Lesson 10-8

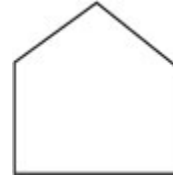**Example 1 Classify Polygons**
Determine whether the figure is a polygon. If it is, classify
the polygon and state whether it is regular. If it is *not* a polygon, explain why.

The figure has five sides. The sides are not all congruent and
the angles are not congruent. It is a pentagon, but is not regular.

Example 2 Classify Polygons
Determine whether the figure is a polygon. If it is, classify
the polygon and state whether it is regular. If it is *not* a polygon, explain why.

This figure is not closed. It is not a polygon.

Example 3 Angle Measure of a Polygon
ALGEBRA Find the measure of each angle of a regular octagon.

- Draw all of the diagonals from one vertex and count the number of triangles

    formed.
- Find the sum of the measures of the polygon.
  number of triangles formed × 180° = sum of angle measures in polygon
  $$6 \times 180° = 1,080°$$
- Find the measure of each angle of the polygon. Let n represent the measure of one
  angle in the octagon.
  $8n = 1,080$ There are eight congruent angles.
  $n = 135$ Divide each side by 8.

The measure of each angle in a regular octagon is 135°.

Example 4 Tessellations
SWIMMING POOL Sam is planning to tile the floor of his new in-ground swimming pool with pentagonal-shaped tiles. The tiles are regular pentagons. Can a tessellation be created with these tiles?

The measure of each angle in a regular pentagon is 108°.
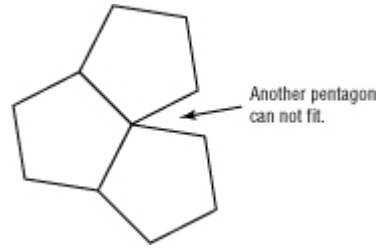The sum of the measures of the angles where the vertices meet must be 360°.
So, solve $108n = 360$.

$108n = 360$ Write the equation.

$\dfrac{108n}{108} = \dfrac{360}{108}$ Divide each side by 108.

$n = 3.\overline{3}$ Use a calculator.

Since the solution, $n = 3.\overline{3}$, is not a whole number, a regular pentagon cannot make a tessellation. So, Sam cannot make a tessellation with these tiles for his pool.

Another pentagon can not fit.

Check You can check if your answer is correct by trying to draw a tessellation of regular pentagons.