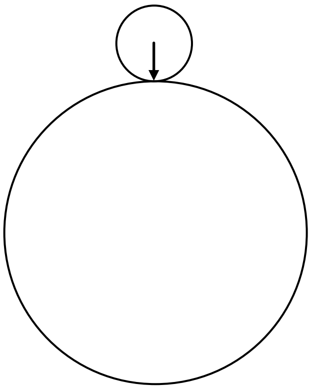
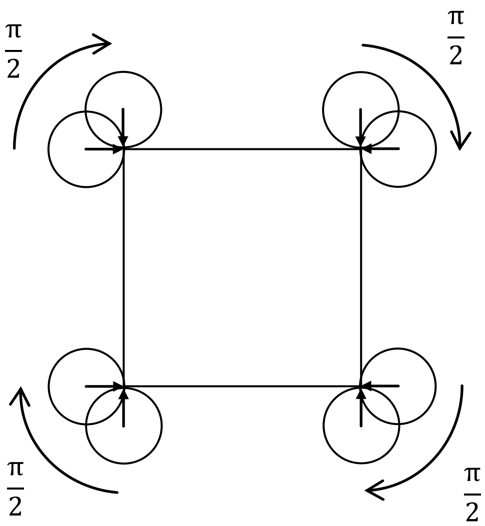
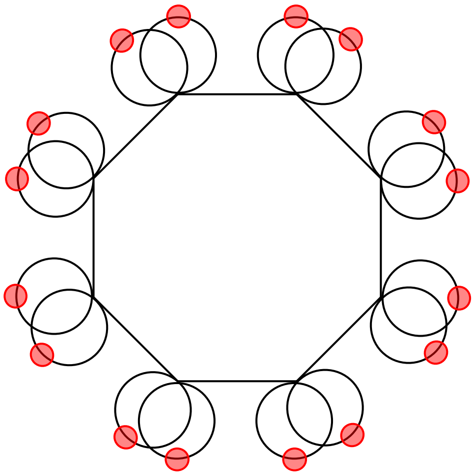
Proof1

George Z.

