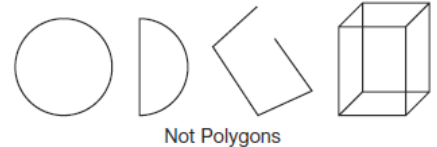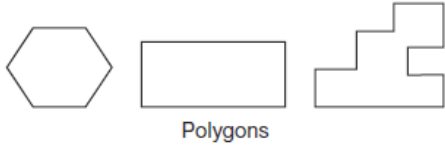Name: _____

Geometry Lesson 15

Date: _____

Objective: TSW identify different polygons.

Period: _____

_____ - A closed plane figure formed by three or more segments. Each segment intersects exactly two other segments only at their endpoints. No two segments with a common endpoint are collinear.

_____ - The segments that form a polygon.

_____ of a Polygon - The intersection of two of its sides.

Polygons

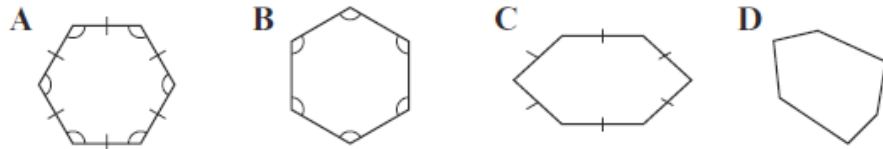Not Polygons

_____ Polygon - A polygon in which all angles are congruent.

_____ polygon - A polygon in which all sides are congruent.

_____ Polygon - If a polygon is both equiangular and equilateral.

_____ Polygon - If a polygon is not equiangular and equilateral.

Hint

Equilateral and equiangular polygons have the same traits as equilateral and equiangular triangles, as introduced in lesson 13.

In the diagram, polygons A and B are _____. Polygons A and C are _____. Since polygon A is both equiangular and equilateral, it is a regular polygon. Polygons B, C and D are all irregular.

Polygons are named by the number of sides they have. The chart below shows some common polygons and their names.

Name	Sides	Regular Polygon	Irregular Polygon
Triangle	3		
Quadrilateral	4		
Pentagon	5		
Hexagon	6		
Heptagon	7		
Octagon	8		
Nonagon	9		
Decagon	10		
Hendecagon	11		
Dodecagon	12		

Example 1 Classifying Polygons
Classify each polygon. Determine whether it is equiangular, equilateral, regular, irregular, or more than one of these.
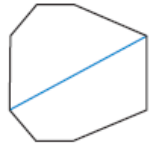
_____ of a Polygon - A segment that connects two nonconsecutive vertices of a polygon.

Example: Pentagon *ABCDE* has two diagonals, $\overline{AC}$ and $\overline{AD}$, from vertex *A*. Three other diagonals could be drawn: $\overline{BD}, \overline{BE},\ and\ \overline{CE}$.

Diagonals can help determine whether a polygon is concave or convex.

_____ Polygon - Every diagonal of the polygon lies inside it, except for the endpoints.

Convex polygon

_____ Polygon - At least one diagonal can be drawn so that part of the diagonal contains points in the exterior of the polygon.

If two polygons have the same size and shape, they are congruent polygons.

Concave polygon

Example 2 Identifying Polygon Properties
a. Find a diagonal that contains points in the exterior of polygon *ABCD*.
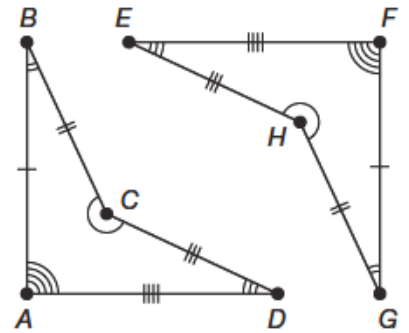   SOLUTION

b. Determine whether polygon *EFGH* is convex or concave. Explain.
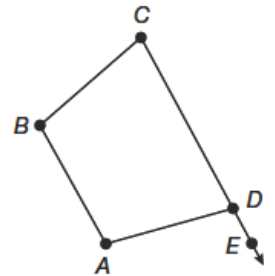   SOLUTION

c. Are polygons *ABCD* and *FGHE* congruent? Justify your answer.
    SOLUTION

Interior angle of a polygon - An angle formed by two sides of a polygon with a common vertex.

