## Important Formulas of Truncated Icosahedron

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## List of 12 Important Formulas of Truncated Icosahedron

## Important Formulas of Truncated Icosahedron ©

1) Circumsphere Radius of Truncated Icosahedron
$\mathrm{fx}_{\mathrm{x}} \mathrm{r}_{\mathrm{c}}=\frac{\sqrt{58+(18 \cdot \sqrt{5})}}{4} \cdot l_{\mathrm{e}}$
$\mathrm{ex} 24.78019 \mathrm{~m}=\frac{\sqrt{58+(18 \cdot \sqrt{5})}}{4} \cdot 10 \mathrm{~m}$
2) Edge Length of Truncated Icosahedron given Circumsphere Radius
$\square$
$\mathrm{ex} 10.08871 \mathrm{~m}=\frac{4 \cdot 25 \mathrm{~m}}{\sqrt{58+(18 \cdot \sqrt{5})}}$
3) Edge Length of Truncated Icosahedron given Midsphere Radius
$f \mathrm{fx} \mathrm{l}_{\mathrm{e}}=\frac{4 \cdot \mathrm{r}_{\mathrm{m}}}{3 \cdot(1+\sqrt{5})}$
ex $9.888544 \mathrm{~m}=\frac{4 \cdot 24 \mathrm{~m}}{3 \cdot(1+\sqrt{5})}$
4) Edge Length of Truncated Icosahedron given Volume 〔
$f \times l_{\mathrm{e}}=\left(\frac{4 \cdot V}{125+(43 \cdot \sqrt{5})}\right)^{\frac{1}{3}}$
$\operatorname{ex} 9.982622 \mathrm{~m}=\left(\frac{4 \cdot 55000 \mathrm{~m}^{3}}{125+(43 \cdot \sqrt{5})}\right)^{\frac{1}{3}}$
5) Icosahedral Edge Length of Truncated Icosahedron
fx $l_{\mathrm{e}(\text { Icosahedron })}=3 \cdot \mathrm{l}_{\mathrm{e}}$
ex $30 \mathrm{~m}=3 \cdot 10 \mathrm{~m}$
6) Midsphere Radius of Truncated Icosahedron
$f_{x} r_{m}=\frac{3 \cdot(1+\sqrt{5})}{4} \cdot l_{e}$
ex $24.27051 \mathrm{~m}=\frac{3 \cdot(1+\sqrt{5})}{4} \cdot 10 \mathrm{~m}$
7) Midsphere Radius of Truncated Icosahedron given Icosahedral Edge Length
$\mathrm{fx} \mathrm{r}_{\mathrm{m}}=\frac{1+\sqrt{5}}{4} \cdot l_{\mathrm{e}(\text { Icosahedron })}$
ex $24.27051 \mathrm{~m}=\frac{1+\sqrt{5}}{4} \cdot 30 \mathrm{~m}$
8) Surface to Volume Ratio of Truncated Icosahedron

$$
\frac{12 \cdot((10 \cdot \sqrt{3})+\sqrt{25+(10 \cdot \sqrt{5})})}{l_{\mathrm{e}} \cdot(125+(43 \cdot \sqrt{5}))}
$$

Open Calculator
$f_{\mathrm{x}} \mathrm{R}_{\mathrm{A} / \mathrm{V}}=\frac{(1)}{\mathrm{l}_{\mathrm{e}} \cdot(125+(43 \cdot \sqrt{5}))}$

$$
\mathrm{ex} 0.131326 \mathrm{~m}^{-1}=\frac{12 \cdot((10 \cdot \sqrt{3})+\sqrt{25+(10 \cdot \sqrt{5})})}{10 \mathrm{~m} \cdot(125+(43 \cdot \sqrt{5}))}
$$

9) Total Surface Area of Truncated Icosahedron
$f \mathrm{x} \operatorname{TSA}=3 \cdot \mathrm{l}_{\mathrm{e}}^{2} \cdot((10 \cdot \sqrt{3})+\sqrt{25+(10 \cdot \sqrt{5})})$
ex $7260.725 \mathrm{~m}^{2}=3 \cdot(10 \mathrm{~m})^{2} \cdot((10 \cdot \sqrt{3})+\sqrt{25+(10 \cdot \sqrt{5})})$
10) Total Surface Area of Truncated Icosahedron given Volume
$\mathrm{TSA}=3 \cdot\left(\frac{4 \cdot \mathrm{~V}}{125+(43 \cdot \sqrt{5})}\right)^{\frac{2}{3}} \cdot((10 \cdot \sqrt{3})+\sqrt{25+(10 \cdot \sqrt{5})})$
ex $7235.512 \mathrm{~m}^{2}=3 \cdot\left(\frac{4 \cdot 55000 \mathrm{~m}^{3}}{125+(43 \cdot \sqrt{5})}\right)^{\frac{2}{3}} \cdot((10 \cdot \sqrt{3})+\sqrt{25+(10 \cdot \sqrt{5})})$
11) Volume of Truncated Icosahedron
$f_{x} V=\frac{125+(43 \cdot \sqrt{5})}{4} \cdot l_{\mathrm{e}}^{3}$
$\mathrm{ex} 55287.73 \mathrm{~m}^{3}=\frac{125+(43 \cdot \sqrt{5})}{4} \cdot(10 \mathrm{~m})^{3}$
12) Volume of Truncated Icosahedron given Total Surface Area
fix
$\mathrm{V}=\frac{125+(43 \cdot \sqrt{5})}{4} \cdot\left(\sqrt{\frac{\mathrm{TSA}}{3 \cdot((10 \cdot \sqrt{3})+\sqrt{25+(10 \cdot \sqrt{5})})}}\right)^{3}$
$\operatorname{ex} 55736.93 \mathrm{~m}^{3}=\frac{125+(43 \cdot \sqrt{5})}{4} \cdot\left(\sqrt{\frac{7300 \mathrm{~m}^{2}}{3 \cdot((10 \cdot \sqrt{3})+\sqrt{25+(10 \cdot \sqrt{5})})}}\right)^{3}$

## Variables Used

- $\mathbf{I}_{\mathbf{e}}$ Edge Length of Truncated Icosahedron (Meter)
- $I_{e(I c o s a h e d r o n)}$ Icosahedral Edge Length of Truncated Icosahedron (Meter)
- $\mathbf{R}_{\mathbf{A} / \mathbf{V}}$ Surface to Volume Ratio of Truncated Icosahedron (1 per Meter)
- $\mathbf{r}_{\mathbf{c}}$ Circumsphere Radius of Truncated Icosahedron (Meter)
- $\mathbf{r}_{\mathbf{m}}$ Midsphere Radius of Truncated Icosahedron (Meter)
- TSA Total Surface Area of Truncated Icosahedron (Square Meter)
- V Volume of Truncated Icosahedron (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 $\left(\mathrm{m}^{3}\right)$

Volume Unit Conversion

- Measurement: Area in Square Meter ( $\mathrm{m}^{2}$ )

Area Unit Conversion

- Measurement: Reciprocal Length in 1 per Meter $\left(\mathrm{m}^{-1}\right)$

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
- Truncated Cuboctahedron Formulas
- Truncated Dodecahedron Formulas

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- Truncated Icosahedron Formulas
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