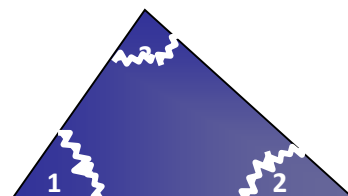


## Angles Relationships in Triangle

### Activity 1

#### STEP 1 Draw triangles

Draw and cut several different triangles.



#### STEP 2 Tear off corners

For each triangle, tear off the three corners and place them next to each other, as shown in the diagram.



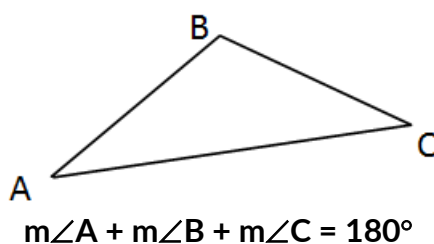
#### STEP 3 Make conjecture.

Make a conjecture about the sum of the measures of the interior angles of a triangle.

Triangulation is a method used in surveying. Land is divided into adjacent triangles. By measuring the sides and angles of one triangle and applying properties of triangles, surveyors can gather information about adjacent angles.

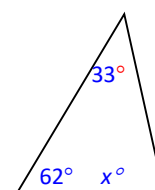
### Theorem 1: Triangle Angle Sum Theorem

The sum of the angle measures of a triangle is  $180^\circ$ .

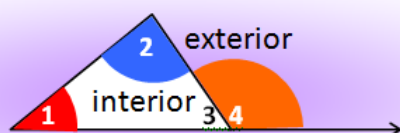


**Example 1:** Find the value of  $x$  in the acute triangle.

$$\begin{aligned} 62^\circ + 33^\circ + x^\circ &= 180^\circ \\ 95^\circ + x^\circ &= 180^\circ \\ 95^\circ - 95^\circ + x^\circ &= 180^\circ - 95^\circ \\ x^\circ &= 85^\circ \end{aligned}$$



The **interior** is the set of all points inside the figure. The **exterior** is the set of all points outside the figure. An **interior angle** is formed by two sides of a triangle. An **exterior angle** is formed by one side of the triangle and the extension of an adjacent side. Each exterior angle has two *remote interior angles*. A **remote interior angle** is an interior angle that is not adjacent to the exterior angle.



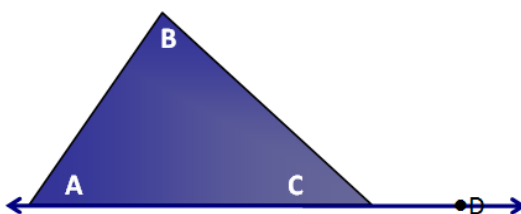
$\angle 4$  is an exterior angle.

Its remote interior angles are  $\angle 1$  and  $\angle 2$ .

### Activity 2

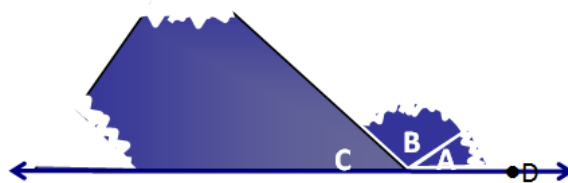
#### STEP 1 Draw exterior angle.

Draw and cut several different triangles. Place each triangle on a piece of paper and extend one side to form an *exterior angle*, as shown on a diagram.



#### STEP 2 Tear off corners.

For each triangle, tear off the corners that are not next to the *exterior angle*. Use them to fill the exterior angle as shown.

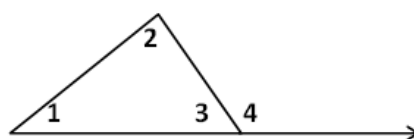


#### STEP 3 Make conjecture.

Make a conjecture about the sum of the measures of the interior angles of a triangle.

### Theorem 2

The measure of an exterior angle of a triangle is equal to the sum of the measures of its remote interior angles.



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