

AGENDA

Lesson 24

Objective:

- SWBAT Prove Isosceles Triangle Theorem (ITT)
- Students will learn WHY any two **triangles** that satisfy the ASA and SSS criteria must be **congruent**.

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

- 1) Do Now - Construct and Compare w/ Partner
- 2) ITT Proof
- 3) ASA Proof
- 4) SSS Proof
- 5) Exercises
- 6) Exit Ticket

HW: Lesson 24 Problem Set

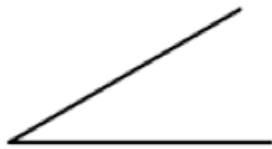
Lesson 24: Congruence Criteria for Triangles—ASA and SSS

DO NOW

Construct and Compare

Construct

Use the provided 30° angle as one base angle of an isosceles triangle. Use a compass and straight edge to construct an appropriate isosceles triangle around it.



Compare

Compare your constructed isosceles triangle with a neighbor's. Does the use of a given angle measure guarantee that all the triangles constructed in class have corresponding sides of equal lengths?

Lesson 24: Congruence Criteria for Triangles—ASA and SSS

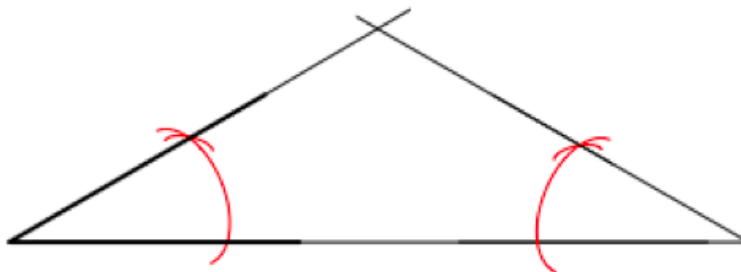
DO NOW

Construct and Compare

Construct

Opening Exercise

Use the provided 30° angle as one base angle of an isosceles triangle. Use a compass and straight edge to construct an appropriate isosceles triangle around it.



Compare

Compare your constructed isosceles triangle with a neighbor's. Does the use of a given angle measure guarantee that all the triangles constructed in class have corresponding sides of equal lengths?

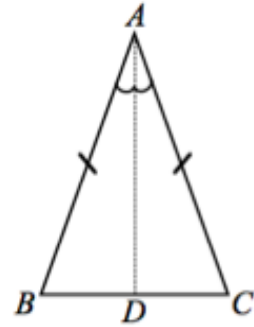
No, side lengths may vary.

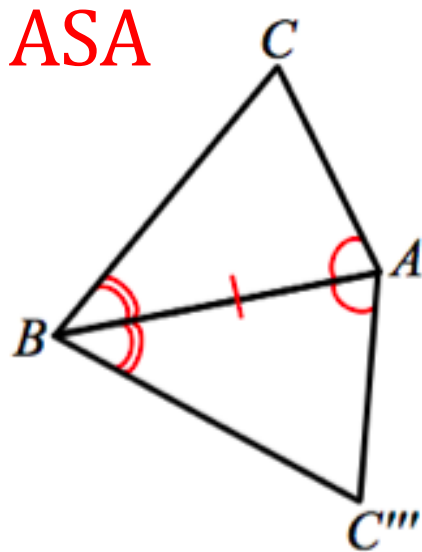
Prove Base Angles of an Isosceles are Congruent: SAS

Given: Isosceles $\triangle ABC$, with $AB = AC$.

Prove: $\angle B \cong \angle C$.

Construction: Draw the angle bisector \overline{AD} of $\angle A$, where D is the intersection of the bisector and BC . We are going to use this auxiliary line towards our SAS criteria.





Geogebra
Link

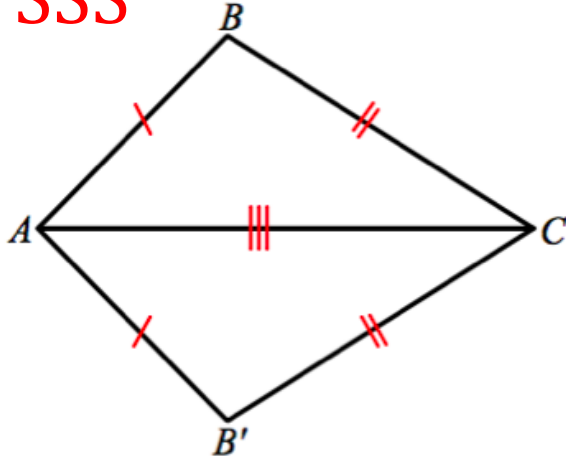
Think..Pair..Share...

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

What can we claim about the two triangles? **Justify** your answer.

Angle-Side-Angle triangle congruence criteria (ASA): Given two triangles ABC and $A'B'C'$. If $\angle CAB = \angle C'A'B'$ (Angle), $AB = A'B'$ (Side), and $\angle CBA = \angle C'B'A'$ (Angle), then the triangles are congruent.