Polygon







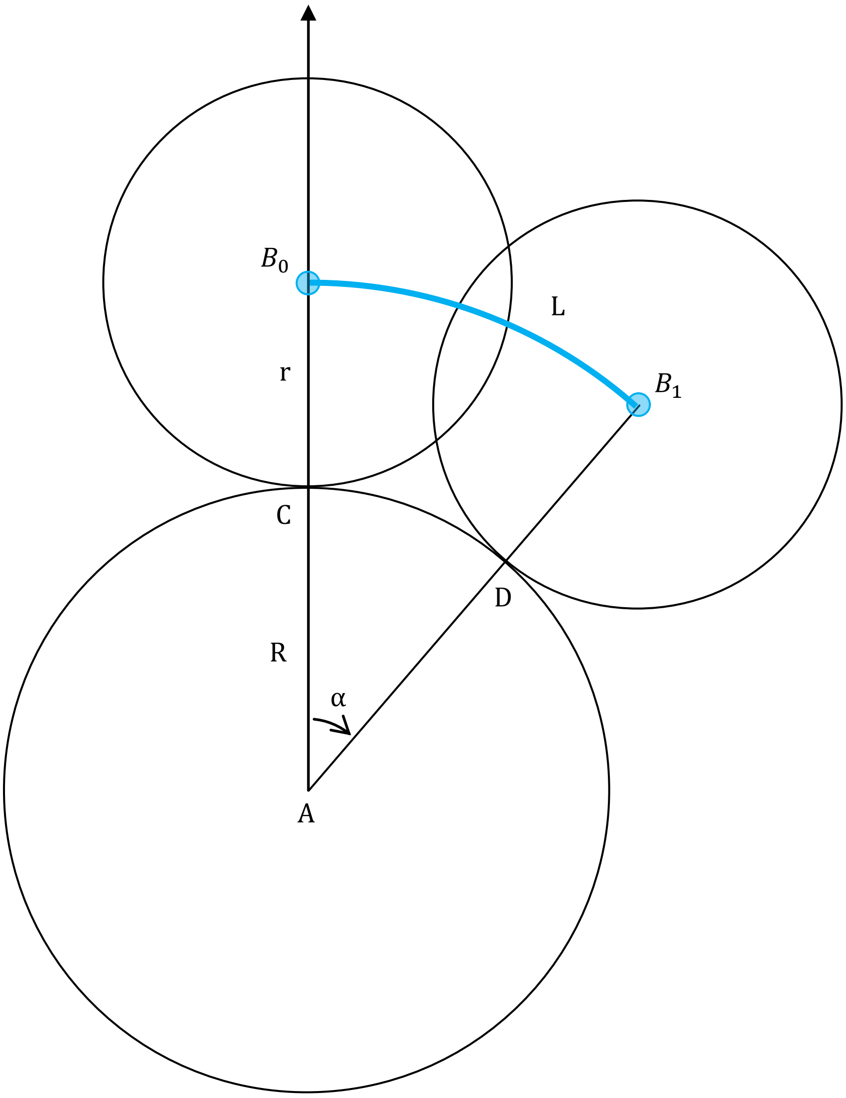
$\frac{\pi}{2} \times 4 = 2\pi$

$\frac{\pi}{4} \times 8 = 2\pi$

$\frac{2\pi}{n} \times n = 2\pi$ (1 revolution)

Proof2

SP M



A: center of large circle, B_0, B_1: center of small circle B

R: radius of A, r: radius of B

α: angle CAD, angle B_0AB_1 β: rotating angle of B

$$\text{arc } B_0B_1 = (R + r)\alpha = L = r\beta$$

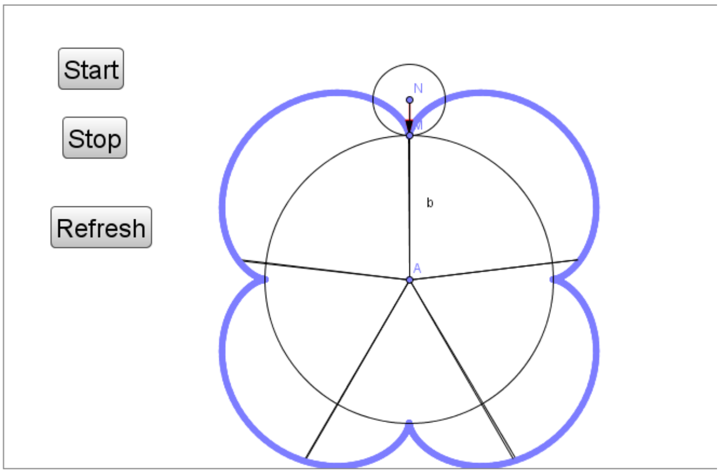
$$\beta = \frac{R + r}{r}\alpha = (\frac{R}{r} + 1)\alpha$$

Proof3

David Van Leeuwen

A question about a rolling circle.

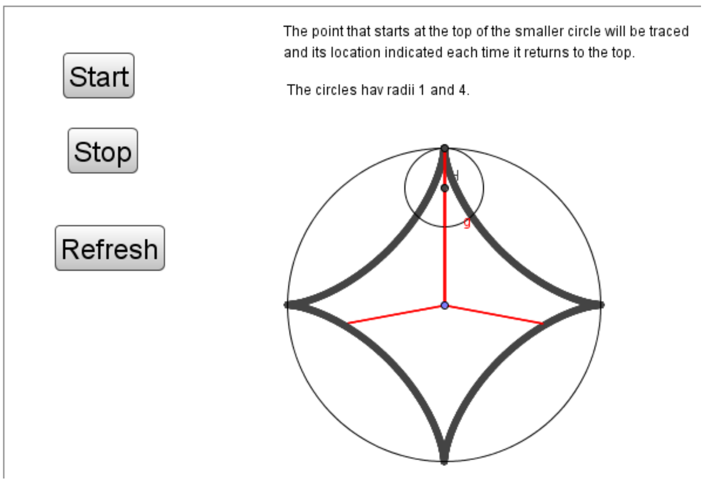
This was created in reply to a question from LinkedIn, asking as to the number of rotations of a circle of radius 1 as it rolls around a circle of radius 4. In this case the point that starts out at the bottom of the small circle is indicated each time it returns to the bottom of that circle.



http://www.geogebratube.org/student/m107691

circle rolling inside circle

In response to question from linkedin about a circle of radius 1 rolling inside a circle of radius 4.

