Important Formulas of Annulus PDF

Formulas
Examples
with Units

List of 25
Important Formulas of Annulus

1) Annulus Formulas

1.1) Area of Annulus Formulas

1.1.1) Area of Annulus Formula

Evaluate Formula

Formula

$$A = \pi \cdot \left(r_{Outer}^{2} - r_{Inner}^{2} \right)$$

Example with Units

$$201.0619\,m^2 = 3.1416 \cdot \left(10\,m^{2} - 6\,m^{2} \right)$$

1.1.2) Area of Annulus given Breadth and Inner Circle Radius Formula

Evaluate Formula

Formula

$$A = \pi \cdot b \cdot \left(b + 2 \cdot r_{Inner} \right)$$

Example with Units

$$201.0619\,m^2 = 3.1416 \cdot 4\,m \cdot \left(4\,m + 2 \cdot 6\,m \right)$$

1.1.3) Area of Annulus given Breadth and Outer Circle Radius Formula

Evaluate Formula

Formula

$$A = \pi \cdot b \cdot \left(2 \cdot r_{Outer} - b \right)$$

Example with Units

$$201.0619\,m^2 = 3.1416 \cdot 4\,m \cdot \left(2 \cdot 10\,m - 4\,m \right)$$

1.2) Breadth of Annulus Formulas

1.2.1) Breadth of Annulus Formula

Evaluate Formula

Formula

$$b = r_{Outer} - r_{Inner}$$

Example with Units

$$4\,m = 10\,m - 6\,m$$

1.2.2) Breadth of Annulus given Area and Inner Circle Radius Formula

Evaluate Formula

Formula

$$b = \sqrt{\frac{A}{\pi} + r_{Inner}^{2}} - r_{Inner}$$

Example with Units

$$3.9831\,m = \sqrt{\frac{200\,m^2}{3.1416} + 6\,m^{2}} - 6\,m$$

1.2.3) Breadth of Annulus given Area and Outer Circle Radius Formula

Evaluate Formula

Formula

$$b = r_{Outer} - \sqrt{r_{Outer}^{2} - \frac{A}{\pi}}$$

Example with Units

$$3.9719\,m = 10\,m - \sqrt{10\,m^{2} - \frac{200\,m^2}{3.1416}}$$

1.3) Longest Interval of Annulus Formulas

1.3.1) Longest Interval of Annulus Formula

Evaluate Formula

Formula

$$l = 2 \cdot \sqrt{r_{Outer}^2 - r_{Inner}^2}$$

Example with Units

$$16\,m = 2 \cdot \sqrt{10\,m^2 - 6\,m^2}$$

1.3.2) Longest Interval of Annulus given Breadth and Inner Circle Radius Formula

Evaluate Formula

Formula

$$l = 2 \cdot \sqrt{b \cdot \left(b + 2 \cdot r_{Inner} \right)}$$

Example with Units

$$16\,m = 2 \cdot \sqrt{4\,m \cdot \left(4\,m + 2 \cdot 6\,m \right)}$$

1.3.3) Longest Interval of Annulus given Breadth and Outer Circle Radius Formula

Evaluate Formula

Formula

$$l = 2 \cdot \sqrt{b \cdot \left(2 \cdot r_{Outer} - b \right)}$$

Example with Units

$$16\,m = 2 \cdot \sqrt{4\,m \cdot \left(2 \cdot 10\,m - 4\,m \right)}$$

1.4) Perimeter of Annulus Formulas

1.4.1) Perimeter of Annulus Formula

Evaluate Formula

Formula

$$P = 2 \cdot \pi \cdot \left(r_{Outer} + r_{Inner} \right)$$

Example with Units

$$100.531\,m = 2 \cdot 3.1416 \cdot \left(10\,m + 6\,m \right)$$

1.4.2) Perimeter of Annulus given Breadth and Inner Circle Radius Formula

Evaluate Formula

Formula

$$P = 2 \cdot \pi \cdot \left(b + 2 \cdot r_{Inner} \right)$$

Example with Units

$$100.531\,m = 2 \cdot 3.1416 \cdot \left(4\,m + 2 \cdot 6\,m \right)$$

1.4.3) Perimeter of Annulus given Breadth and Outer Circle Radius Formula

Evaluate Formula

Formula

$$P = 2 \cdot \pi \cdot \left(2 \cdot r_{Outer} - b \right)$$

Example with Units

$$100.531\,m = 2 \cdot 3.1416 \cdot \left(2 \cdot 10\,m - 4\,m \right)$$

1.5) Radius of Annulus Formulas

1.5.1) Radius of Inner Circle of Annulus given Area and Breadth Formula

Evaluate Formula

Formula

$$r_{Inner} = \frac{\left(\frac{\left(\frac{A}{\pi} \right)}{b} \right) - b}{2}$$

Example with Units

$$5.9577\,m = \frac{\left(\frac{\left(\frac{200\,m^2}{3.1416} \right)}{4\,m} \right) - 4\,m}{2}$$

1.5.2) Radius of Inner Circle of Annulus given Outer Circle Radius and Area Formula

Evaluate Formula

Formula

$$r_{Inner} = \sqrt{r_{Outer}^2 - \frac{A}{\pi}}$$

Example with Units

$$6.0281\,m = \sqrt{10\,m^2 - \frac{200\,m^2}{3.1416}}$$

1.5.3) Radius of Inner Circle of Annulus given Outer Circle Radius and Breadth Formula