SSS



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

Is there enough given information to know a rigid transformation will map $\triangle AB'C$ 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. Can we claim that the two triangles $\triangle AB'C$ and $\triangle ABC$ are congruent?

Justify your answer.

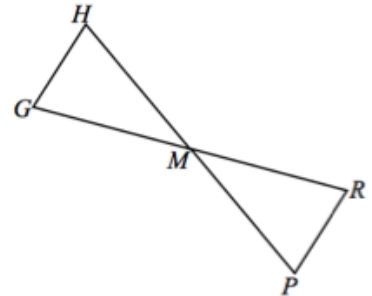
**Geogebra
Link**

Side-Side-Side triangle congruence criteria (SSS): Given two triangles ABC and $A'B'C'$. If $AB = A'B'$ (Side), $AC = A'C'$ (Side), and $BC = B'C'$ (Side) then the triangles are congruent.

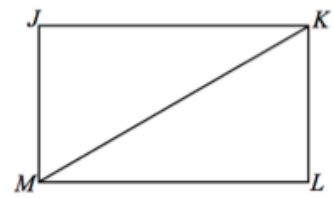
Exercises

Based on the information provided, determine whether a congruence exists between triangles. If a congruence between triangles exists, or if multiple congruencies exist, state the congruencies and the criteria used to determine them.

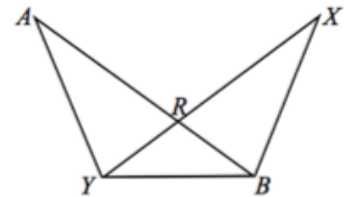
1. Given: M is the midpoint of HP , $\angle H = \angle P$.



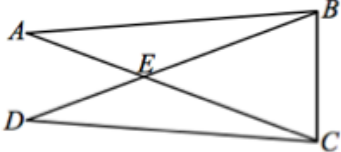
2. Given: Rectangle $JKLM$ with diagonal KM .



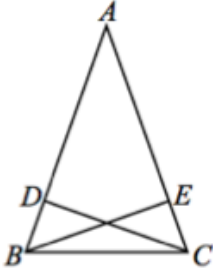
3. Given: $RY = RB$, $AR = XR$.



4. Given: $\angle A = \angle D, AE = DE$.



5. Given: $AB = AC, BD = \frac{1}{4}AB, CE = \frac{1}{4}AC$.



Name _____

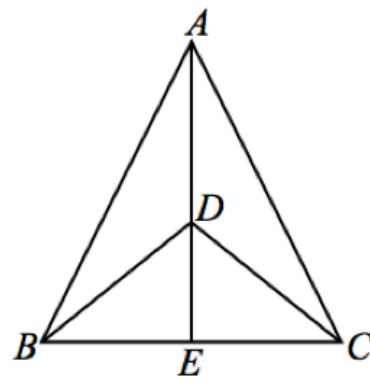
Date _____

Lesson 24: Congruence Criteria for Triangles—ASA and SSS**Exit Ticket**

Based on the information provided, determine whether a congruence exists between triangles.

If a congruence between triangles exists, or if multiple congruencies exist, state the congruencies and the criteria used to determine them.

Given: $BD = CD$, E is the midpoint of BC .



Name _____

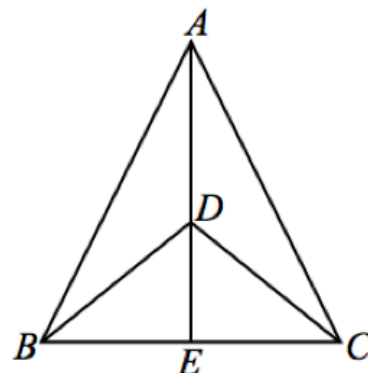
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Lesson 24: Congruence Criteria for Triangles—ASA and SSS**Exit Ticket**

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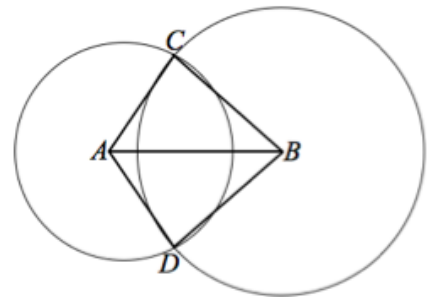
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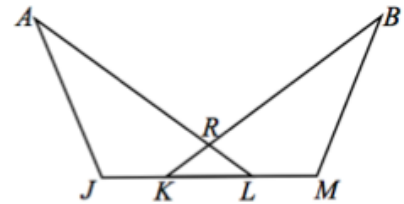
Problem Set

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

1. Given: Circles with centers A and B intersect at C and D .
 Prove: $\angle CAB \cong \angle DAB$.



2. Given: $\angle J = \angle M, JA = MB, JK = KL = LM$.
 Prove: $KR = LR$.



3. Given: $\angle w = \angle x$ and $\angle y = \angle z$.
 Prove: (1) $\triangle ABE \cong \triangle ACE$.
 (2) $AB = AC$ and $AD \perp BC$.

