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Important Formulas of Torus and Torus Sector

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List of 28 Important Formulas of Torus and Torus Sector

Important Formulas of Torus and Torus Sector

Total Surface Area of Torus

1) Total Surface Area of Torus

Open Calculator

fx $$\text{TSA} = 4 \cdot \left(\pi^2\right) \cdot \text{r} \cdot \text{r}_{\text{Circular Section}}$$

ex $$3158.273\text{m}^2 = 4 \cdot \left(\pi^2\right) \cdot 10\text{m} \cdot 8\text{m}$$

2) Total Surface Area of Torus given Radius and Breadth

Open Calculator

fx $$\text{TSA} = \left(4 \cdot \left(\pi^2\right) \cdot (\text{r}) \cdot \left(\left(\frac{\text{b}}{2}\right) - \text{r}\right)\right)$$

ex $$3158.273\text{m}^2 = \left(4 \cdot \left(\pi^2\right) \cdot (10\text{m}) \cdot \left(\left(\frac{36\text{m}}{2}\right) - 10\text{m}\right)\right)$$

3) Total Surface Area of Torus given Radius and Hole Radius

Open Calculator

fx $$\text{TSA} = \left(4 \cdot \left(\pi^2\right) \cdot (\text{r}) \cdot (\text{r} - \text{r}_{\text{Hole}})\right)$$

ex $$3158.273\text{m}^2 = \left(4 \cdot \left(\pi^2\right) \cdot (10\text{m}) \cdot (10\text{m} - 2\text{m})\right)$$

4) Total Surface Area of Torus given Radius and Volume

Open Calculator

fx $$\text{TSA} = \left(4 \cdot \left(\pi^2\right) \cdot (\text{r}) \cdot \left(\sqrt{\frac{\text{V}}{2 \cdot \pi^2 \cdot \text{r}}}\right)\right)$$

ex $$3154.134\text{m}^2 = \left(4 \cdot \left(\pi^2\right) \cdot (10\text{m}) \cdot \left(\sqrt{\frac{12600\text{m}^3}{2 \cdot \pi^2 \cdot 10\text{m}}}\right)\right)$$

Volume of Torus

5) Volume of Torus

Open Calculator

fx $V = 2 \cdot (\pi^2) \cdot r \cdot (r_{Circular\ Section}^2)$

ex $12633.09\text{m}^3 = 2 \cdot (\pi^2) \cdot 10\text{m} \cdot ((8\text{m})^2)$

6) Volume of Torus given Radius and Breadth

Open Calculator

fx $V = \left(2 \cdot (\pi^2) \cdot (r) \cdot \left(\left(\left(\frac{b}{2}\right) - r\right)^2\right)\right)$

ex $12633.09\text{m}^3 = \left(2 \cdot (\pi^2) \cdot (10\text{m}) \cdot \left(\left(\left(\frac{36\text{m}}{2}\right) - 10\text{m}\right)^2\right)\right)$

7) Volume of Torus given Radius and Hole Radius

Open Calculator

fx $V = \left(2 \cdot (\pi^2) \cdot (r) \cdot \left((r - r_{Hole})^2\right)\right)$

ex $12633.09\text{m}^3 = \left(2 \cdot (\pi^2) \cdot (10\text{m}) \cdot \left((10\text{m} - 2\text{m})^2\right)\right)$

8) Volume of Torus given Radius of Circular Section and Hole Radius

Open Calculator

fx $V = \left(2 \cdot (\pi^2) \cdot \left(r_{Circular\ Section}^2\right) \cdot (r_{Hole} + r_{Circular\ Section})\right)$

ex $12633.09\text{m}^3 = \left(2 \cdot (\pi^2) \cdot \left((8\text{m})^2\right) \cdot (2\text{m} + 8\text{m})\right)$

Breadth of Torus

9) Breadth of Torus

Open Calculator

fx $b = 2 \cdot (r + r_{Circular\ Section})$

ex $36\text{m} = 2 \cdot (10\text{m} + 8\text{m})$

10) Breadth of Torus given Radius and Total Surface Area

Open Calculator

fx $$b = 2 \cdot \left(r + \left(\frac{TSA}{4 \cdot \pi^2 \cdot r} \right) \right)$$

ex $$36.21139\text{m} = 2 \cdot \left(10\text{m} + \left(\frac{3200\text{m}^2}{4 \cdot \pi^2 \cdot 10\text{m}} \right) \right)$$

