BEGIN WORKING ON THESE PROBLEMS

WHEN THE BELL RINGS.

Determine the measure of an interior angle of the given regular polygon.

1. regular nonagon $\frac{180(9-2)}{9}$ $140°$

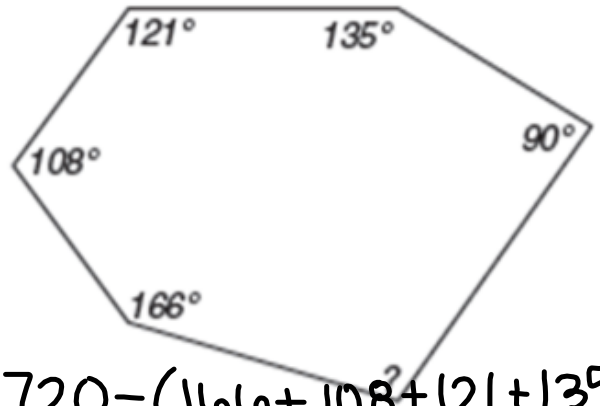
2. regular decagon $\frac{180(10-2)}{10}$ $144°$

3. regular 15-gon $\frac{180(15-2)}{15}$ $156°$

4. regular 47-gon $\frac{180(47-2)}{47}$ $172.3°$

Determine the measure of the missing angle in each figure.

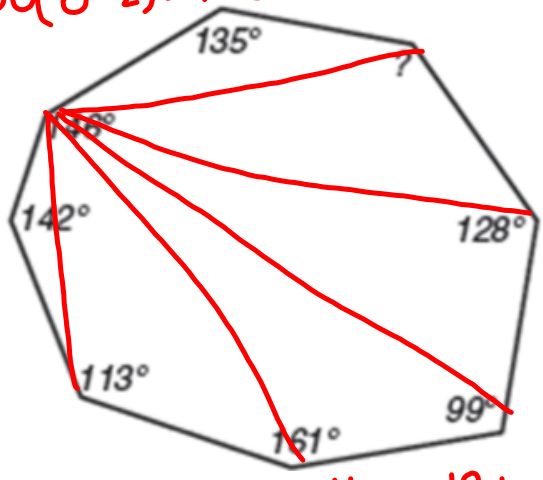
5. $720 = 180(6-2)$



$720-(166+108+121+135+90)$

$100°$

6. $180(8-2)=1080$



$1080-(128+99+161+113+142+146+135)$

$= 156°$

Illuminate Interim Assessment

DO NOT WRITE ON TEST!!

#4 Juan's house (-2, 6)

Fabiana's house (7, 3)

#8-9

K (1,2)
B (3,4)
U (5,2)
C (3,0)

#11&12

T (2,2) T' (0,0)
A (5,5) A' (1,1)
C (8,2) C' (2,0)

Exterior and Interior Angle Measurement Interactions

7.5

Sum of the Exterior Angle Measures of a Polygon

PG.539-540 IN YOUR BOOK

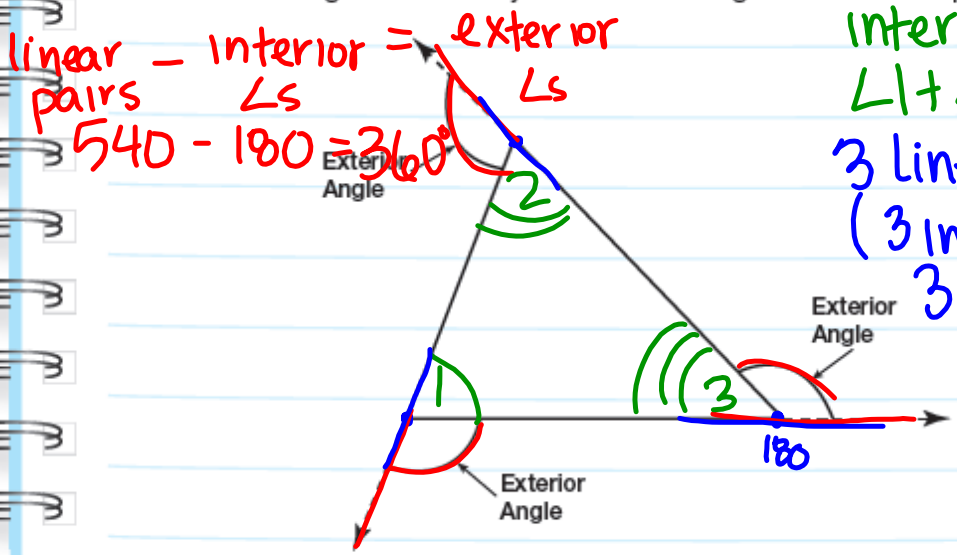
Previously, you wrote a formula for the sum of all the interior angle measures of a polygon. In this lesson, you will write a formula for the sum of all the exterior angle measures of a polygon.