Evaluate Formula

Formula

$$r_{Inner} = r_{Outer} - b$$

Example with Units

$$6\,m = 10\,m - 4\,m$$

1.5.4) Radius of Outer Circle of Annulus given Area and Breadth Formula

Evaluate Formula

Formula

$$r_{Outer} = \frac{\left(\frac{\left(\frac{A}{\pi}\right)}{b}\right) + b}{2}$$

Example with Units

$$9.9577\,m = \frac{\left(\frac{\left(\frac{200\,m^2}{3.1416}\right)}{4\,m}\right) + 4\,m}{2}$$

1.5.5) Radius of Outer Circle of Annulus given Inner Circle Radius and Area Formula

Evaluate Formula

Formula

$$r_{Outer} = \sqrt{\frac{A}{\pi} + r_{Inner}^2}$$

Example with Units

$$9.9831\,m = \sqrt{\frac{200\,m^2}{3.1416} + 6\,m^2}$$

1.5.6) Radius of Outer Circle of Annulus given Inner Circle Radius and Breadth Formula

Evaluate Formula

Formula

$$r_{Outer} = b + r_{Inner}$$

Example with Units

$$10\,m = 4\,m + 6\,m$$

2) Annulus Sector Formulas

2.1) Area of Annulus Sector Formula

Evaluate Formula

Formula

$$A_{Sector} = \left(r_{Outer}^2 - r_{Inner}^2\right) \cdot \frac{\angle_{Central(Sector)}}{2}$$

Example with Units

$$16.7552\,m^2 = \left(10\,m^2 - 6\,m^2\right) \cdot \frac{30°}{2}$$

2.2) Central Angle of Annulus Sector given Inner Arc Length Formula

Evaluate Formula

Formula

$$\angle_{Central(Sector)} = \frac{l_{Inner\ Arc(Sector)}}{r_{Inner}}$$

Example with Units

$$28.6479° = \frac{3\,m}{6\,m}$$

2.3) Central Angle of Annulus Sector given Outer Arc Length Formula

Evaluate Formula

Formula

$$\angle_{Central(Sector)} = \frac{l_{Outer\ Arc(Sector)}}{r_{Outer}}$$

Example with Units

$$28.6479° = \frac{5\,m}{10\,m}$$

2.4) Diagonal of Annulus Sector Formula

Evaluate Formula

Formula

$$d_{Sector} = \sqrt{r_{Outer}^2 + r_{Inner}^2 - 2 \cdot r_{Outer} \cdot r_{Inner} \cdot \cos\left(\angle_{Central(Sector)}\right)}$$

Example with Units

$$5.6637\,m = \sqrt{10\,m^2 + 6\,m^2 - 2 \cdot 10\,m \cdot 6\,m \cdot \cos\left(30°\right)}$$

2.5) Inner Arc Length of Annulus Sector Formula

Evaluate Formula

Formula

$$l_{Inner\ Arc(Sector)} = r_{Inner} \cdot \angle_{Central(Sector)}$$

Example with Units

$$3.1416\,m = 6\,m \cdot 30°$$

2.6) Outer Arc Length of Annulus Sector Formula

Evaluate Formula

Formula

$$l_{Outer\ Arc(Sector)} = r_{Outer} \cdot \angle_{Central(Sector)}$$

Example with Units

$$5.236\,m = 10\,m \cdot 30°$$

2.7) Perimeter of Annulus Sector Formula

Evaluate Formula

Formula

$$P_{Sector} = l_{Outer\ Arc(Sector)} + l_{Inner\ Arc(Sector)} + \left(2 \cdot b\right)$$

Example with Units

$$16\,m = 5\,m + 3\,m + \left(2 \cdot 4\,m\right)$$

Variables used in list of Important Formulas of Annulus above

- $\angle_{Central(Sector)}$ Central Angle of Annulus Sector *(Degree)*
- A Area of Annulus *(Square Meter)*
- A_{Sector} Area of Annulus Sector *(Square Meter)*
- b Breadth of Annulus *(Meter)*
- d_{Sector} Diagonal of Annulus Sector *(Meter)*
- l Longest Interval of Annulus *(Meter)*
- $l_{Inner\ Arc(Sector)}$ Inner Arc Length of Annulus Sector *(Meter)*
- $l_{Outer\ Arc(Sector)}$ Outer Arc Length of Annulus Sector *(Meter)*
- P Perimeter of Annulus *(Meter)*
- P_{Sector} Perimeter of Annulus Sector *(Meter)*
- r_{Inner} Inner Circle Radius of Annulus *(Meter)*
- r_{Outer} Outer Circle Radius of Annulus *(Meter)*

Constants, Functions, Measurements used in list of Important Formulas of Annulus above

- constant(s): **pi**, 3.14159265358979323846264338327950288 *Archimedes' constant*
- Functions: **cos**, cos(Angle) *Cosine of an angle is the ratio of the side adjacent to the angle to the hypotenuse of the triangle.*
- 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: **Area** in Square Meter (m²) *Area Unit Conversion*
- Measurement: **Angle** in Degree (°) *Angle Unit Conversion*

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