Important Circular Hyperboloid Formulas PDF

Formulas
Examples
with Units

List of 12
Important Circular Hyperboloid Formulas

1) Height and Volume of Circular Hyperboloid Formulas

1.1) Height of Circular Hyperboloid Formula

Evaluate Formula

Formula

$$h = 2 \cdot p \cdot \sqrt{\frac{r_{Base}^2}{r_{Skirt}^2} - 1}$$

Example with Units

$$12.1244\,\text{m} = 2 \cdot 3.5\,\text{m} \cdot \sqrt{\frac{20\,\text{m}^2}{10\,\text{m}^2} - 1}$$

1.2) Height of Circular Hyperboloid given Volume Formula

Evaluate Formula

Formula

$$h = \frac{3 \cdot V}{\pi \cdot \left(\left(2 \cdot r_{Skirt}^2\right) + r_{Base}^2\right)}$$

Example with Units

$$12.0162\,\text{m} = \frac{3 \cdot 7550\,\text{m}^3}{3.1416 \cdot \left(\left(2 \cdot 10\,\text{m}^2\right) + 20\,\text{m}^2\right)}$$

1.3) Volume of Circular Hyperboloid Formula

Evaluate Formula

Formula

$$V = \frac{1}{3} \cdot \pi \cdot h \cdot \left(\left(2 \cdot r_{Skirt}^2\right) + r_{Base}^2\right)$$

Example with Units

$$7539.8224\,\text{m}^3 = \frac{1}{3} \cdot 3.1416 \cdot 12\,\text{m} \cdot \left(\left(2 \cdot 10\,\text{m}^2\right) + 20\,\text{m}^2\right)$$

1.4) Volume of Circular Hyperboloid given Base Radius and Skirt Radius Formula

Evaluate Formula

Formula

$$V = \frac{2}{3} \cdot \pi \cdot p \cdot \sqrt{\frac{r_{Base}^2}{r_{Skirt}^2} - 1} \cdot \left(\left(2 \cdot r_{Skirt}^2\right) + r_{Base}^2\right)$$

Example with Units

$$7617.9573\,\text{m}^3 = \frac{2}{3} \cdot 3.1416 \cdot 3.5\,\text{m} \cdot \sqrt{\frac{20\,\text{m}^2}{10\,\text{m}^2} - 1} \cdot \left(\left(2 \cdot 10\,\text{m}^2\right) + 20\,\text{m}^2\right)$$

1.5) Volume of Hyperboloid given Base Radius Formula

Evaluate Formula

Formula

$$V = \frac{1}{3} \cdot \pi \cdot h \cdot r_{Base}^{2} \cdot \left(\frac{2}{1 + \frac{h^{2}}{4 \cdot p^{2}}} + 1 \right)$$

Example with Units

$$7578.8888\,\text{m}^3 = \frac{1}{3} \cdot 3.1416 \cdot 12\,\text{m} \cdot 20\,\text{m}^{2} \cdot \left(\frac{2}{1 + \frac{12\,\text{m}^{2}}{4 \cdot 3.5\,\text{m}^{2}}} + 1 \right)$$

1.6) Volume of Hyperboloid given Skirt Radius Formula

Evaluate Formula

Formula

$$V = \frac{1}{3} \cdot \pi \cdot h \cdot r_{Skirt}^{2} \cdot \left(3 + \frac{h^{2}}{4 \cdot p^{2}} \right)$$

Example with Units

$$7462.8854\,\text{m}^3 = \frac{1}{3} \cdot 3.1416 \cdot 12\,\text{m} \cdot 10\,\text{m}^{2} \cdot \left(3 + \frac{12\,\text{m}^{2}}{4 \cdot 3.5\,\text{m}^{2}} \right)$$

2) Radius of Hyperboloid Formulas

2.1) Base Radius of Circular Hyperboloid Formula

Evaluate Formula

Formula

$$r_{Base} = r_{Skirt} \cdot \sqrt{1 + \frac{h^{2}}{4 \cdot p^{2}}}$$

Example with Units

$$19.8463\,\text{m} = 10\,\text{m} \cdot \sqrt{1 + \frac{12\,\text{m}^{2}}{4 \cdot 3.5\,\text{m}^{2}}}$$

2.2) Base Radius of Circular Hyperboloid given Volume Formula

Evaluate Formula

Formula

$$r_{Base} = \sqrt{\frac{3 \cdot V}{\pi \cdot h} - \left(2 \cdot r_{Skirt}^{2} \right)}$$

Example with Units

$$20.0202\,\text{m} = \sqrt{\frac{3 \cdot 7550\,\text{m}^3}{3.1416 \cdot 12\,\text{m}} - \left(2 \cdot 10\,\text{m}^{2} \right)}$$

2.3) Skirt Radius of Circular Hyperboloid Formula

Evaluate Formula

Formula

$$r_{Skirt} = \frac{r_{Base}}{\sqrt{1 + \frac{h^2}{4 \cdot p^2}}}$$

Example with Units

$$10.0774\,\text{m} = \frac{20\,\text{m}}{\sqrt{1 + \frac{12\,\text{m}^2}{4 \cdot 3.5\,\text{m}^2}}}$$

