PROJECT
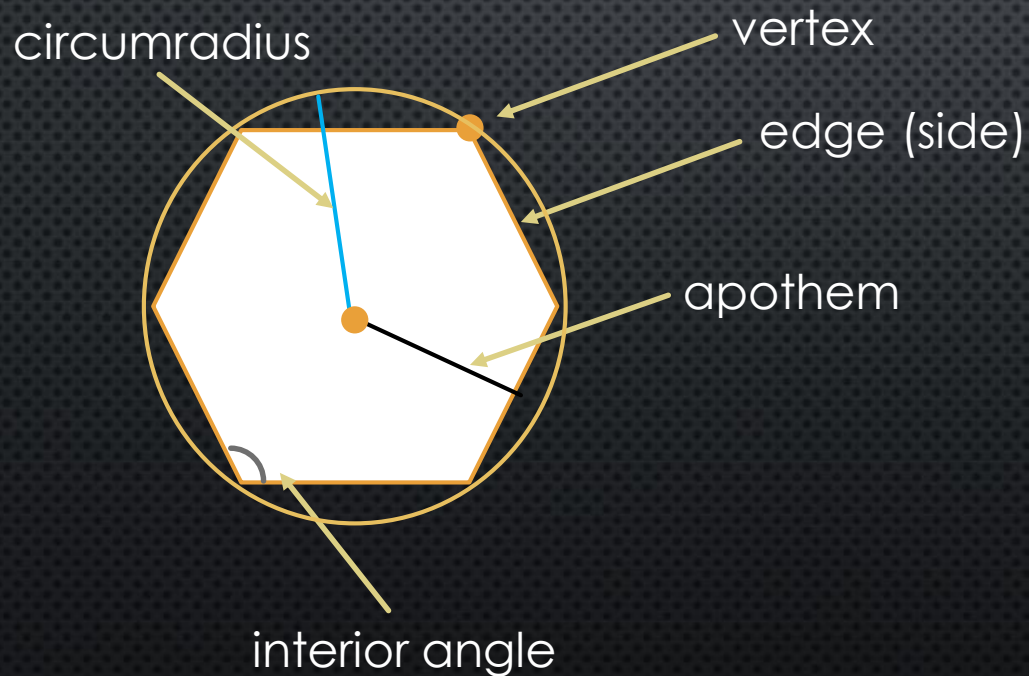
A regular strictly convex polygon is a polygon that has the following characteristics:

- all interior angles are less than 180°
- all sides have equal length

circumradius

vertex

edge (side)

apothem

interior angle

For a regular strictly convex polygon with

- n edges (= n vertices)
- R circumradius

interior angle $= (n - 2) \times \frac{180}{n}$

edge length $s = 2\,R\,\sin\left(\frac{\pi}{n}\right)$

apothem $a = R\,\cos\left(\frac{\pi}{n}\right)$

area $= \frac{1}{2}n\,s\,a$

perimeter $= n\,s$

circumradius

vertex

edge

R

s

apothem

a
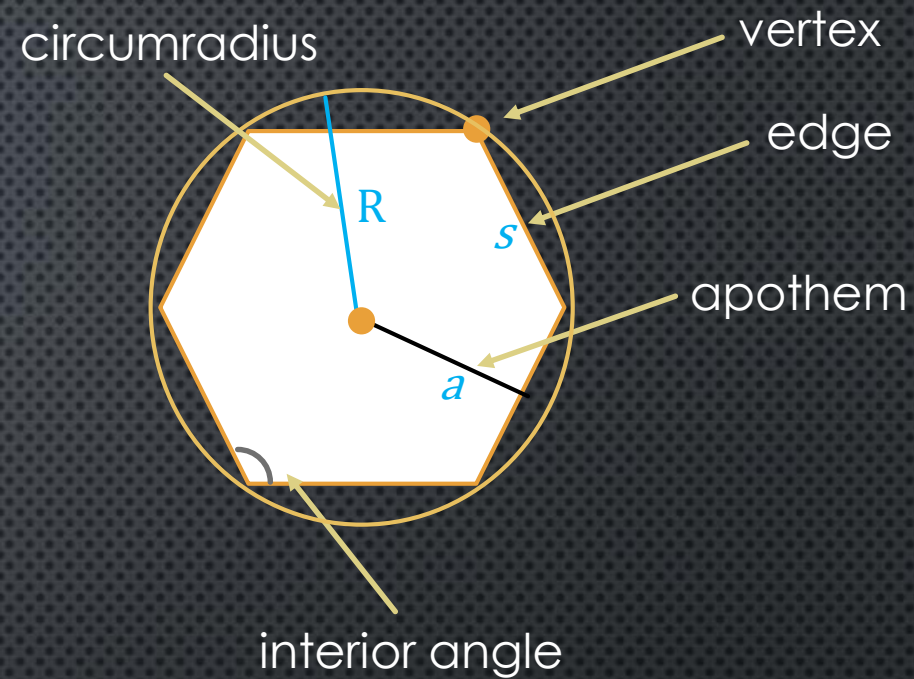
interior angle

Goal 1

Create a `Polygon` class:

Initializer

- number of edges/vertices
- circumradius

Properties

- # edges
- # vertices
- interior angle
- edge length
- apothem
- area
- perimeter

Functionality

- a proper representation (`__repr__`)
- implements equality (`==`) based on # vertices and circumradius (`__eq__`)
- implements `>` based on number of vertices only (`__gt__`)

Implement a `Polygons` sequence type:

Initializer

- number of vertices for largest polygon in the sequence
- common circumradius for all polygons

Properties

- max efficiency polygon: returns the Polygon with the highest area : perimeter ratio

Functionality

- functions as a sequence type (`__getitem__`)
- supports the `len()` function (`__len__`)
- has a proper representation (`__repr__`)