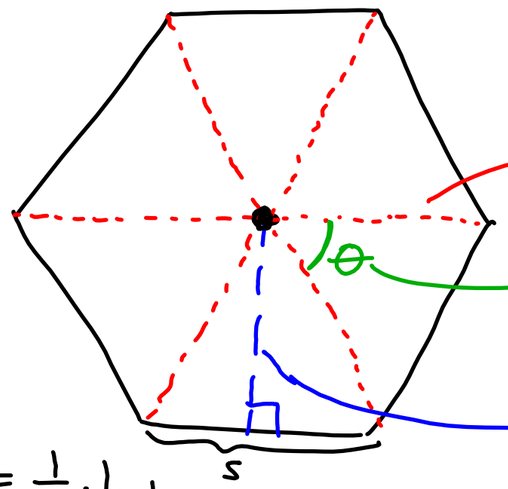
# Area of Regular Polygons

– regular → all sides + angles are equal




radius → center to vertex

central angle → angle made by 2 consecutive radii, equal to $\frac{360}{\#\text{ of sides}}$

apothem → center to side

One Δ

$A = \frac{1}{2} \cdot b \cdot h = \frac{1}{2} \cdot s \cdot a$

Whole

$A = \frac{1}{2} \cdot s \cdot a + \frac{1}{2} \cdot s \cdot a + \frac{1}{2} \cdot s \cdot a + \frac{1}{2} \cdot s \cdot a + \frac{1}{2} \cdot s \cdot a + \frac{1}{2} \cdot s \cdot a$

$A = \frac{1}{2} \cdot a \cdot (\underbrace{s+s+s+s+s+s}_{\text{Perimeter} = P})$

$\boxed{A = \frac{1}{2} \cdot a \cdot P}$

## Names of Shapes

4 → quadrilateral

5 → pentagon

6 → hexagon

7 → heptagon

8 → octagon

9 → nonagon

10 → decagon

12 → dodecagon

n → n-gon

EX → pentagon → $a = 5$ in., $s = 10$ in.

$A = \frac{1}{2}(5 \text{ in.})(5 \cdot 10 \text{ in.})$

$A = 125 \text{ in}^2$

EX → dodecagon → $a = 4$ in., $s = 3$ in.

$A = \frac{1}{2}(4 \text{ in})(12 \cdot 3 \text{ in.})$

$A = 72 \text{ in}^2$

EX → octagon → $a = 7$ cm, $s = 10$ cm

$A = \frac{1}{2}(7 \text{ cm})(8 \cdot 10 \text{ cm})$

$A = 280 \text{ cm}^2$

EX → 25-gon → $a = 5$ m, $s = 2$ m

$A = \frac{1}{2}(5 \text{ m})(25 \cdot 2 \text{ m})$

$A = 125 \text{ m}^2$