Exploring
Triangles with GSP

# Part A: Triangle Angle Sum Measurement

1. Draw Ray $\vec{AB}$
2. Draw point *C* not on this ray.
3. Construct segments $\overbar{AC} $ and $\overbar{BC}$
4. Now measure the three interior angles of the triangle.
5. Click on the [Measure] menu and choose [Calculate]. Find the sum of the three interior angles by clicking on the angle measures and the plus sign on the calculator.
6. What is the sum of the interior angles of a triangle?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
Move the vertices of the triangle around to show that this is always true.
7. Construct point *D* on the ray as shown to the right.
8. Measure $∠CBD$.
9. Use the [Calculate] tool to find the sum $m∠ACB+m∠CAB$.
10. How do the measurements from # 8 and #9 compare?
11. What theorem is #9 showing?

# Part B: Building Triangles

We now want to investigate what information is important to know that two triangles are congruent.

**Definition:** **Congruent Triangles -**  Congruent triangles have \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ angles and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ sides.

Change sketchpad settings to round to the nearest unit degree for angles and the nearest tenth of a cm for length. Now, begin by Draw $∆ABC$ and measure all of its angles and sides.

**Side-Side-Side**

Change your triangle so you have $AB=10.0cm, BC=15.0cm, AC=16.0cm$

Is your triangle congruent to your partner’s triangle?

**Side-Angle-Side**

Change your triangle so you have $AB=10.0cm, m∠A=50°, AC=16.0cm$

Is your triangle congruent to your partner’s triangle?

**Side-Side-Angle**

Change your triangle so you have $m∠A=20°,AC=12.0cm, BC=8.0cm,$

Is your triangle congruent to your partner’s triangle?

**Angle-Angle-Angle**

Change your triangle so you have $m∠A=30°, m∠A=50°, m∠A=100°$

Is your triangle congruent to your partner’s triangle?

**Angle-Side-Angle**

Change your triangle so you have $m∠A=50°, AC=15.0cm, m∠C=40°$

Is your triangle the congruent to your partner’s triangle?

**Angle- Angle- Side**

Change your triangle so you have $m∠A=50°, m∠C =40°, CB=16.0cm$

Is your triangle the congruent to your partner’s triangle?