Each interior angle of a polygon can be paired with an exterior angle. An **exterior angle of a polygon** is formed adjacent to each interior angle by extending one side of each vertex of the polygon as shown in the triangle.

Each exterior angle and the adjacent interior angle form a linear pair.

linear pairs − interior ∠s = exterior ∠s

540 − 180 = 360°



interior ∠s

∠1 + ∠2 + ∠3 = 180°

3 linear pairs

(3 interior ∠s & 3 exterior ∠s)

3(180) = 540°

1. Use the formula for the sum of interior angle measures of a polygon and the Linear Pair Postulate to calculate the sum of the exterior angle measures of a triangle.

sum of exterior ∠s : 360°

Sep 14-9:16 AM

PG.541 IN YOUR BOOK

Let's explore the sum of the exterior angle measures of other polygons.

2. Calculate the sum of the exterior angle measures of a quadrilateral by completing each step.
   a. Draw a quadrilateral and extend each side to locate an exterior angle at each vertex.

   b. Use the formula for the sum of interior angle measures of a polygon and the Linear Pair Postulate to calculate the sum of the exterior angle measures of a quadrilateral.

3. Calculate the sum of the exterior angle measures of a pentagon by completing each step.
   a. Draw a pentagon and extend each side to locate an exterior angle at each vertex.

PG.542 IN YOUR BOOK

   b. Use the formula for the sum of the interior angle measures of a polygon and the Linear Pair Postulate to calculate the sum of the exterior angle measures of a pentagon.

PG.542 IN YOUR BOOK

4. Calculate the sum of the exterior angle measures of a hexagon by completing each step.

   a. Without drawing a hexagon, how many linear pairs are formed by each interior and adjacent exterior angle? How do you know?

   b. What is the relationship between the number of sides of a polygon and the number of linear pairs formed by each interior angle and its adjacent exterior angle?

   c. Use the formula for the sum of the interior angle measures of a polygon and the Linear Pair Postulate to calculate the sum of the measures of the exterior angles of a hexagon.

Nov 18-8:54 AM

PG.543 IN YOUR BOOK

5. Complete the table.

Number of Sides of the Polygon	3	4	5	6	7	15
Number of Linear Pairs Formed	3					
Sum of Measures of Linear Pairs	540					
Sum of Measures of Interior Angles	180					
Sum of Measures of Exterior Angles	360	360	360	360	360	360

6. When you calculated the sum of the exterior angle measures in the 15-sided polygon, did you need to know anything about the number of linear pairs, the sum of the linear pair measures, or the sum of the interior angle measures of the 15-sided polygon? Explain your reasoning.

7. If a polygon has 100 sides, calculate the sum of the exterior angle measures. Explain how you calculated your answer.

8. What is the sum of the exterior angle measures of an n-sided polygon?

9. If the sum of the exterior angle measures of a polygon is 360°, how many sides does the polygon have? Explain your reasoning.

PG.544 IN YOUR BOOK

10. Explain why the sum of the exterior angle measures of any polygon is always equal to 360°.

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PG.544 IN YOUR BOOK

1. Calculate the measure of each exterior angle of an equilateral triangle. Explain your reasoning.

2. Calculate the measure of each exterior angle of a square. Explain your reasoning.

3. Calculate the measure of each exterior angle of a regular pentagon. Explain your reasoning. $\frac{360}{n}$ n = # of sides

4. Calculate the measure of each exterior angle of a regular hexagon. Explain your reasoning. $\frac{360}{6} =$

5. Complete the table shown to look for a pattern.

Number of Sides of a Regular Polygon	3	4	5	6	7	15
Sum of Measures of Exterior Angles						
Measure of Each Interior Angle						
Measure of Each Exterior Angle						

6. When you calculated the measure of each exterior angle in the 15-sided regular polygon, did you need to know anything about the measure of each interior angle? Explain your reasoning.

7. If a regular polygon has 100 sides, calculate the measure of each exterior angle. Explain how you calculated your answer.

8. What is the measure of each exterior angle of an *n*-sided regular polygon?

9. If the measure of each exterior angle of a regular polygon is 18°, how many sides does the polygon have? Explain how you calculated your answer.

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NOT IN YOUR BOOK

7. If a regular polygon has 30 sides, what is the measure of each exterior angle? Explain your reasoning.

8. The degree measure of each exterior angle of a regular octagon is represented by the expression $7x - 4$. Solve for x.

Nov 19-2:51 PM

Homework

Finish Lesson 7.4

Aug 24-2:00 PM