2.4) Skirt Radius of Circular Hyperboloid given Volume Formula

Evaluate Formula

Formula

$$r_{Skirt} = \sqrt{\frac{1}{2} \cdot \left(\frac{3 \cdot V}{\pi \cdot h} - r_{Base}^2 \right)}$$

Example with Units

$$10.0202\,\text{m} = \sqrt{\frac{1}{2} \cdot \left(\frac{3 \cdot 7550\,\text{m}^3}{3.1416 \cdot 12\,\text{m}} - 20\,\text{m}^2 \right)}$$

3) Shape Parameter of Circular Hyperboloid Formulas

3.1) Shape Parameter of Circular Hyperboloid Formula

Evaluate Formula

Formula

$$p = \sqrt{\frac{h^2}{4 \cdot \left(\frac{r_{Base}^2}{r_{Skirt}^2} - 1 \right)}}$$

Example with Units

$$3.4641\,\text{m} = \sqrt{\frac{12\,\text{m}^2}{4 \cdot \left(\frac{20\,\text{m}^2}{10\,\text{m}^2} - 1 \right)}}$$

3.2) Shape Parameter of Circular Hyperboloid given Volume Formula

Evaluate Formula

Formula

$$p = \frac{3 \cdot V}{2 \cdot \pi \cdot \sqrt{\frac{r_{Base}^2}{r_{Skirt}^2} - 1} \cdot \left(\left(2 \cdot r_{Skirt}^2 \right) + r_{Base}^2 \right)}$$

Example with Units

$$3.4688\,\text{m} = \frac{3 \cdot 7550\,\text{m}^3}{2 \cdot 3.1416 \cdot \sqrt{\frac{20\,\text{m}^2}{10\,\text{m}^2} - 1} \cdot \left(\left(2 \cdot 10\,\text{m}^2 \right) + 20\,\text{m}^2 \right)}$$

Variables used in list of Circular Hyperboloid Formulas above

- **h** Height of Circular Hyperboloid *(Meter)*
- **p** Shape Parameter of Circular Hyperboloid *(Meter)*
- r_{Base} Base Radius of Circular Hyperboloid *(Meter)*
- r_{Skirt} Skirt Radius of Circular Hyperboloid *(Meter)*
- **V** Volume of Circular Hyperboloid *(Cubic Meter)*

Constants, Functions, Measurements used in list of Circular Hyperboloid Formulas above

- constant(s): **pi**, 3.14159265358979323846264338327950288 *Archimedes' constant*
- Functions: **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*

Download other Important 3D Geometry PDFs

- Important Anticube Formulas
- Important Antiprism Formulas
- Important Barrel Formulas
- Important Bent Cuboid Formulas
- Important Bicone Formulas
- Important Capsule Formulas
- Important Circular Hyperboloid Formulas
- Important Cuboctahedron Formulas
- Important Cut Cylinder Formulas
- Important Cut Cylindrical Shell Formulas
- Important Cylinder Formulas
- Important Cylindrical Shell Formulas
- Important Diagonally Halved Cylinder Formulas
- Important Disphenoid Formulas
- Important Double Calotte Formulas
- Important Double Point Formulas
- Important Ellipsoid Formulas
- Important Elliptic Cylinder Formulas
- Important Elongated Dodecahedron Formulas
- Important Flat End Cylinder Formulas
- Important Frustum of Cone Formulas
- Important Great Dodecahedron Formulas
- Important Great Icosahedron Formulas
- Important Great Stellated Dodecahedron Formulas
- Important Half Cylinder Formulas
- Important Half Tetrahedron Formulas
- Important Hemisphere Formulas
- Important Hollow Cuboid Formulas
- Important Hollow Cylinder Formulas
- Important Hollow Frustum Formulas
- Important Hollow Hemisphere Formulas
- Important Hollow Pyramid Formulas
- Important Hollow Sphere Formulas
- Important Ingot Formulas
- Important Obelisk Formulas
- Important Oblique Cylinder Formulas
- Important Oblique Prism Formulas
- Important Obtuse Edged Cuboid Formulas
- Important Oloid Formulas
- Important Paraboloid Formulas
- Important Parallelepiped Formulas
- Important Ramp Formulas
- Important Regular Bipyramid Formulas
- Important Rhombohedron Formulas
- Important Right Wedge Formulas
- Important Semi Ellipsoid Formulas
- Important Sharp Bent Cylinder Formulas
- Important Skewed Three Edged Prism Formulas

- Important Small Stellated Dodecahedron Formulas
- Important Solid of Revolution Formulas
- Important Sphere Formulas
- Important Spherical Cap Formulas
- Important Spherical Corner Formulas
- Important Spherical Ring Formulas
- Important Spherical Sector Formulas
- Important Spherical Segment Formulas
- Important Spherical Wedge Formulas
- Important Square Pillar Formulas
- Important Star Pyramid Formulas
- Important Stellated Octahedron Formulas
- Important Toroid Formulas
- Important Torus Formulas
- Important Trirectangular Tetrahedron Formulas
- Important Truncated Rhombohedron Formulas

Try our Unique Visual Calculators

- Percentage of number
- LCM calculator
- Simple fraction

Please SHARE this PDF with someone who needs it!

This PDF can be downloaded in these languages

English Spanish French German Russian Italian Portuguese Polish Dutch

7/8/2024 | 10:04:01 AM UTC