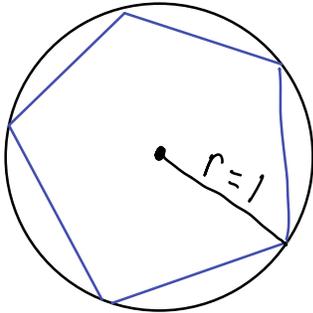


ARCHIMEDES

$$C = 2\pi r$$

In a unit circle, $r=1$. So, $C=2\pi$.

Dividing by 2 on both sides to solve for π yields:

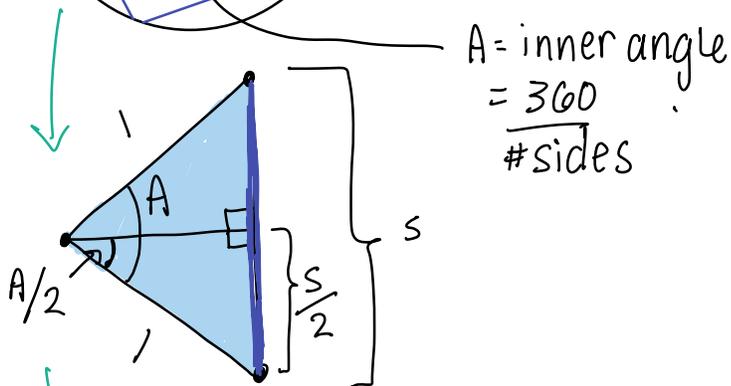
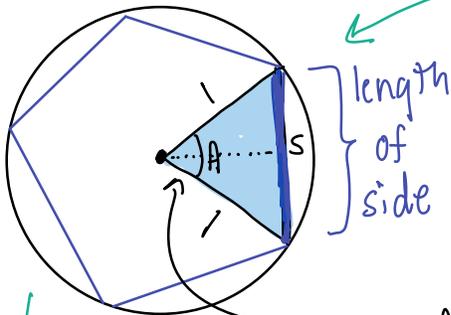


$$\pi = \frac{\text{circumference of circle}}{2}$$

$$\geq \frac{\text{circumference of polygon}}{2}$$

$$= \frac{\# \text{ sides} \times \text{length of side}}{2}$$

$$= \frac{\# \text{ sides} \times 2 \times \sin\left(\frac{360}{2 \times \# \text{ of sides}}\right)}{2}$$



$$\sin\left(\frac{A}{2}\right) = \frac{\text{opposite}}{\text{hypotenuse}} = \frac{s/2}{1} = \frac{s}{2}. \text{ Solving for } s:$$

$$\text{length of side} = s = 2 \times \sin\left(\frac{A}{2}\right) = 2 \times \sin\left(\frac{360}{2 \times \# \text{ of sides}}\right)$$