## Important Formulas of Frustum of Cone

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## List of $\mathbf{2 6}$ Important Formulas of Frustum of Cone

## Important Formulas of Frustum of Cone

## Height of Frustum of Cone

1) Height of Frustum of Cone given Curved Surface Area
$\mathbf{f x} \mathbf{h}=\sqrt{\left(\frac{\text { CSA }}{\pi \cdot\left(\mathrm{r}_{\text {Top }}+\mathrm{r}_{\text {Base }}\right)}\right)^{2}-\left(\mathrm{r}_{\text {Top }}-\mathrm{r}_{\text {Base }}\right)^{2}}$
ex $8.135666 \mathrm{~m}=\sqrt{\left(\frac{450 \mathrm{~m}^{2}}{\pi \cdot(10 \mathrm{~m}+5 \mathrm{~m})}\right)^{2}-(10 \mathrm{~m}-5 \mathrm{~m})^{2}}$
2) Height of Frustum of Cone given Slant Height
$\mathrm{fx}=\sqrt{\mathrm{h}_{\text {Slant }}^{2}-\left(\mathrm{r}_{\text {Top }}-\mathrm{r}_{\text {Base }}\right)^{2}}$
ex $7.483315 \mathrm{~m}=\sqrt{(9 m)^{2}-(10 m-5 m)^{2}}$
3) Height of Frustum of Cone given Total Surface Area
$\mathrm{fx} \mathrm{h}=\sqrt{\left(\frac{\frac{\mathrm{TSA}}{\pi}-\left(\mathrm{r}_{\text {Top }}^{2}+\mathrm{r}_{\text {Base }}^{2}\right)}{\mathrm{r}_{\mathrm{Top}}+\mathrm{r}_{\text {Base }}}\right)^{2}-\left(\mathrm{r}_{\mathrm{Top}}-\mathrm{r}_{\text {Base }}\right)^{2}}$

4) Height of Frustum of Cone given Volume
$f \mathbf{f x}=\frac{3 \cdot \mathrm{~V}}{\pi \cdot\left(\mathrm{r}_{\text {Top }}^{2}+\mathrm{r}_{\text {Base }}^{2}+\left(\mathrm{r}_{\mathrm{Top}} \cdot \mathrm{r}_{\text {Base }}\right)\right)}$
ex 8.18

$$
\pi \cdot\left((10 \mathrm{~m})^{2}+(5 \mathrm{~m})^{2}+(10 \mathrm{~m} \cdot 5 \mathrm{~m})\right)
$$

## Radius of Frustum of Cone

5) Base Radius of Frustum of Cone given Base Area
$r_{\text {Base }}=\sqrt{\frac{A_{\text {Base }}}{\pi}}$
ex $5.046265 \mathrm{~m}=\sqrt{\frac{80 \mathrm{~m}^{2}}{\pi}}$
6) Base Radius of Frustum of Cone given Slant Height
$f x r_{\text {Base }}=r_{\text {Top }}-\sqrt{h_{\text {Slant }}^{2}-h^{2}}$
ex $5.876894 \mathrm{~m}=10 \mathrm{~m}-\sqrt{(9 \mathrm{~m})^{2}-(8 \mathrm{~m})^{2}}$
7) Top Radius of Frustum of Cone given Slant Height and Base Area
$\mathrm{fx}_{\mathrm{X}} \mathrm{r}_{\text {op }}=\sqrt{\mathrm{h}_{\text {Slant }}^{2}-\mathrm{h}^{2}}+\sqrt{\frac{\mathrm{A}_{\text {Base }}}{\pi}}$
ex $9.169371 \mathrm{~m}=\sqrt{(9 \mathrm{~m})^{2}-(8 \mathrm{~m})^{2}}+\sqrt{\frac{80 \mathrm{~m}^{2}}{\pi}}$
8) Top Radius of Frustum of Cone given Top Area
$f \mathrm{x} \mathrm{r}_{\mathrm{Top}}=\sqrt{\frac{\mathrm{A}_{\mathrm{Top}}}{\pi}}$
ex $10.01337 \mathrm{~m}=\sqrt{\frac{315 \mathrm{~m}^{2}}{\pi}}$

