Name:_____

INVESTIGATION: interior angles of regular polygons

Section A: Sum of angles of a Triangle

Instructions:

- Open the workbook on GeoGebra called **Interior Angles of a Triangle** or type this in your url http://www.geogebra.org/m/3152017
- Measure the angles of the vertices of triangle ABC and DEF and record the information below.

1. Fill in the table below based on your findings:

Triangle				**Sum of interior angles**
ABC	$\widehat{\mathbf{A}} =$ _____	$\widehat{\mathbf{B}} =$ _____	$\widehat{\boldsymbol{C}} =$ _____	
MPQ	$\widehat{\mathbf{D}} =$ _____	$\widehat{\mathbf{E}} =$ _____	$\widehat{\mathbf{F}} =$ _____	

2. ***Predict*** the **sum** of the three interior angles of the triangle GHI.

_____

3. Now, measure the degrees in each angle in triangle GHI. What is the sum? Was your prediction correct?

_____

_____

4. Based on your findings, make a ***RULE*** about the sum of the interior angles of **any** triangle

_____

_____

5. Fill in the blanks below to complete the ***Interior Angle Sum theorem*** for the interior angles of triangles:

Given triangle ABC, $\widehat{\mathbf{A}} + \widehat{\mathbf{B}} + \widehat{\boldsymbol{C}}$ **=** _____$^{\mathbf{0}}$

6. ***Explain*** how you could use the **angle sum theorem of triangles** to find the missing angle, $P\hat{Q}R$, in the triangle below:

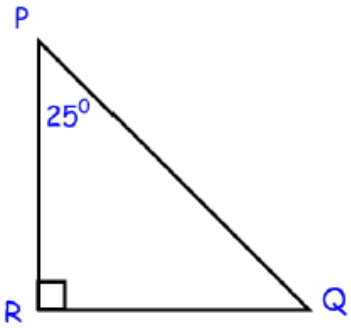
_____

_____

_____

_____

_____



Section B: Sum of angles of a Polygon

1. Construct a regular hexagon with side lengths, Polygon **ABCDEF** - 2 cm and Polygon **GHIJKL** - 4 cm

a) Measure the interior angles of each of your hexagons – what size is each angle?

Polygon **ABCDEF** - 2 cm _____

Polygon **GHIJKL** - 4 cm _____

b) Find the sum of the interior angles of each hexagon.

Polygon **ABCDEF** - 2 cm _____

Polygon **GHIJKL** - 4 cm _____

c) What do you notice about the sum of the interior angles?

_____

_____

2. Construct a regular octagon with side lengths, Polygon **ABCDEFGH** – 1,5 cm and Polygon **IJKLMNOP** - 3 cm

a) Measure the interior angles of each of your octagon – what size is each angle?

Polygon **ABCDEFGH** – 1,5 cm _____

Polygon **IJKLMNOP** - 3 cm _____

b) Find the sum of the interior angles of each octagon.

Polygon **ABCDEFGH** – 1,5 cm _____

Polygon **IJKLMNOP** - 3 cm _____

c) What do you notice about the sum of the interior angles?

_____

_____

3. We can cut up regular **POLYGONS** into **TRIANGLES.** Complete the table below:

Regular Polygon	No. of sides	No. of triangles	Size of interior angle	Sum of interior angle
Equilateral triangle				
Square				
Pentagon				
Hexagon				
Octagon				

4. Determine the following:

4.1 In a regular polygon, the angles are all the same size. What is the size of each of the interior angles in a regular pentagon?

_____

_____

4.2 If a polygon has n sides, what is the sum of its interior angles? (formula)

_____

_____

4.3 If a polygon has n sides, what is the size of each angle? (formula)

_____

_____

5. Use the formulae above to find the sum of the interior angles, and the size of each angle, in a regular polygon with:

Sides	Size of each angle	Sum of its interior angles
10		
12		
20		
100		

6. Would the results differ for an irregular polygon? Explain.

_____

_____

_____

_____

7. What have you learnt from this investigation?

_____

_____

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_____

RUBRIC FOR INVESTIGATION

ASSESSMENT CRITERIA	LEVEL				WEIGHING	MARK
	1	2	3	4		
ORGANISATION AND RECORDING OF DATA	No attempt to organise data, tables are not used. Recording is muddled	Some classification is done, tables are used, minor errors in recording.	Correct classification of data, works in an organised fashion, results are recorded in tables.	Results are well organised and correctly classified and neatly recorded in clearly labelled tables	20	
CORRECTNESS OF CALCULATIONS	Major errors in calculations	Minor errors in mathematical calculations	No errors in carrying out operations, correct mathematical calculations.	Calculations show clear understanding of mathematical concepts and procedures. Operations are worked out accurately and completely.	20	
IDENTIFICATION OF PATTERNS	No Patterns are found	Some patterns are identified, patterns are not satisfactorily described.	Patterns are correctly and sufficiently identified and describes, variables are used.	Patterns are correctly identified and described. Variables are defined and effectively used.	20	
LOGIC IN MATHEMATICAL REASONING	No logical reasoning	Inconsistent analysis and interpretation. Reasoning is not clear and consistent.	Consistent analysis and appropriate interpretation. Able to reach a consistent conclusion, supplies some supporting arguments.	Consistent and correct analysis and interpretation throughout. Strong supporting arguments. Proper logical reasoning.	20	
MATHEMATICAL LANGUAGE AND COMMUNICATION	No attempt to use mathematical language, communication is poor	Some attempt to use mathematical language. Ideas are not clearly communicated.	Correct use of mathematical language. Clear appropriate explanations. Good communication.	Correct use of appropriate mathematical language. Clear, unambiguous and elegant explanations. Excellent communication.	20	

TOTAL: 100