11) Breadth of Torus given Radius and Volume

Open Calculator

fx $$b = 2 \cdot \left(r + \left(\sqrt{\frac{V}{2 \cdot \pi^2 \cdot r}} \right) \right)$$

ex $$35.97903\text{m} = 2 \cdot \left(10\text{m} + \left(\sqrt{\frac{12600\text{m}^3}{2 \cdot \pi^2 \cdot 10\text{m}}} \right) \right)$$

Hole Radius of Torus

12) Hole Radius of Torus

Open Calculator

fx $$r_{\text{Hole}} = r - r_{\text{Circular Section}}$$

ex $$2\text{m} = 10\text{m} - 8\text{m}$$

13) Hole Radius of Torus given Radius and Volume

Open Calculator

fx $$r_{\text{Hole}} = r - \left(\sqrt{\frac{V}{2 \cdot \pi^2 \cdot r}} \right)$$

ex $$2.010485\text{m} = 10\text{m} - \left(\sqrt{\frac{12600\text{m}^3}{2 \cdot \pi^2 \cdot 10\text{m}}} \right)$$

Radius of Circular Section of Torus

14) Radius of Circular Section of Torus

Open Calculator

fx $r_{\text{Circular Section}} = r - r_{\text{Hole}}$

ex $8\text{m} = 10\text{m} - 2\text{m}$

15) Radius of Circular Section of Torus given Radius and Volume

Open Calculator

fx $r_{\text{Circular Section}} = \sqrt{\frac{V}{2 \cdot \pi^2 \cdot r}}$

ex $7.989515\text{m} = \sqrt{\frac{12600\text{m}^3}{2 \cdot \pi^2 \cdot 10\text{m}}}$

Radius of Torus

16) Radius of Torus

Open Calculator

fx $r = r_{\text{Hole}} + r_{\text{Circular Section}}$

ex $10\text{m} = 2\text{m} + 8\text{m}$

17) Radius of Torus given Hole Radius and Surface to Volume Ratio

Open Calculator

fx $r = r_{\text{Hole}} + \frac{2}{R_{A/V}}$

ex $10\text{m} = 2\text{m} + \frac{2}{0.25\text{m}^{-1}}$

18) Radius of Torus given Radius of Circular Section and Total Surface Area

Open Calculator

fx $$r = \frac{TSA}{4 \cdot (\pi^2) \cdot r_{Circular\ Section}}$$

ex $$10.13212m = \frac{3200m^2}{4 \cdot (\pi^2) \cdot 8m}$$

19) Radius of Torus given Radius of Circular Section and Volume

Open Calculator

fx $$r = \frac{V}{2 \cdot \pi^2 \cdot r_{Circular\ Section}^2}$$

ex $$9.973804m = \frac{12600m^3}{2 \cdot \pi^2 \cdot (8m)^2}$$

Torus Sector

20) Lateral Surface Area of Torus Sector

Open Calculator

fx $$LSA_{Sector} = \left(4 \cdot (\pi^2) \cdot (r) \cdot (r_{Circular\ Section}) \cdot \left(\frac{\angle_{Intersection}}{2 \cdot \pi}\right)\right)$$

ex $$263.1895m^2 = \left(4 \cdot (\pi^2) \cdot (10m) \cdot (8m) \cdot \left(\frac{30^\circ}{2 \cdot \pi}\right)\right)$$

21) Lateral Surface Area of Torus Sector given Volume

Open Calculator

fx $$LSA_{Sector} = 2 \cdot \left(\frac{V_{Sector}}{r_{Circular\ Section}}\right)$$

ex $$262.5m^2 = 2 \cdot \left(\frac{1050m^3}{8m}\right)$$

22) Radius of Circular Section of Torus given Lateral Surface Area of Torus Sector

Open Calculator

fx $$r_{\text{Circular Section}} = \left(\frac{LSA_{\text{Sector}}}{4 \cdot (\pi^2) \cdot (r) \cdot \left(\frac{\angle_{\text{Intersection}}}{2 \cdot \pi} \right)} \right)$$

ex $$7.903052\text{m} = \left(\frac{260\text{m}^2}{4 \cdot (\pi^2) \cdot (10\text{m}) \cdot \left(\frac{30^\circ}{2 \cdot \pi} \right)} \right)$$

23) Radius of Circular Section of Torus given Volume of Torus Sector

Open Calculator

fx $$r_{\text{Circular Section}} = \sqrt{\frac{V_{\text{Sector}}}{2 \cdot (\pi^2) \cdot (r) \cdot \left(\frac{\angle_{\text{Intersection}}}{2 \cdot \pi} \right)}}$$

ex $$7.989515\text{m} = \sqrt{\frac{1050\text{m}^3}{2 \cdot (\pi^2) \cdot (10\text{m}) \cdot \left(\frac{30^\circ}{2 \cdot \pi} \right)}}$$