## Slant Height of Frustum of Cone

9) Slant Height of Frustum of Cone
$f \times \mathrm{h}_{\text {Slant }}=\sqrt{\mathrm{h}^{2}+\left(\mathrm{r}_{\mathrm{Top}}-\mathrm{r}_{\text {Base }}\right)^{2}}$
ex $9.433981 \mathrm{~m}=\sqrt{(8 \mathrm{~m})^{2}+(10 \mathrm{~m}-5 \mathrm{~m})^{2}}$
10) Slant Height of Frustum of Cone given Curved Surface Area
$f \times \mathrm{h}_{\text {Slant }}=\frac{\text { CSA }}{\pi \cdot\left(\mathrm{r}_{\mathrm{Top}}+\mathrm{r}_{\text {Base }}\right)}$
$\mathbf{x} 9.549297 \mathrm{~m}=\frac{450 \mathrm{~m}^{2}}{\pi \cdot(10 \mathrm{~m}+5 \mathrm{~m})}$
11) Slant Height of Frustum of Cone given Total Surface Area
$\mathrm{fx} \mathrm{h}_{\text {Slant }}=\frac{\frac{\mathrm{TSA}}{\pi}-\left(\mathrm{r}_{\text {Top }}^{2}+\mathrm{r}_{\text {Base }}^{2}\right)}{\mathrm{r}_{\text {Top }}+\mathrm{r}_{\text {Base }}}$
ex $9.704227 \mathrm{~m}=$

$$
\frac{\frac{850 \mathrm{~m}^{2}}{\pi}-\left((10 \mathrm{~m})^{2}+(5 \mathrm{~m})^{2}\right)}{10 \mathrm{~m}+5 \mathrm{~m}}
$$

12) Slant Height of Frustum of Cone given Volume
$f \mathbf{f x} \mathrm{~h}_{\text {Slant }}=\sqrt{\left(\frac{3 \cdot \mathrm{~V}}{\pi \cdot\left(\mathrm{r}_{\text {Top }}^{2}+\mathrm{r}_{\text {Base }}^{2}+\left(\mathrm{r}_{\text {Top }} \cdot \mathrm{r}_{\text {Base }}\right)\right)}\right)^{2}+\left(\mathrm{r}_{\text {Top }}-\mathrm{r}_{\text {Base }}\right)^{2}}$

