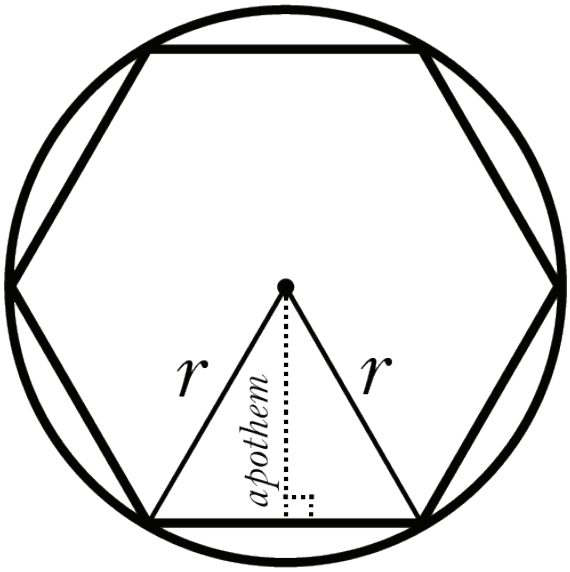
Quick Reference: Area of a Regular Polygon that's Inscribed in a Circle

- ***Regular*** means all the angles and side lengths of the polygon are the same
- ***Inscribed*** means all the vertices ("corners") of the polygon lie on the circle



In the following formulas:

- ***r*** is the **radius** of the circle
- ***n*** is the **number of sides** of the polygon (in the figure above, *n=6)*
- the ***apothem*** is the **perpendicular distance** from the center of the circle to any of the sides of the polygon

$$Area_{\substack{regular\\polygon}} = (\tfrac{1}{2})Perimeter \cdot apothem$$

$$Area_{\substack{regular\\polygon}} = n \cdot (apothem)^2 \cdot tan(\tfrac{180^\circ}{n})$$

$$Area_{\substack{regular\\polygon}} = \tfrac{n \cdot r^2}{2} \cdot sin(\tfrac{360^\circ}{n})$$