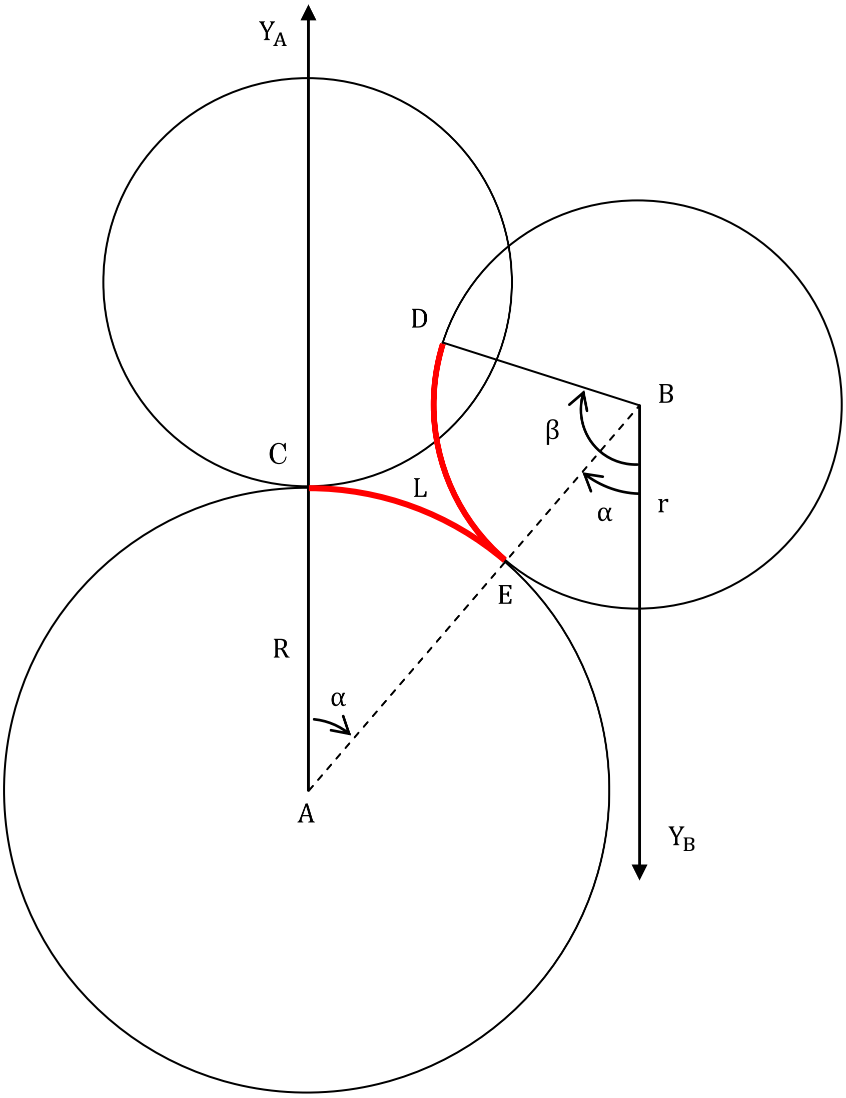


http://www.geogebratube.org/student/m108418

Proof4

Michael J Carroll

http://www.mijcar.com/myfiles/rotatingcirclescomplete.pdf



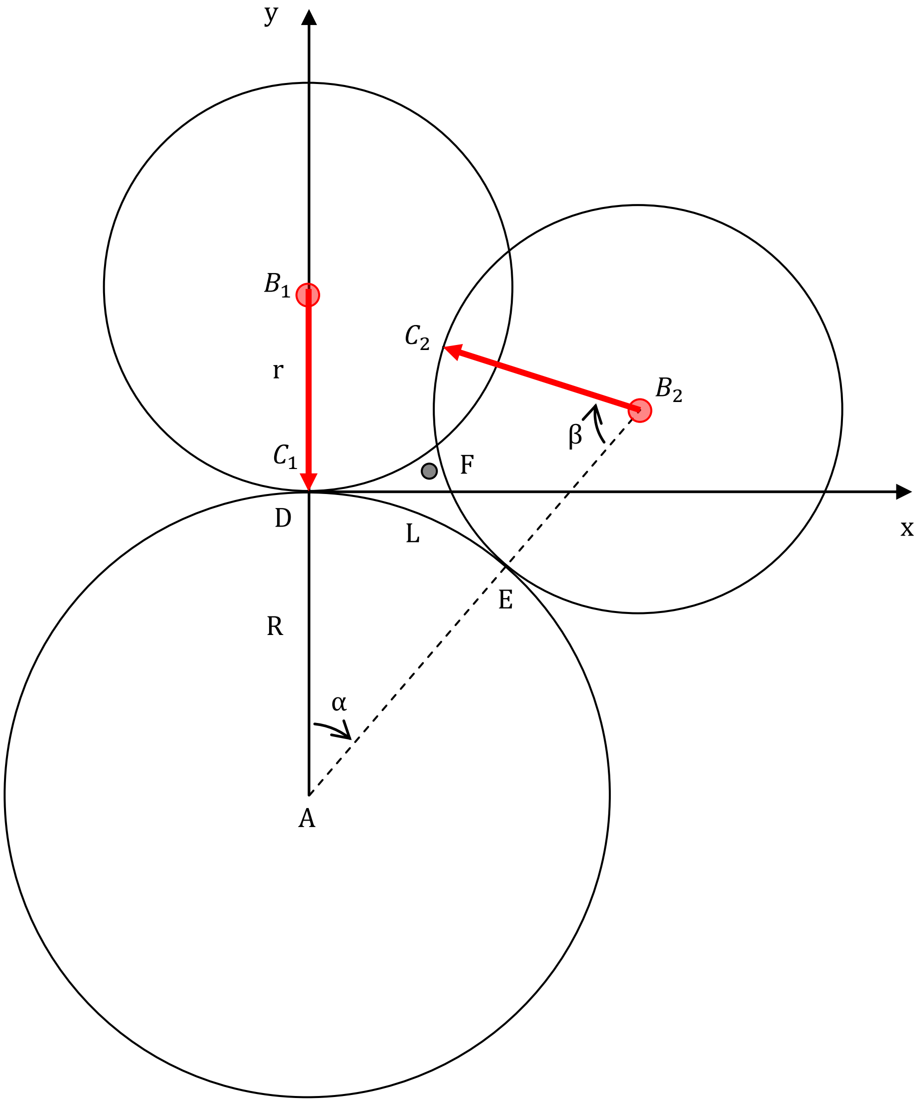
α = the angular position (in radians) of circle *B* relative to Y_A.

β = the rotation (in radians) of circle *B* relative to Y_B

$\text{arc CE} = R\alpha = L = \text{arc ED} = r(\beta - \alpha)$

$R\alpha = r(\beta - \alpha)$

$$\beta = \left(\frac{R}{r} + 1\right)\alpha$$



B_1, B_2: centers of small circle B,

C_1, C_2: bottoms of small circle B

point B_1 moves to point B_2, and point C_1 moves to point C_2.

arc $DE = R\alpha = L = r\beta =$ arc EC_2

angle of vector B_1C_1 and vector B_2C_2 is rotating angle of small circle B.

That is $\alpha + \beta$.

This translation is done by rotating B around the fixed point F.

fixed point F