**Exploring**

Triangles with Parallel Lines

**In this activity we will be exploring triangles and making some conjectures about the angles that are formed inside and outside the triangle**

**Directions:**  Complete the following questions with your observations.

1. Measure the three angles in the triangle below and ∠ACD. Write the measurements in the angles.  
   
2. What is the sum of the angles inside the triangle?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Proving the Triangle-Angle-Sum Theorem:  
    In the drawing below, *m*∥*n*. Answer the following questions to prove what you found in #2

***m***

***n***

***1***

***2***

***5***

***4***

***3***

* 1. What is the sum of ? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  2. What do you know about ∠1 and ∠5? Why?
  3. What do you know about ∠3 and ∠4? Why?

1. What can you conclude about ? Explain?
2. **Types of Triangles.** Use the Triangles below to answer these questions.

**1**

**5**

**4**

**3**

**2**

**7**

**6**

* 1. **Equiangular** triangles have 3 congruent angles.   
     Which of the triangles are *equiangular?*
  2. **Acute** triangles have 3 acute angles.  
     Which of the triangles are *acute*?
  3. **Right** triangles have 1 right angle.  
     Which of the triangles are *right* triangles?
  4. **Obtuse** triangles have 1 obtuse angle.  
     Which of the triangles are *obtuse* triangles?
  5. **Equilateral** triangles have 3 congruent sides.  
     Which of the triangles are *equilateral* triangles?
  6. **Isosceles** triangles have 2 congruent sides.Which of the triangles are *isosceles* triangles?
  7. **Scalene** triangles have *no* congruent sides.Which of the triangles are *scalene* triangles?

1. ∠ACD (in the triangle in #1) is called an **exterior angle** .

What is m∠*ACD* = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
∠A and ∠B are called **remote interior angles** because they are inside the triangle and not adjacent to ∠ACD.  
 What is *m∠B* + *m∠A =* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

***Conjecture:*** Make a conjecture about exterior angles and the sum of their remote interior angles:

1. **Proof**. Use the diagram below where ***l***∥***m*** to explain why your conjecture in #6 is true.

***m***

***n***

***1***

***2***

***4***

***3***

***m***

***n***

***t***

***1***

***2***

***8***

***7***

***6***

***5***

***4***

***3***