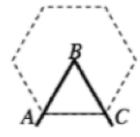


Objectives:

- About special types of polygons, such as regular and non-convex polygons.
- How the measures of the interior and exterior angles of a regular polygon are related to the number of sides of the polygon.

W.Up (from #70 HW)

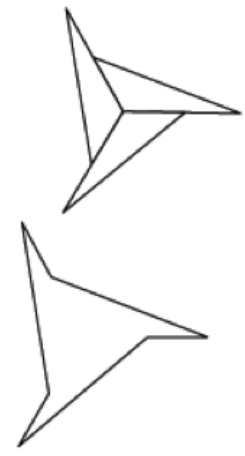
The angle created by a hinged mirror when forming a regular polygon is called a **central angle**. For example, $\angle ABC$ in the diagram at right is the central angle of the regular hexagon.



- a) Find a central angle for regular hexagon.
- b) Find an interior angle for regular hexagon.
- c) Find an exterior angle for regular hexagon.

8-1. PINWHEELS AND POLYGONS

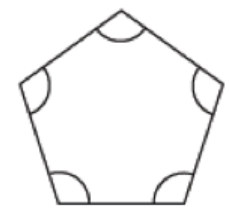
Inez loves pinwheels. One day in class, she noticed that if she put three congruent triangles together so that one set of corresponding angles are adjacent, she could make a shape that looks like a pinwheel.



- a. Can you determine any of the angles of her triangles? Explain how you found your answer.
- b. The overall shape (outline) of Inez's pinwheel is shown at right. How many sides does it have? What is another name for this shape?

- c. Jorge has a triangle with angle measures 32° , 40° , and 108° . Will this triangle be able to form a pinwheel? Explain.

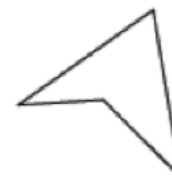
8-13. Copy the diagram of the regular pentagon at right onto your paper. Then, with your team, find the *sum* of the measures of its interior angles *as many ways as you can*. You may want to use the fact that the sum of the angles of a triangle is 180° . Be prepared to share your team's methods with the class.



8-14 a. Complete the table

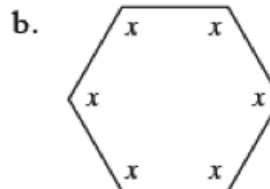
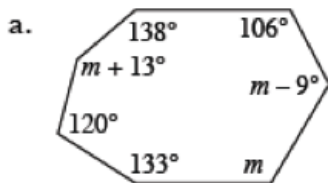
Number of Sides of the Polygon	3	4	5	6	7	8	9	10	12
Sum of the Interior Angles of the Polygon	180°								

b. Does the interior angle sum depend on whether the polygon is convex? Test this idea by drawing a few non-convex polygons (like the one at right) on your paper and determine if it matters whether the polygon is convex. Explain your findings.



c. Find the sum of the interior angles of a 100-gon. Explain your reasoning.

8-16. Use the angle relationships in each of the diagrams below to solve for the given variables. Show all work.



8-24

a. Determine the measure of each interior angle of a regular octagon. Explain how you found your answer.



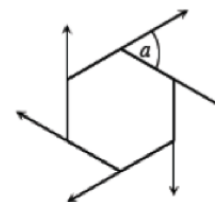
b. What about the interior angles of other regular polygons? Find the interior angles of a regular nonagon and a regular 100-gon.

c. Will the process you used for part (a) work for any regular polygon? Write an expression that will calculate the interior angle of an n -gon.

8-26. Jeremy asks, “What about exterior angles? What can we learn about them?”

Find the sum of the hexagon.

- Find the sum of the exterior angles.
 - (1) equilateral triangle
 - (2) regular octagon
 - (3) regular decagon
 - (4) regular dodecagon (12-gon)

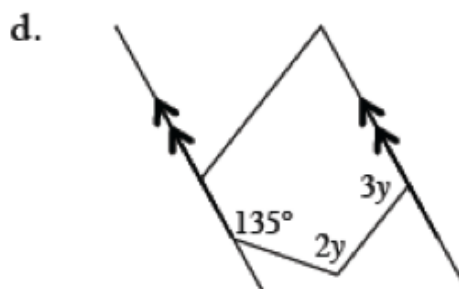
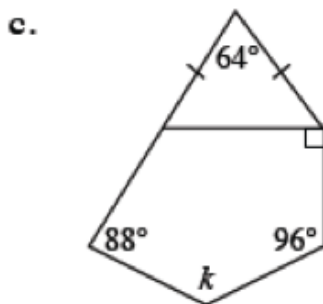


Complete the table

Name of Polygon	Number of Sides
Triangle	3
	4
Pentagon	5
	6
	7

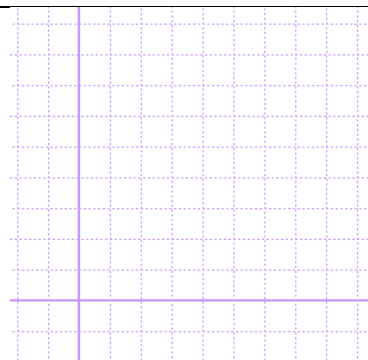
Name of Polygon	Number of Sides
Octagon	8
	9
	10
11-gon	11
n -gon	n

Use the angle relationships in each of the diagrams below to solve for the given variables. Show all work.



8-17. On graph paper, graph $\triangle ABC$ if $A(3, 0)$, $B(2, 7)$, and $C(6, 4)$.

- What is the most specific name for this triangle? Prove your answer is correct using both slope and side length.
- Find $m\angle A$. Explain how you found your answer.



8-18. The exterior angles of a quadrilateral are labeled a , b , c , and d in the diagram at right. Find the measures of a , b , c , and d and then find the sum of the exterior angles.