## Surface Area of Frustum of Cone

## 13) Base Area of Frustum of Cone

$f \times \quad \mathrm{A}_{\text {Base }}=\pi \cdot \mathrm{r}_{\text {Base }}^{2}$
ex $78.53982 \mathrm{~m}^{2}=\pi \cdot(5 \mathrm{~m})^{2}$
14) Curved Surface Area of Frustum of Cone
$\mathrm{fx} \mathrm{CSA}=\pi \cdot\left(\mathrm{r}_{\text {Top }}+\mathrm{r}_{\text {Base }}\right) \cdot \sqrt{\left(\mathrm{r}_{\text {Top }}-\mathrm{r}_{\text {Base }}\right)^{2}+\mathrm{h}^{2}}$
ex $444.5659 \mathrm{~m}^{2}=\pi \cdot(10 \mathrm{~m}+5 \mathrm{~m}) \cdot \sqrt{(10 \mathrm{~m}-5 \mathrm{~m})^{2}+(8 \mathrm{~m})^{2}}$
15) Curved Surface Area of Frustum of Cone given Slant Height
$\mathrm{fx}_{\mathrm{fx}}^{\mathrm{CSA}}=\pi \cdot\left(\mathrm{r}_{\text {Top }}+\mathrm{r}_{\text {Base }}\right) \cdot \mathrm{h}_{\text {Slant }}$
Open Calculator
ex $424.115 \mathrm{~m}^{2}=\pi \cdot(10 \mathrm{~m}+5 \mathrm{~m}) \cdot 9 \mathrm{~m}$
16) Curved Surface Area of Frustum of Cone given Total Surface Area
$\mathrm{fx} \mathrm{CSA}=\mathrm{TSA}-\left(\pi \cdot\left(\mathrm{r}_{\mathrm{Top}}^{2}+\mathrm{r}_{\text {Base }}^{2}\right)\right)$
ex $457.3009 \mathrm{~m}^{2}=850 \mathrm{~m}^{2}-\left(\pi \cdot\left((10 \mathrm{~m})^{2}+(5 \mathrm{~m})^{2}\right)\right)$
17) Curved Surface Area of Frustum of Cone given Volume
fx
Open Calculator
$\mathrm{CSA}=\pi \cdot\left(\mathrm{r}_{\mathrm{Top}}+\mathrm{r}_{\text {Base }}\right) \cdot \sqrt{\left(\frac{3 \cdot \mathrm{~V}}{\pi \cdot\left(\mathrm{r}_{\text {Top }}^{2}+\mathrm{r}_{\text {Base }}^{2}+\left(\mathrm{r}_{\mathrm{Top}} \cdot \mathrm{r}_{\text {Base }}\right)\right)}\right)^{2}+\left(\mathrm{r}_{\mathrm{Top}}-\mathrm{r}_{\text {Base }}\right)^{2}}$
ex $451.9868 \mathrm{~m}^{2}=\pi \cdot(10 \mathrm{~m}+5 \mathrm{~m}) \cdot \sqrt{\left(\frac{3 \cdot 1500 \mathrm{~m}^{3}}{\pi \cdot\left((10 \mathrm{~m})^{2}+(5 \mathrm{~m})^{2}+(10 \mathrm{~m} \cdot 5 \mathrm{~m})\right)}\right)^{2}+(10 \mathrm{~m}-5 \mathrm{~m})^{2}}$
18) Top Area of Frustum of Cone
$\mathrm{fx} \mathrm{A}_{\mathrm{Top}}=\pi \cdot \mathrm{r}_{\mathrm{Top}}^{2}$
ex $314.1593 \mathrm{~m}^{2}=\pi \cdot(10 \mathrm{~m})^{2}$
19) Total Surface Area of Frustum of Cone
$\mathrm{fx} \mathrm{TSA}=\pi \cdot\left(\left(\left(\mathrm{r}_{\text {Top }}+\mathrm{r}_{\text {Base }}\right) \cdot \sqrt{\left(\mathrm{r}_{\text {Top }}-\mathrm{r}_{\text {Base }}\right)^{2}+\mathrm{h}^{2}}\right)+\mathrm{r}_{\text {Top }}^{2}+\mathrm{r}_{\text {Base }}^{2}\right)$
Open Calculatore
20) Total Surface Area of Frustum of Cone given Curved Surface Area
$f \mathbf{x} \mathrm{TSA}=\mathrm{CSA}+\left(\pi \cdot\left(\mathrm{r}_{\mathrm{Top}}^{2}+\mathrm{r}_{\text {Base }}^{2}\right)\right)$
ex $842.6991 \mathrm{~m}^{2}=450 \mathrm{~m}^{2}+\left(\pi \cdot\left((10 \mathrm{~m})^{2}+(5 \mathrm{~m})^{2}\right)\right)$
21) Total Surface Area of Frustum of Cone given Slant Height
$\mathrm{fx}_{\mathrm{x}}^{\mathrm{TSA}}=\pi \cdot\left(\left(\left(\mathrm{r}_{\text {Top }}+\mathrm{r}_{\text {Base }}\right) \cdot \mathrm{h}_{\text {Slant }}\right)+\mathrm{r}_{\text {Top }}^{2}+\mathrm{r}_{\text {Base }}^{2}\right)$
Open Calculatores
ex $816.8141 \mathrm{~m}^{2}=\pi \cdot\left(((10 \mathrm{~m}+5 \mathrm{~m}) \cdot 9 \mathrm{~m})+(10 \mathrm{~m})^{2}+(5 \mathrm{~m})^{2}\right)$
22) Total Surface Area of Frustum of Cone given Volume
$f x$
$\mathrm{TSA}=\pi \cdot\left(\left(\left(\mathrm{r}_{\mathrm{Top}}+\mathrm{r}_{\text {Base }}\right) \cdot \sqrt{\left(\frac{3 \cdot \mathrm{~V}}{\pi \cdot\left(\mathrm{r}_{\text {Top }}^{2}+\mathrm{r}_{\text {Base }}^{2}+\left(\mathrm{r}_{\mathrm{Top}} \cdot \mathrm{r}_{\text {Base }}\right)\right)}\right)^{2}+\left(\mathrm{r}_{\text {Top }}-\mathrm{r}_{\text {Base }}\right)^{2}}\right)\right.$
ex
$844.6858 \mathrm{~m}^{2}=\pi \cdot\left(\left((10 \mathrm{~m}+5 \mathrm{~m}) \cdot \sqrt{\left(\frac{3 \cdot 1500 \mathrm{~m}^{3}}{\pi \cdot\left((10 \mathrm{~m})^{2}+(5 \mathrm{~m})^{2}+(10 \mathrm{~m} \cdot 5 \mathrm{~m})\right)}\right)^{2}+(10 \mathrm{~m}-5 \mathrm{~m})^{2}}\right)+(10 \mathrm{~m})^{2}\right.$

