

Geometry: Interior and Exterior Angles of a Triangle

Part 1: Interior Angles of a Triangle

Construct a triangle and measure its interior angles.

- Draw $\triangle ABC$ near the center of the screen.
- Measure and label each of the three interior angles.
- Calculate the sum of the measures of the three angles. (Note: You can add only two measurements at a time using the Calculate tool.)

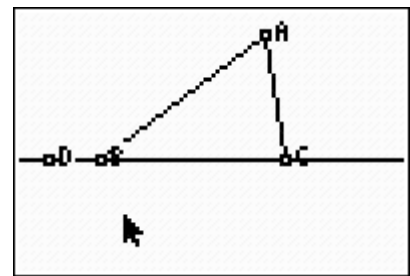
Exploration:

1. What is the relationship among the angles as you change the triangle by dragging one of its vertices or one of its sides?
2. Make a conjecture about the sum of the interior angles of a triangle. Does your conjecture hold for any type of triangle (acute, right, obtuse, scalene, isosceles, and equilateral)? Explain your reasoning.

Part 2: Exterior Angles of a triangle

Construct an exterior angle to $\triangle ABC$.

- Use the line tool to extend side \overline{BC} .
- Construct a point D on \overline{BC} as shown.
- Measure $\angle ACD$



Exploration:

3. Drag point B to three different locations along \overline{DC} . Find $m\angle DBA$, $m\angle BAC$, and $m\angle ACB$ for each location. Collect your data in the first three blank columns of the table to the right:

$m\angle DBA$						
$m\angle BAC$						
$m\angle ACB$						

4. Drag point A vertically to three new locations. Find three more sets of values for $m\angle DBA$, $m\angle BAC$, and $m\angle ACB$. Record your data in the last three columns of the table above.
5. Study the data in the table. Complete the following conjecture about the exterior angle $\angle DBA$ and its two remote interior angles, $\angle BAC$ and $\angle ACB$.
If $\angle DBA$ is an exterior angle of $\triangle ABC$, then $m\angle DBA = \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$.
6. Generalize your conjecture from question 5. The measure of an exterior angle of a triangle is $\underline{\hspace{2cm}}$.
7. How are $\angle DBA$ and $\angle ABC$ related?