

## AGENDA

### Lesson 25

Objective:

- Students will learn WHY any two **triangles** that satisfy the AAS and HL criteria must be **congruent**.

Language Objective: **SWBAT** use a two-column proof to justify their conjectures about triangle congruence using the AAS and HL criteria

- 1) Take out HW to be checked
- 2) Do Now - Think... Write...Pair...Share
- 3) SAA Criteria
- 4) HL Criteria
- 5) AAA and SAA
- 6) Exercises
- 7) Exit ticket

HW: Lesson 25 Problem Set

## Lesson 25: Congruence Criteria for Triangles—SAA and HL

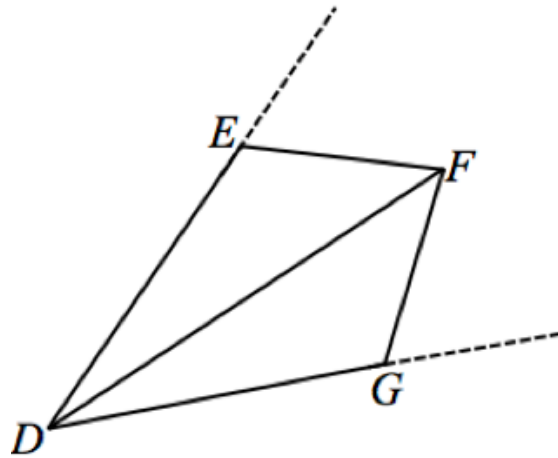
### DO NOW

Think... Write...Pair...Share

Write a proof for the following question. Once done, compare your proof with a neighbor's.

Given:  $DE = DG, EF = GF$

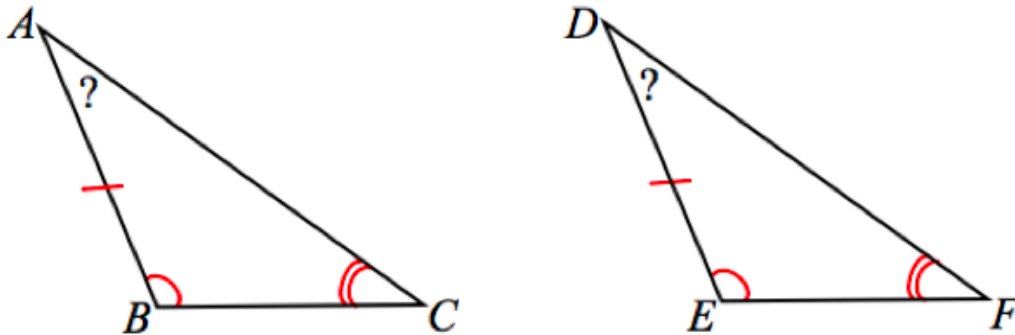
Prove:  $DF$  is the angle bisector of  $\angle EDG$



# SAA: Side - Angle- Angle

Consider a pair of triangles that meet the SAA criteria.

If you knew that two angles of one triangle corresponded to and were equal in measure to two angles of the other triangle, what conclusions can you draw about the third angles of each triangle?

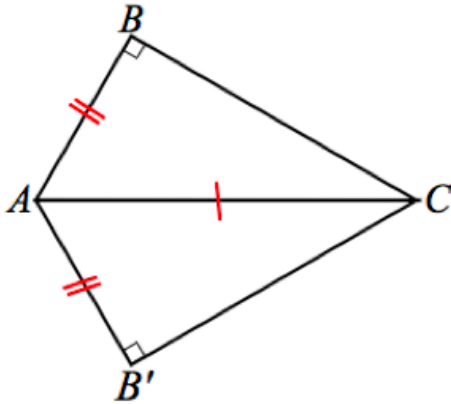


Given this conclusion, which formerly learned triangle congruence criteria can we use to determine if the pair of triangles are congruent?

Therefore, the SAA criterion is actually an extension of the \_\_\_\_\_ triangle congruence criterion.

**Conclusion:** [Given two triangles  \$ABC\$  and  \$A'B'C'\$  such that  \$AB = A'B'\$  \(Side\),  \$\angle B = \angle B'\$  \(Angle\), and  \$\angle C = \angle C'\$  \(Angle\), then the triangles are congruent.](#)

# HL : Hypotenuse - Leg



Think...Pair...Share...

Is there enough given information to know a rigid transformation will map  $\triangle A'B'C$  onto  $\triangle ABC$ ?

Can we draw in an **auxiliary line** to help us move towards the goal of proving the two triangles congruent?

Think...Pair...Share...

Look at the new triangles you have created. What do you notice about the angles?

Which formerly learned triangle congruence criteria can we use to determine if the pair of triangles are congruent?

Justify your answer.

**Hypotenuse-Leg triangle congruence criteria (HL):** Given two right triangles  $ABC$  and  $A'B'C'$  with right angles  $\angle B$  and  $\angle B'$ . If  $AB = A'B'$  (Leg) and  $AC = A'C'$  (Hypotenuse), then the triangles are congruent.

## SSA

Construct Triangle  $\triangle ABC$  given:  $AB = 11$ ,  $BC = 9$ , and  $\angle BAC = 23^\circ$ .

Compare your triangle with a partner. Are your two triangles congruent or are they different?

Do you think that SSA is enough criteria to claim congruence between triangles?

Justify your answer.

