\left(\left(\frac{[phi]}{2} + \frac{\sqrt{[phi] - \frac{5}{27}}}{2}\right)^{\frac{1}{3}} + \left(\frac{[phi]}{2} - \frac{\sqrt{[phi] - \frac{5}{27}}}{2}\right)^{\frac{1}{3}}\right)^2\right) - \left(\right.}{6 \cdot \left(3 - \left(\left(\left(\frac{[phi]}{2} + \frac{\sqrt{[phi] - \frac{5}{27}}}{2}\right.\right.\right.\right.$$

ex

$$37616.65\text{m}^3 = \frac{\left((12 \cdot ((3 \cdot [phi]) + 1)) \cdot \left(\left(\left(\frac{[phi]}{2} + \frac{\sqrt{[phi] - \frac{5}{27}}}{2}\right)^{\frac{1}{3}} + \left(\frac{[phi]}{2} - \frac{\sqrt{[phi] - \frac{5}{27}}}{2}\right)^{\frac{1}{3}}\right)^2\right) - \left(((36 \cdot [p\right.}{6 \cdot \left(3 - \left(\left(\left(\frac{[phi]}{2} + \frac{\sqrt{[phi] - \frac{5}{27}}}{2}\right)\right.\right.\right.\right.$$

11) Volume of Snub Dodecahedron given Total Surface Area

Open Calculator

$$V = \frac{\left((12 \cdot ((3 \cdot [phi]) + 1)) \cdot \left(\left(\left(\frac{[phi]}{2} + \frac{\sqrt{[phi] - \frac{5}{27}}}{2}\right)^{\frac{1}{3}} + \left(\frac{[phi]}{2} - \frac{\sqrt{[phi] - \frac{5}{27}}}{2}\right)^{\frac{1}{3}}\right)^{2}\right) - \left(\right.\right.}{6 \cdot \left(3 - \left(\left(\frac{[phi]}{2} + \frac{\sqrt{[phi] - \frac{5}{27}}}{2}\right.\right.\right.}$$

ex

$$37324.38\text{m}^3 = \frac{\left((12 \cdot ((3 \cdot [phi]) + 1)) \cdot \left(\left(\left(\frac{[phi]}{2} + \frac{\sqrt{[phi] - \frac{5}{27}}}{2}\right)^{\frac{1}{3}} + \left(\frac{[phi]}{2} - \frac{\sqrt{[phi] - \frac{5}{27}}}{2}\right)^{\frac{1}{3}}\right)^{2}\right) - \left(((36 \cdot [p\right.}{6 \cdot \left(3 - \left(\left(\frac{[phi]}{2} + \frac{\sqrt{[phi] - \frac{5}{27}}}{2}\right)^{\frac{1}{3}} + \right.\right.}$$

Variables Used

- l_e Edge Length of Snub Dodecahedron *(Meter)*
- $R_{A/V}$ Surface to Volume Ratio of Snub Dodecahedron *(1 per Meter)*
- r_c Circumsphere Radius of Snub Dodecahedron *(Meter)*
- r_m Midsphere Radius of Snub Dodecahedron *(Meter)*
- **TSA** Total Surface Area of Snub Dodecahedron *(Square Meter)*
- **V** Volume of Snub Dodecahedron *(Cubic Meter)*

Constants, Functions, Measurements used

- Constant: **[phi]**, 1.61803398874989484820458683436563811
  Golden ratio
- 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

Check other formula lists

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- Rhombicosidodecahedron Formulas
- Rhombicuboctahedron Formulas
- Snub Cube Formulas
- Snub Dodecahedron Formulas
- Truncated Cube Formulas
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