## Volume of Frustum of Cone

23) Volume of Frustum of Cone
$\mathrm{f}_{\mathrm{x}}^{\mathrm{X}} \mathrm{V}=\frac{1}{3} \cdot \pi \cdot \mathrm{~h} \cdot\left(\mathrm{r}_{\text {Top }}^{2}+\mathrm{r}_{\text {Base }}^{2}+\left(\mathrm{r}_{\text {Top }} \cdot \mathrm{r}_{\text {Base }}\right)\right)$
ex $1466.077 \mathrm{~m}^{3}=\frac{1}{3} \cdot \pi \cdot 8 \mathrm{~m} \cdot\left((10 \mathrm{~m})^{2}+(5 \mathrm{~m})^{2}+(10 \mathrm{~m} \cdot 5 \mathrm{~m})\right)$
24) Volume of Frustum of Cone given Curved Surface Area

$$
\mathrm{V}=\frac{1}{3} \cdot \pi \cdot \sqrt{\left(\frac{\mathrm{CSA}}{\pi \cdot\left(\mathrm{r}_{\text {Top }}+\mathrm{r}_{\text {Base }}\right)}\right)^{2}-\left(\mathrm{r}_{\text {Top }}-\mathrm{r}_{\text {Base }}\right)^{2}} \cdot\left(\mathrm{r}_{\text {Top }}^{2}+\mathrm{r}_{\text {Base }}^{2}+\left(\mathrm{r}_{\text {Top }} \cdot \mathrm{r}_{\text {Base }}\right)\right)
$$

ex $1490.939 \mathrm{~m}^{3}=\frac{1}{3} \cdot \pi \cdot \sqrt{\left(\frac{450 \mathrm{~m}^{2}}{\pi \cdot(10 \mathrm{~m}+5 \mathrm{~m})}\right)^{2}-(10 \mathrm{~m}-5 \mathrm{~m})^{2}} \cdot\left((10 \mathrm{~m})^{2}+(5 \mathrm{~m})^{2}+(10 \mathrm{~m} \cdot 5 \mathrm{~m})\right)$
25) Volume of Frustum of Cone given Slant Height
$f \mathrm{f} V=\frac{\pi \cdot \sqrt{\mathrm{h}_{\text {Slant }}^{2}-\left(\mathrm{r}_{\text {Top }}-\mathrm{r}_{\text {Base }}\right)^{2}}}{3} \cdot\left(\mathrm{r}_{\text {Top }}^{2}+\mathrm{r}_{\text {Base }}^{2}+\left(\mathrm{r}_{\text {Top }} \cdot \mathrm{r}_{\text {Base }}\right)\right)$
ex $1371.389 \mathrm{~m}^{3}=\frac{\pi \cdot \sqrt{(9 \mathrm{~m})^{2}-(10 \mathrm{~m}-5 \mathrm{~m})^{2}}}{3} \cdot\left((10 \mathrm{~m})^{2}+(5 \mathrm{~m})^{2}+(10 \mathrm{~m} \cdot 5 \mathrm{~m})\right)$
26) Volume of Frustum of Cone given Total Surface Area
$f x$

$$
\mathrm{V}=\frac{1}{3} \cdot \pi \cdot \sqrt{\left(\frac{\frac{\mathrm{TSA}}{\pi}-\left(\mathrm{r}_{\text {Top }}^{2}+\mathrm{r}_{\text {Base }}^{2}\right)}{\mathrm{r}_{\text {Top }}+\mathrm{r}_{\text {Base }}}\right)^{2}-\left(\mathrm{r}_{\text {Top }}-\mathrm{r}_{\text {Base }}\right)^{2} \cdot\left(\mathrm{r}_{\text {Top }}^{2}+\mathrm{r}_{\text {Base }}^{2}+\left(\mathrm{r}_{\text {Top }} \cdot \mathrm{r}_{\text {Base }}\right)\right)}
$$

