

Important Solid of Revolution Formulas PDF



Formulas
Examples
with Units

List of 16 Important Solid of Revolution Formulas

1) Area under Curve of Solid of Revolution Formulas

1.1) Area under Curve of Solid of Revolution Formula

Formula

Evaluate Formula

$$A_{\text{Curve}} = \frac{\text{LSA} + \left(\left(r_{\text{Top}} + r_{\text{Bottom}} \right)^2 \cdot \pi \right)}{2 \cdot \pi \cdot r_{\text{Area Centroid}} \cdot R_{A/V}}$$

Example with Units

$$52.9234 \text{ m}^2 = \frac{2360 \text{ m}^2 + \left(\left(10 \text{ m} + 20 \text{ m} \right)^2 \cdot 3.1416 \right)}{2 \cdot 3.1416 \cdot 12 \text{ m} \cdot 1.3 \text{ m}^{-1}}$$

1.2) Area under Curve of Solid of Revolution given Volume Formula

Formula

Example with Units

Evaluate Formula

$$A_{\text{Curve}} = \frac{V}{2 \cdot \pi \cdot r_{\text{Area Centroid}}}$$

$$50.3991 \text{ m}^2 = \frac{3800 \text{ m}^3}{2 \cdot 3.1416 \cdot 12 \text{ m}}$$

2) Curve Length of Solid of Revolution Formulas

2.1) Curve Length of Solid of Revolution Formula

Formula

Example with Units

Evaluate Formula

$$l_{\text{Curve}} = \left(\frac{\text{LSA}}{2 \cdot \pi \cdot r_{\text{Curve Centroid}}} \right)$$

$$25.0404 \text{ m} = \left(\frac{2360 \text{ m}^2}{2 \cdot 3.1416 \cdot 15 \text{ m}} \right)$$

3) Radius of Solid of Revolution Formulas

3.1) Bottom Radius of Solid of Revolution Formulas

3.1.1) Bottom Radius of Solid of Revolution Formula

Formula

Example with Units

Evaluate Formula

$$r_{\text{Bottom}} = \left(\sqrt{\frac{\text{TSA} - \text{LSA}}{\pi}} \right) - r_{\text{Top}}$$

$$20.0666 \text{ m} = \left(\sqrt{\frac{5200 \text{ m}^2 - 2360 \text{ m}^2}{3.1416}} \right) - 10 \text{ m}$$



3.2) Radius at Area Centroid of Solid of Revolution Formulas

3.2.1) Radius at Area Centroid of Solid of Revolution Formula

Formula

$$r_{\text{Area Centroid}} = \frac{V}{2 \cdot \pi \cdot A_{\text{Curve}}}$$

Example with Units

$$12.0958 \text{ m} = \frac{3800 \text{ m}^3}{2 \cdot 3.1416 \cdot 50 \text{ m}^2}$$

Evaluate Formula 

3.2.2) Radius at Area Centroid of Solid of Revolution given Surface to Volume Ratio Formula

Formula

$$r_{\text{Area Centroid}} = \frac{\text{LSA} + \left(\left(r_{\text{Top}} + r_{\text{Bottom}} \right)^2 \cdot \pi \right)}{2 \cdot \pi \cdot A_{\text{Curve}} \cdot R_{A/V}}$$

Example with Units

$$12.7016 \text{ m} = \frac{2360 \text{ m}^2 + \left(\left(10 \text{ m} + 20 \text{ m} \right)^2 \cdot 3.1416 \right)}{2 \cdot 3.1416 \cdot 50 \text{ m}^2 \cdot 1.3 \text{ m}^{-1}}$$

Evaluate Formula 

3.3) Radius at Curve Centroid of Solid of Revolution Formulas

3.3.1) Radius at Curve Centroid of Solid of Revolution Formula

Formula

$$r_{\text{Curve Centroid}} = \frac{\text{LSA}}{2 \cdot \pi \cdot l_{\text{Curve}}}$$

Example with Units

$$15.0242 \text{ m} = \frac{2360 \text{ m}^2}{2 \cdot 3.1416 \cdot 25 \text{ m}}$$

Evaluate Formula 

3.4) Top Radius of Solid of Revolution Formulas

3.4.1) Top Radius of Solid of Revolution Formula

Formula

$$r_{\text{Top}} = \left(\sqrt{\frac{\text{TSA} - \text{LSA}}{\pi}} \right) - r_{\text{Bottom}}$$

Example with Units

$$10.0666 \text{ m} = \left(\sqrt{\frac{5200 \text{ m}^2 - 2360 \text{ m}^2}{3.1416}} \right) - 20 \text{ m}$$

Evaluate Formula 

4) Surface Area of Solid of Revolution Formulas

4.1) Lateral Surface Area of Solid of Revolution Formulas

4.1.1) Lateral Surface Area of Solid of Revolution Formula

Formula

$$\text{LSA} = 2 \cdot \pi \cdot l_{\text{Curve}} \cdot r_{\text{Curve Centroid}}$$

Example with Units

$$2356.1945 \text{ m}^2 = 2 \cdot 3.1416 \cdot 25 \text{ m} \cdot 15 \text{ m}$$

Evaluate Formula 



4.1.2) Lateral Surface Area of Solid of Revolution given Surface to Volume Ratio Formula

Formula

Evaluate Formula 

$$LSA = \left(R_{A/V} \cdot 2 \cdot \pi \cdot A_{Curve} \cdot r_{Area\ Centroid} \right) - \left(\left(\left(r_{Top} + r_{Bottom} \right)^2 \right) \cdot \pi \right)$$

