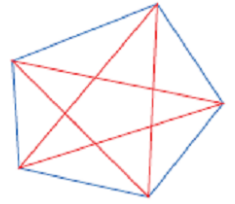## 7.3: Angle Relationships in Polygons

Types of Polygons

Convex Polygon
A polygon with no part of any line segment joining two points on the polygon outside of the polygon. Each of the interior angles are less than 180°

A regular polygon is a polygon with all sides equal and all interior angles equal.

Concave Polygon
A polygon with parts of some line segments joining two points on the polygon outside the polygon.
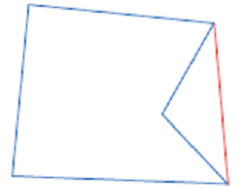
Interior Angles of a Convex Polygon
The sum of the interior angles of a convex polygon is dependent on the number of sides of the polygon in question. As investigated using Geometers Sketchpad, the sum of the interior angles of an n-sided polygon is $180°(n-2)$.

Exterior Angles of a Convex Polygon
The sum of the exterior angles of a convex polygon is 360°.

Problem:
Using Paper and Pencil, construct each of the following figures, and then show that the sum of the interior angles in each figure is $180°(n-2)$.

a) Quadrilateral   b) pentagon

c) Heptagon   d) hexagon

Ex. 1: Calculate the sum of the interior angles of a nonagon.

Ex. 2: Find the measure of each interior angle of a regular hexagon.

Ex. 3: How many sides does a polygon have if each of its interior angles measures 140°?