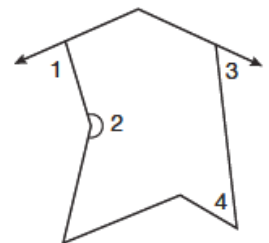_____ angle of a polygon - An angle formed by one side of a polygon and the extension of an adjacent side.

 In the diagram, ∠*CDA* is an interior angle and ∠*ADE* is an exterior angle.

Example 3 Identifying Interior and Exterior Angles of Polygons
For each numbered angle in the polygon, determine whether it is an interior angle or an exterior angle.
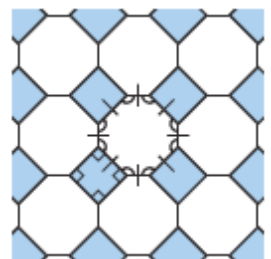   SOLUTION

Example 4 Application: Tile Patterns
This floor tile pattern uses polygonal tiles that fit together exactly.
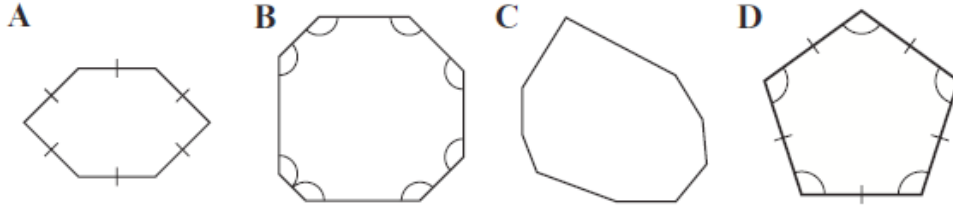a. Name the two types of polygons used in the pattern. Are they regular or irregular? Explain.
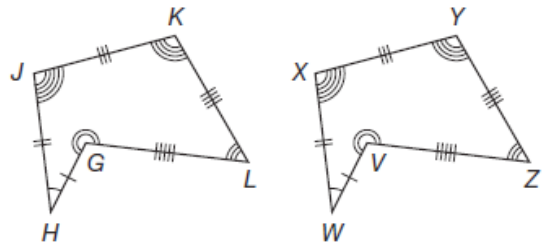   SOLUTION

b. Pick any pair of unshaded polygons. Are they congruent? Are they convex or concave? Explain.
    SOLUTION

You Try!!!!
a.Name each polygon. Determine whether it is equiangular, equilateral, regular, irregular, or more than one of these.

A   B   C   D

b.Find a diagonal in polygon *GHJKL* that contains points in the
exterior of the polygon.

c.Determine whether polygon *VWXYZ* is convex or concave. Explain.

d.Are polygons *GHJKL* and *VWXYZ* congruent? Justify your answer.

e. For each numbered angle in the polygon, determine whether it is an interior angle or an
exterior angle.
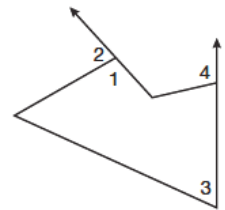
f. Name the type of polygon used in this pattern. Are the polygons regular or irregular?
Explain.
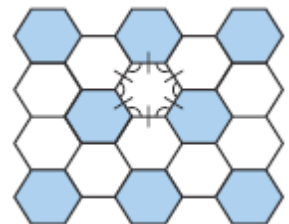
g.Pick any pair of polygons in this pattern. Are they congruent? Are they convex or
concave? Explain.