

Shaded area: Calculated Area

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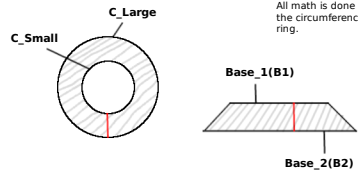
Red line: Distance between circles(d)/height of trapezoid(h)

Blue line: Radius of Circle(r)/Height of Triangle(h)

$$\text{Area of trapezoid} = 1/2 * h * (b_1 + b_2)$$

$$\text{Area of ring} = A_{\text{Large}} - A_{\text{Small}}$$

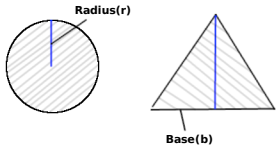
$$\text{Distance between Circles} = r_{\text{Large}} - r_{\text{Small}}$$



All math is done assuming one only knows the circumferences of the two circles in the ring.

Assume the distance between the circles to be equal to the height of the trapezoid, and the circumferences to be equal to the bases, large to large, and small to small.

$$\text{Distance between Circles} = (C_{\text{Large}} / (2\pi)) - (C_{\text{Small}} / (2\pi))$$



Assume the circumference of the circle to be equal to the base of the triangle, and the radius of the circle to the height of the triangle.

$$\begin{aligned} \text{Area of Triangle/Circle} &= 1/2 * b * h \\ &= 1/2 * C * r \\ &= 1/2 * 2 * \pi * r * r \\ &= \pi * r * r \\ &= \pi * r^2 \end{aligned}$$

$$\begin{aligned} \text{Area of Trapezoid/Ring} &= 1/2 * h * (b_1 + b_2) \\ &= 1/2 * d * (C_{\text{Large}} + C_{\text{Small}}) \\ 2A &= d * (C_{\text{Large}} + C_{\text{Small}}) \\ 2A &= ((C_{\text{Large}} / (2\pi)) - (C_{\text{Small}} / (2\pi))) * (C_{\text{Large}} + C_{\text{Small}}) \\ 2A &= ((C_{\text{Large}} - C_{\text{Small}}) / (2\pi)) * (C_{\text{Large}} + C_{\text{Small}}) \\ 4\pi A &= (C_{\text{Large}} - C_{\text{Small}}) * (C_{\text{Large}} + C_{\text{Small}}) \\ 4\pi A &= (C_{\text{Large}}^2 - C_{\text{Small}}^2) + (C_{\text{Large}} * C_{\text{Small}}) - (C_{\text{Large}} * C_{\text{Small}}) - (C_{\text{Small}}^2) \\ 4\pi A &= (C_{\text{Large}}^2) - (C_{\text{Small}}^2) \\ A &= ((C_{\text{Large}}^2) - (C_{\text{Small}}^2)) / (4\pi) \end{aligned}$$

$$\text{Area of circle} = \pi * r^2$$

$$\text{Area of Triangle} = 1/2 * b * h$$

$$\text{Circumference of Circle} = 2 * \pi * r$$

$$\text{Radius from Circumference} = C / 2\pi$$