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# Important Formulas of Annulus

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# List of 25 Important Formulas of Annulus

## Important Formulas of Annulus

### Annulus

#### Area of Annulus

##### 1) Area of Annulus

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

[Open Calculator !\[\]\(3211b5d1d968fc1665909b34f9f16010\_img.jpg\)](#)

$$\text{ex } 201.0619\text{m}^2 = \pi \cdot ((10\text{m})^2 - (6\text{m})^2)$$

##### 2) Area of Annulus given Breadth and Inner Circle Radius

$$\text{fx } A = \pi \cdot b \cdot (b + 2 \cdot r_{\text{Inner}})$$

[Open Calculator !\[\]\(9c2e8d1b5bd77cb5c9f83b7a9cff79fd\_img.jpg\)](#)

$$\text{ex } 201.0619\text{m}^2 = \pi \cdot 4\text{m} \cdot (4\text{m} + 2 \cdot 6\text{m})$$

##### 3) Area of Annulus given Breadth and Outer Circle Radius

$$\text{fx } A = \pi \cdot b \cdot (2 \cdot r_{\text{Outer}} - b)$$

[Open Calculator !\[\]\(235bfe13ebf007ce2eea9e689707fac7\_img.jpg\)](#)

$$\text{ex } 201.0619\text{m}^2 = \pi \cdot 4\text{m} \cdot (2 \cdot 10\text{m} - 4\text{m})$$



## Breadth of Annulus

### 4) Breadth of Annulus

$$fx \quad b = r_{Outer} - r_{Inner}$$

[Open Calculator !\[\]\(a03a7eb2f4046e1d3c76772003e549ea\_img.jpg\)](#)

$$ex \quad 4m = 10m - 6m$$

### 5) Breadth of Annulus given Area and Inner Circle Radius

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

[Open Calculator !\[\]\(5361750c22c4e047a52f4eac1ec2d4cc\_img.jpg\)](#)

$$ex \quad 3.983085m = \sqrt{\frac{200m^2}{\pi} + (6m)^2} - (6m)$$

### 6) Breadth of Annulus given Area and Outer Circle Radius

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

[Open Calculator !\[\]\(b792654f2cef9719eabeb6c5be00811e\_img.jpg\)](#)

$$ex \quad 3.971897m = (10m) - \sqrt{(10m)^2 - \frac{200m^2}{\pi}}$$

## Longest Interval of Annulus

### 7) Longest Interval of Annulus

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

[Open Calculator !\[\]\(28f72b996fc97883dfd9d4e8b1b16b4e\_img.jpg\)](#)

$$ex \quad 16m = 2 \cdot \sqrt{(10m)^2 - (6m)^2}$$




8) Longest Interval of Annulus given Breadth and Inner Circle Radius 

$$fx \quad l = 2 \cdot \sqrt{b \cdot (b + 2 \cdot r_{Inner})}$$

[Open Calculator !\[\]\(e78f798d4ea5c530c9db49e7d26e6b95\_img.jpg\)](#)


$$ex \quad 16m = 2 \cdot \sqrt{4m \cdot (4m + 2 \cdot 6m)}$$

9) Longest Interval of Annulus given Breadth and Outer Circle Radius 

$$fx \quad l = 2 \cdot \sqrt{b \cdot (2 \cdot r_{Outer} - b)}$$

[Open Calculator !\[\]\(05be7c7a8995decd503647c99211f7c2\_img.jpg\)](#)

$$ex \quad 16m = 2 \cdot \sqrt{4m \cdot (2 \cdot 10m - 4m)}$$

Perimeter of Annulus 10) Perimeter of Annulus 

$$fx \quad P = 2 \cdot \pi \cdot (r_{Outer} + r_{Inner})$$

[Open Calculator !\[\]\(626ce8ac21792b9405bfddfea8e0c96a\_img.jpg\)](#)

$$ex \quad 100.531m = 2 \cdot \pi \cdot (10m + 6m)$$

11) Perimeter of Annulus given Breadth and Inner Circle Radius 

$$fx \quad P = 2 \cdot \pi \cdot (b + 2 \cdot r_{Inner})$$

[Open Calculator !\[\]\(c1168d6a8b365d11e842ece304635fa7\_img.jpg\)](#)

$$ex \quad 100.531m = 2 \cdot \pi \cdot (4m + 2 \cdot 6m)$$

12) Perimeter of Annulus given Breadth and Outer Circle Radius 

$$fx \quad P = 2 \cdot \pi \cdot (2 \cdot r_{Outer} - b)$$

[Open Calculator !\[\]\(ccd39a0dc6d5afcc151e1371f9462f58\_img.jpg\)](#)

$$ex \quad 100.531m = 2 \cdot \pi \cdot (2 \cdot 10m - 4m)$$



## Radius of Annulus

### 13) Radius of Inner Circle of Annulus given Area and Breadth

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

[Open Calculator !\[\]\(74d4806277d7e73349d8e8c0897931e9\_img.jpg\)](#)

$$\text{ex } 5.957747\text{m} = \frac{\left(\frac{\left(\frac{200\text{m}^2}{\pi}\right)}{4\text{m}}\right) - 4\text{m}}{2}$$