## AAA

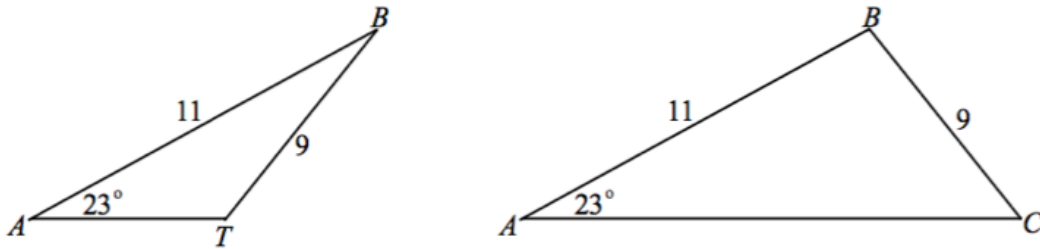
Think...Pair...Share

Using your knowledge of **dilations** from middle school, do you think AAA criteria is enough to prove triangle congruence.

Draw a picture to justify your answer.

## SSA

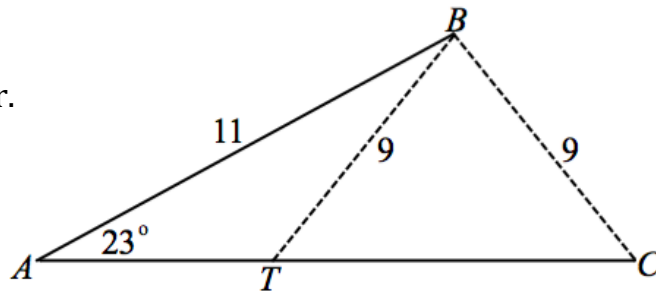
Construct Triangle  $\triangle ABC$  given:  $AB = 11$ ,  $BC = 9$ , and  $\angle BAC = 23^\circ$ .



Compare your triangle with a partner. Are your two triangles congruent or are they different?

Do you think that SSA is enough criteria to claim congruence between triangles?

Justify your answer.



The pattern of SSA cannot *guarantee* congruence criteria. In other words, two triangles under SSA criteria might be congruent, but they might not be; therefore we cannot categorize SSA as congruence criterion.

## AAA

Think...Pair...Share

Using your knowledge of **dilations** from middle school, do you think AAA criteria is enough to prove triangle congruence.

Draw a picture to justify your answer.

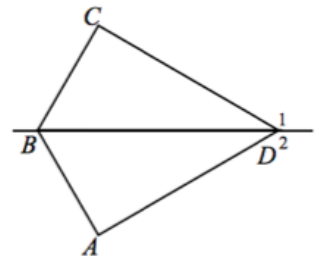
Even though the angle measures may be the same, the sides can be proportionally larger; you can have similar triangles in addition to a congruent triangle.

List all the triangle congruence criteria here: \_\_\_\_\_

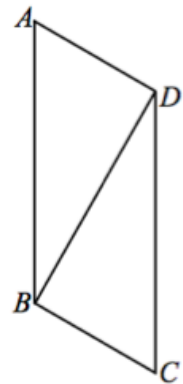
List the criteria that do not determine congruence here: \_\_\_\_\_

**Examples**

1. Given:  $BC \perp CD$ ,  $AB \perp AD$ ,  $\angle 1 = \angle 2$   
Prove:  $\triangle BCD \cong \triangle BAD$



2. Given:  $AD \perp BD$ ,  $BD \perp BC$ ,  $AB = CD$   
Prove:  $\triangle ABD \cong \triangle CDB$



Name \_\_\_\_\_

Date \_\_\_\_\_

**Lesson 25: Congruence Criteria for Triangles—SAA and HL****Exit Ticket**

1. Sketch an example of two triangles that meet the AAA criteria but are not congruent.

2. Sketch an example of two triangles that meet the SSA criteria that are not congruent.

Name \_\_\_\_\_

Date \_\_\_\_\_

**Lesson 25: Congruence Criteria for Triangles—SAA and HL****Exit Ticket**

1. Sketch an example of two triangles that meet the AAA criteria but are not congruent.

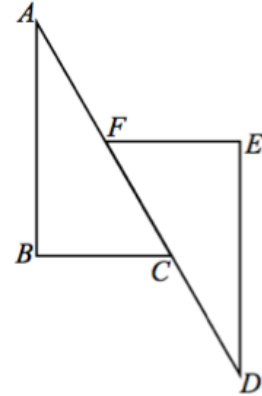
2. Sketch an example of two triangles that meet the SSA criteria that are not congruent.



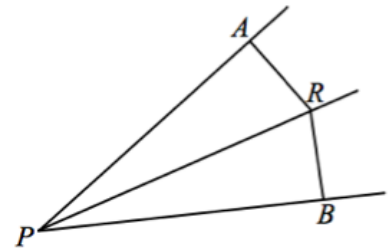
**Problem Set**

Use your knowledge of triangle congruence criteria to write proofs for each of the following problems.

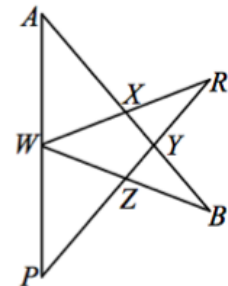
1. Given:  $AB \perp BC, DE \perp EF, BC \parallel EF, AF = DC$   
 Prove:  $\triangle ABC \cong \triangle DEF$



2. In the figure,  $PA \perp AR$  and  $PB \perp BR$  and  $R$  is equidistant from the lines  $PA$  and  $PB$ . Prove that  $PR$  bisects  $\angle APB$ .



3. Given:  $\angle A = \angle P, \angle B = \angle R, W$  is the midpoint of  $AP$   
 Prove:  $RW = BW$



4. Given:  $BR = CU$ , rectangle  $RSTU$   
Prove:  $\triangle ARU$  is isosceles

