

Name: _____ Period: _____ Date: _____

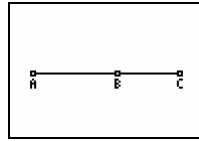
Geometry: Triangle Angle Sums and Exterior Angle Sums

Triangle-Angle-Sum Theorem – The sum of the measures of the angles of a triangle is _____.

Part 1: Triangle Exterior Angle Theorem

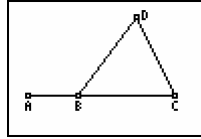
Construct a triangle and measure its exterior and interior angles.

- Construct \overline{AC} in the lower half of your screen.

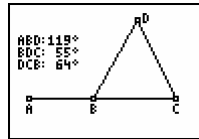


- Construct point B on \overline{AC} .

- Construct point D above \overline{AC} .



- Construct \overline{BD} and \overline{CD} .



- Measure $\angle ABD$, $\angle BDC$, and $\angle DCB$.

Exploration:

1. Drag point B to three different locations along \overline{AC} . Find $m\angle ABD$, $m\angle BDC$, and $m\angle DCB$ for each location. Collect your data in the first three blank columns of the table to the right:

Measurement	1 st	2 nd	3 rd	4 th	5 th	6 th
$m\angle ABD$						
$m\angle BDC$						
$m\angle DCB$						

2. Drag point D vertically to three new locations. Find three more sets of values for $m\angle ABD$, $m\angle BDC$, and $m\angle DCB$. Record your data in the last three columns of the table above.

3. Study the data in the table above. Complete the following conjecture about the exterior angle $\angle ABD$ and its two remote interior angles, $\angle BDC$ and $\angle DCB$.

If $\angle ABD$ is an exterior angle of $\triangle BCD$, then $m\angle ABD = \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$.

4. Generalize your conjecture from question 5: The measure of an exterior angle of a triangle is

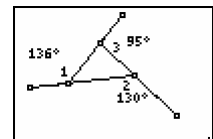
5. How are $\angle ABD$ and $\angle DBC$ related? (Vertical, Alt. Int., Alt. Ext., Same-side Int., Same-side Ext., Complementary, or Supplementary.)

6. $m\angle BDC + m\angle DCB + m\angle CBD = \underline{\hspace{2cm}}$

Show your teacher your calculator screen and completed answers. Teacher Signature: _____

Part 2: Exterior Angles of a Triangle

- Open EXTERIOR with Cabri Jr. If asked to save changes, then tab over to no and press enter.



Extension:

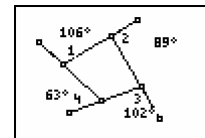
7. Drag any of the three vertices. Make four different triangles. For each triangle, find $m\angle 1$, $m\angle 2$, $m\angle 3$. Record their measures and their sum in the table below.

$m\angle 1$				
$m\angle 2$				
$m\angle 3$				
$m\angle 1 + m\angle 2 + m\angle 3$				

8. Study the data in the table. Complete this conjecture about the sum of the measures of the exterior angles of a triangle. The sum of the measures of the exterior angles of a triangle, one at each vertex, is _____.

Part 3: Exterior Angles of a Quadrilateral

- Open EXTRIOR4. If asked to save changes, then tab over to no and press enter.



9. Drag any of the four vertices. Make four different quadrilaterals. For each quadrilateral, find $m\angle 1$, $m\angle 2$, $m\angle 3$, and $m\angle 4$. Record their measures and their sum in the table below.

$m\angle 1$				
$m\angle 2$				
$m\angle 3$				
$m\angle 4$				
$m\angle 1 + m\angle 2 + m\angle 3 + m\angle 4$				

10. The sum of the measures of the exterior angles of a quadrilateral, one at each vertex, is _____.

11. What would you conjecture about the sum of the measures of exterior angles of a pentagon, one at each vertex, be?

Show your teacher your calculator screen and completed answers. Teacher Signature: _____