### 14) Radius of Inner Circle of Annulus given Outer Circle Radius and Area

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

[Open Calculator !\[\]\(8bba887393ca45b761e5cb49e755e762\_img.jpg\)](#)

$$\text{ex } 6.028103\text{m} = \sqrt{(10\text{m})^2 - \frac{200\text{m}^2}{\pi}}$$


### 15) Radius of Inner Circle of Annulus given Outer Circle Radius and Breadth

$$\text{fx } r_{\text{Inner}} = r_{\text{Outer}} - b$$

[Open Calculator !\[\]\(0fb13ad0bfa3d86868cdd3883e5665b3\_img.jpg\)](#)


$$\text{ex } 6\text{m} = 10\text{m} - 4\text{m}$$



16) Radius of Outer Circle of Annulus given Area and Breadth Open Calculator 

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

$$ex \quad 9.957747m = \frac{\left(\frac{\left(\frac{200m^2}{\pi}\right)}{4m}\right) + 4m}{2}$$

17) Radius of Outer Circle of Annulus given Inner Circle Radius and Area Open Calculator 

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

$$ex \quad 9.983085m = \sqrt{\frac{200m^2}{\pi} + (6m)^2}$$

18) Radius of Outer Circle of Annulus given Inner Circle Radius and Breadth Open Calculator 

$$fx \quad r_{Outer} = b + r_{Inner}$$

$$ex \quad 10m = 4m + 6m$$



## Annulus Sector

### 19) Area of Annulus Sector

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

[Open Calculator !\[\]\(83f22ed94ec5517769dd76d702c6bfd8\_img.jpg\)](#)

$$\text{ex } 16.75516\text{m}^2 = ((10\text{m})^2 - (6\text{m})^2) \cdot \frac{30^\circ}{2}$$

### 20) Central Angle of Annulus Sector given Inner Arc Length

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

[Open Calculator !\[\]\(3cb60d42b10e53f9522bb0b392c1c4cd\_img.jpg\)](#)

$$\text{ex } 28.64789^\circ = \frac{3\text{m}}{6\text{m}}$$

### 21) Central Angle of Annulus Sector given Outer Arc Length

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

[Open Calculator !\[\]\(0d7ca0919e6c47bbd874bfa0189fe22e\_img.jpg\)](#)

$$\text{ex } 28.64789^\circ = \frac{5\text{m}}{10\text{m}}$$

### 22) Diagonal of Annulus Sector

**fx**
[Open Calculator !\[\]\(683dba75afe26e28cd4de5730b776760\_img.jpg\)](#)

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

$$\text{ex } 5.663652\text{m} = \sqrt{(10\text{m})^2 + (6\text{m})^2 - 2 \cdot (10\text{m}) \cdot (6\text{m}) \cdot \cos(30^\circ)}$$



### 23) Inner Arc Length of Annulus Sector

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

[Open Calculator !\[\]\(6605b201d6f14d9b3bcb8ab5f274d107\_img.jpg\)](#)

$$ex \quad 3.141593m = 6m \cdot 30^\circ$$

### 24) Outer Arc Length of Annulus Sector

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

[Open Calculator !\[\]\(e8fb589d58dad1692debababa5e928b6\_img.jpg\)](#)

$$ex \quad 5.235988m = 10m \cdot 30^\circ$$

### 25) Perimeter of Annulus Sector

**fx**[Open Calculator !\[\]\(4688aadfd656ded00cd6bdfae55089a9\_img.jpg\)](#)

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

$$ex \quad 16m = 5m + 3m + (2 \cdot 4m)$$








## Variables Used

- $\angle$ Central(Sector) Central Angle of Annulus Sector (Degree)
- **A** Area of Annulus (Square Meter)
- **A<sub>Sector</sub>** Area of Annulus Sector (Square Meter)
- **b** Breadth of Annulus (Meter)
- **d<sub>Sector</sub>** Diagonal of Annulus Sector (Meter)
- **l** Longest Interval of Annulus (Meter)
- **l<sub>Inner Arc(Sector)</sub>** Inner Arc Length of Annulus Sector (Meter)
- **l<sub>Outer Arc(Sector)</sub>** Outer Arc Length of Annulus Sector (Meter)
- **P** Perimeter of Annulus (Meter)
- **P<sub>Sector</sub>** Perimeter of Annulus Sector (Meter)
- **r<sub>Inner</sub>** Inner Circle Radius of Annulus (Meter)
- **r<sub>Outer</sub>** Outer Circle Radius of Annulus (Meter)



## Constants, Functions, Measurements used

- **Constant:** **pi**, 3.14159265358979323846264338327950288  
*Archimedes' constant*
- **Function:** **cos**,  $\cos(\text{Angle})$   
*Trigonometric cosine function*
- **Function:** **sqrt**,  $\sqrt{\text{Number}}$   
*Square root function*
- **Measurement:** **Length** in Meter (m)  
*Length Unit Conversion* 
- **Measurement:** **Area** in Square Meter (m<sup>2</sup>)  
*Area Unit Conversion* 
- **Measurement:** **Angle** in Degree (°)  
*Angle Unit Conversion* 



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