$1524.165 \mathrm{~m}^{3}=\frac{1}{3} \cdot \pi \cdot \sqrt{\left(\frac{\frac{850 \mathrm{~m}^{2}}{\pi}-\left((10 \mathrm{~m})^{2}+(5 \mathrm{~m})^{2}\right)}{10 \mathrm{~m}+5 \mathrm{~m}}\right)^{2}-(10 \mathrm{~m}-5 \mathrm{~m})^{2}} \cdot\left((10 \mathrm{~m})^{2}+(5 \mathrm{~m})^{2}+(10 \mathrm{~m} \cdot 5 \mathrm{~m})\right)$

## Variables Used

- ABase Base Area of Frustum of Cone (Square Meter)
- $\mathbf{A}_{\text {Top }}$ Top Area of Frustum of Cone (Square Meter)
- CSA Curved Surface Area of Frustum of Cone (Square Meter)
- h Height of Frustum of Cone (Meter)
- $\mathbf{h}_{\text {Slant }}$ Slant Height of Frustum of Cone (Meter)
- $\mathbf{r}_{\text {Base }}$ Base Radius of Frustum of Cone (Meter)
- $\mathbf{r}_{\text {Top }}$ Top Radius of Frustum of Cone (Meter)
- TSA Total Surface Area of Frustum of Cone (Square Meter)
- V Volume of Frustum of Cone (Cubic Meter)


## Constants, Functions, Measurements used

- Constant: pi, 3.14159265358979323846264338327950288

Archimedes' constant

- 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

## Check other formula lists

- Anticube Formulas
- Antiprism Formulas
- Barrel Formulas
- Bent Cuboid Formulas
- Bicone Formulas
- Capsule Formulas
- Circular Hyperboloid Formulas
- Cuboctahedron Formulas
- Cut Cylinder Formulas
- Cut Cylindrical Shell Formulas
- Cylinder Formulas
- Cylindrical Shell Formulas
- Diagonally Halved Cylinder Formulas

- Disphenoid Formulas $\sqrt{ }$
- Double Calotte Formulas
- Double Point Formulas
- Ellipsoid Formulas
- Elliptic Cylinder FormulasU
- Elongated Dodecahedron Formulas
- Flat End Cylinder Formulas
- Frustum of Cone Formulas
- Great Dodecahedron Formulas
- Great Icosahedron Formulas
- Great Stellated Dodecahedron Formulas 【
- Half Cylinder Formulas
- Half Spherical Shell Formulas
- Half Tetrahedron Formulas
- Hemisphere Formulas
- Hollow Cuboid Formulas
- Hollow Cylinder Formulas
- Hollow Frustum Formulas
- Hollow Pyramid Formulas
- Hollow Sphere Formulas
- Ingot Formulas
- Obelisk Formulas
- Oblique Cylinder Formulas
- Oblique Prism Formulas
- Obtuse Edged Cuboid Formulas
- Oloid Formulas
- Paraboloid Formulas
- Parallelepiped Formulas
- Prismatoid Formulas
- Ramp Formulas
- Regular Bipyramid Formulas
- Rhombohedron Formulas
- Right Wedge Formulas
- Semi Ellipsoid Formulas
- Sharp Bent Cylinder Formulas
- Small Stellated Dodecahedron Formulas
- Solid of Revolution Formulas
- Sphere Formulas
- Spherical Cap Formulas
- Spherical Corner Formulas
- Spherical Ring Formulas
- Spherical Sector Formulas
- Spherical Segment Formulas
- Spherical Wedge Formulas
- Spherical Zone Formulas
- Square Pillar Formulas
- Stellated Octahedron Formulas $\longleftarrow$
- Trirectangular Tetrahedron Formulas
- Truncated Rhombohedron Formulas


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