24) Total Surface Area of Torus Sector

Open Calculator

fx $$TSA_{\text{Sector}} = \left(LSA_{\text{Sector}} + \left(2 \cdot \pi \cdot \left(r_{\text{Circular Section}}^2 \right) \right) \right)$$

ex $$662.1239\text{m}^2 = \left(260\text{m}^2 + \left(2 \cdot \pi \cdot \left((8\text{m})^2 \right) \right) \right)$$

25) Total Surface Area of Torus Sector given Lateral Surface Area and Radius

fx

Open Calculator

$$TSA_{\text{Sector}} = \left(LSA_{\text{Sector}} + \left(2 \cdot \pi \cdot \left(\left(\frac{LSA_{\text{Sector}}}{4 \cdot (\pi^2) \cdot (r) \cdot \left(\frac{\angle_{\text{Intersection}}}{2 \cdot \pi} \right)} \right)^2 \right) \right) \right)$$

ex $$652.4367\text{m}^2 = \left(260\text{m}^2 + \left(2 \cdot \pi \cdot \left(\left(\frac{260\text{m}^2}{4 \cdot (\pi^2) \cdot (10\text{m}) \cdot \left(\frac{30^\circ}{2 \cdot \pi} \right)} \right)^2 \right) \right) \right)$$

26) Volume of Torus Sector

Open Calculator

$$V_{Sector} = \left(2 \cdot \left(\pi^2\right) \cdot (r) \cdot \left(r^2_{Circular\ Section}\right) \cdot \left(\frac{\angle_{Intersection}}{2 \cdot \pi}\right)\right)$$

$$1052.758\text{m}^3 = \left(2 \cdot \left(\pi^2\right) \cdot (10\text{m}) \cdot \left((8\text{m})^2\right) \cdot \left(\frac{30^\circ}{2 \cdot \pi}\right)\right)$$

27) Volume of Torus Sector given Lateral Surface Area

Open Calculator

$$V_{Sector} = \frac{r_{Circular\ Section} \cdot LSA_{Sector}}{2}$$

$$1040\text{m}^3 = \frac{8\text{m} \cdot 260\text{m}^2}{2}$$

28) Volume of Torus Sector given Lateral Surface Area and Total Surface Area

Open Calculator

$$V_{Sector} = \left(2 \cdot \left(\pi^2\right) \cdot (r) \cdot \left(\frac{TSA_{Sector} - LSA_{Sector}}{2 \cdot \pi}\right) \cdot \left(\frac{\angle_{Intersection}}{2 \cdot \pi}\right)\right)$$

$$1073.377\text{m}^3 = \left(2 \cdot \left(\pi^2\right) \cdot (10\text{m}) \cdot \left(\frac{670\text{m}^2 - 260\text{m}^2}{2 \cdot \pi}\right) \cdot \left(\frac{30^\circ}{2 \cdot \pi}\right)\right)$$

Variables Used

- $\angle_{Intersection}$ Angle of Intersection of Torus Sector *(Degree)*
- **b** Breadth of Torus *(Meter)*
- LSA_{Sector} Lateral Surface Area of Torus Sector *(Square Meter)*
- **r** Radius of Torus *(Meter)*
- $R_{A/V}$ Surface to Volume Ratio of Torus *(1 per Meter)*
- $r_{Circular\ Section}$ Radius of Circular Section of Torus *(Meter)*
- r_{Hole} Hole Radius of Torus *(Meter)*
- **TSA** Total Surface Area of Torus *(Square Meter)*
- TSA_{Sector} Total Surface Area of Torus Sector *(Square Meter)*
- **V** Volume of Torus *(Cubic Meter)*
- V_{Sector} Volume of Torus Sector *(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 (m^3)
  Volume Unit Conversion
- Measurement: **Area** in Square Meter (m^2)
  Area Unit Conversion
- Measurement: **Angle** in Degree (°)
  Angle Unit Conversion
- Measurement: **Reciprocal Length** in 1 per Meter (m^{-1})
  Reciprocal Length 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
- Double Calotte Formulas
- Double Point Formulas
- Ellipsoid Formulas
- Elliptic Cylinder Formulas
- 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 Tetrahedron Formulas
- Hemisphere Formulas
- Hollow Cuboid Formulas
- Hollow Cylinder Formulas
- Hollow Frustum Formulas
- Hollow Hemisphere 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
- Skewed Three Edged Prism 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
- Star Pyramid Formulas
- Stellated Octahedron Formulas
- Toroid Formulas
- Torus Formulas
- Trirectangular Tetrahedron Formulas
- Truncated Rhombohedron Formulas

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