Example with Units

$$2073.4512\text{m}^2 = \left(1.3\text{m}^{-1} \cdot 2 \cdot 3.1416 \cdot 50\text{m}^2 \cdot 12\text{m} \right) - \left(\left(\left(10\text{m} + 20\text{m} \right)^2 \right) \cdot 3.1416 \right)$$

4.1.3) Lateral Surface Area of Solid of Revolution given Total Surface Area Formula

Formula

Evaluate Formula 

$$LSA = TSA - \left(\left(\left(r_{Top} + r_{Bottom} \right)^2 \right) \cdot \pi \right)$$

Example with Units

$$2372.5666\text{m}^2 = 5200\text{m}^2 - \left(\left(\left(10\text{m} + 20\text{m} \right)^2 \right) \cdot 3.1416 \right)$$

4.2) Total Surface Area of Solid of Revolution Formulas

4.2.1) Total Surface Area of Solid of Revolution Formula

Formula

Evaluate Formula 

$$TSA = LSA + \left(\left(\left(r_{Top} + r_{Bottom} \right)^2 \right) \cdot \pi \right)$$

Example with Units

$$5187.4334\text{m}^2 = 2360\text{m}^2 + \left(\left(\left(10\text{m} + 20\text{m} \right)^2 \right) \cdot 3.1416 \right)$$

5) Surface to Volume Ratio of Solid of Revolution Formulas

5.1) Surface to Volume Ratio of Solid of Revolution Formula

Formula

Evaluate Formula 

$$R_{A/V} = \frac{LSA + \left(\left(\left(r_{Top} + r_{Bottom} \right)^2 \right) \cdot \pi \right)}{2 \cdot \pi \cdot A_{Curve} \cdot r_{Area\ Centroid}}$$

Example with Units

$$1.376\text{m}^{-1} = \frac{2360\text{m}^2 + \left(\left(\left(10\text{m} + 20\text{m} \right)^2 \right) \cdot 3.1416 \right)}{2 \cdot 3.1416 \cdot 50\text{m}^2 \cdot 12\text{m}}$$



6) Volume of Solid of Revolution Formulas

6.1) Volume of Solid of Revolution Formula

Formula

$$V = 2 \cdot \pi \cdot A_{\text{Curve}} \cdot r_{\text{Area Centroid}}$$

Example with Units

$$3769.9112 \text{ m}^3 = 2 \cdot 3.1416 \cdot 50 \text{ m}^2 \cdot 12 \text{ m}$$

Evaluate Formula 

6.2) Volume of Solid of Revolution given Lateral Surface Area Formula

Formula

$$V = \left(2 \cdot \pi \cdot A_{\text{Curve}} \right) \cdot \left(\frac{\text{LSA} + \left(\left(r_{\text{Top}} + r_{\text{Bottom}} \right)^2 \cdot \pi \right)}{2 \cdot \pi \cdot A_{\text{Curve}} \cdot R_{A/V}} \right)$$

Example with Units

$$3990.3334 \text{ m}^3 = \left(2 \cdot 3.1416 \cdot 50 \text{ m}^2 \right) \cdot \left(\frac{2360 \text{ m}^2 + \left(\left(10 \text{ m} + 20 \text{ m} \right)^2 \cdot 3.1416 \right)}{2 \cdot 3.1416 \cdot 50 \text{ m}^2 \cdot 1.3 \text{ m}^{-1}} \right)$$

Evaluate Formula 

6.3) Volume of Solid of Revolution given Surface to Volume Ratio Formula

Formula

$$V = \left(2 \cdot \pi \cdot r_{\text{Area Centroid}} \right) \cdot \left(\frac{\text{LSA} + \left(\left(r_{\text{Top}} + r_{\text{Bottom}} \right)^2 \cdot \pi \right)}{2 \cdot \pi \cdot r_{\text{Area Centroid}} \cdot R_{A/V}} \right)$$

Example with Units

$$3990.3334 \text{ m}^3 = \left(2 \cdot 3.1416 \cdot 12 \text{ m} \right) \cdot \left(\frac{2360 \text{ m}^2 + \left(\left(10 \text{ m} + 20 \text{ m} \right)^2 \cdot 3.1416 \right)}{2 \cdot 3.1416 \cdot 12 \text{ m} \cdot 1.3 \text{ m}^{-1}} \right)$$

Evaluate Formula 



Variables used in list of Solid of Revolution Formulas above

- **A_{Curve}** Area under Curve Solid of Revolution (Square Meter)
- **l_{Curve}** Curve Length of Solid of Revolution (Meter)
- **LSA** Lateral Surface Area of Solid of Revolution (Square Meter)
- **R_{A/V}** Surface to Volume Ratio of Solid of Revolution (1 per Meter)
- **r_{Area Centroid}** Radius at Area Centroid of Solid of Revolution (Meter)
- **r_{Bottom}** Bottom Radius of Solid of Revolution (Meter)
- **r_{Curve Centroid}** Radius at Curve Centroid of Solid of Revolution (Meter)
- **r_{Top}** Top Radius of Solid of Revolution (Meter)
- **TSA** Total Surface Area of Solid of Revolution (Square Meter)
- **V** Volume of Solid of Revolution (Cubic Meter)

Constants, Functions, Measurements used in list of Solid of Revolution 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 (m³)
Volume Unit Conversion 
- **Measurement: Area** in Square Meter (m²)
Area Unit Conversion 
- **Measurement: Reciprocal Length** in 1 per Meter (m⁻¹)
Reciprocal Length Unit Conversion 



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- **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** 

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