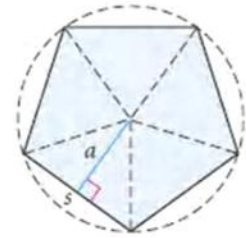




Investigation

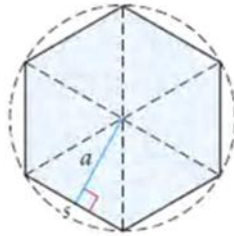
Area Formula for Regular Polygons

Consider a regular pentagon with side length s , divided into congruent isosceles triangles. Each triangle has a base s and a height a .

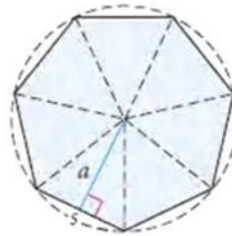


Regular pentagon

- Step 1 | What is the area of one isosceles triangle in terms of a and s ?
- Step 2 | What is the area of this pentagon in terms of a and s ?
- Step 3 | Repeat Steps 1 and 2 with other regular polygons and complete the table below.



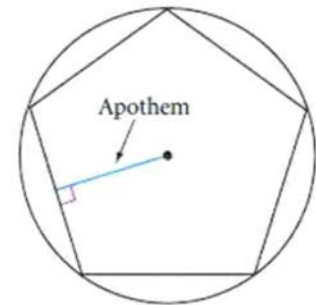
Regular hexagon



Regular heptagon

Number of sides	5	6	7	8	9	10	...	12	...	n
Area of regular polygon							

The distance a appears in the area formula for a regular polygon, and it has a special name—apothem. An **apothem** of a regular polygon is a perpendicular segment from the center of the polygon's circumscribed circle to a side of the polygon. You may also refer to the length of the segment as the apothem.



- Step 4 | What is the perimeter of a regular polygon in terms of n and s ? Use your answer to this question and your last entry in the table to state your next conjecture.

Regular Polygon Area Conjecture

C-79

The area of a regular polygon is given by the formula $\frac{1}{2}Ps$ or $\frac{1}{2}Pa$, where A is the area, P is the perimeter, a is the apothem, s is the length of each side, and n is the number of sides.