Geometry B Live Lesson Class

U1L5 – Review of Congruent Triangles

Agenda

1. Review topics from Unit 1, Lessons 5.

2. Use the 2-column note system to take better notes in math class. Bring your math notebook and pen or pencil to each math LiveLesson class.

2-Column Notes Template

1. Announcements/To Do's	1. Write down important details.
2. School-Wide Learner Outcomes	2. What are you going to work on this week?
3. LL Objectives	
4. Vocabulary words	4. Definitions (fill in as we go)
5. Problems	5. Steps to solving problems
6. Summary (End of class)	6. 1 or 2 sentences about the LL class.

Reminders and To – Do's

Information	What to do
1. Complete 1 math lesson per day.	1. Go to your Planner in Connexus to find the math lesson for the day
2. Check your WebMail every day	2. Go to Connexus to find WebMail
3. Be prepared to spend 4 - 6 hours per day on schoolwork.	3. Complete lessons for the day from your Planner. Do not get behind on lessons.
4. Remind your Learning Coach to take daily attendance	4. Have your Learning Coach log into Connexus daily.

Reminders and To – Do's

Information	What to do
5. Go to the Message Board first for information about our math class.	
6. Contact Mr. Elizondo for math questions. Remember: You need at least 2 phone calls with Mr. Elizondo per semester.	6. Call (559) 549 - 3244 and leave a voicemail if call is not answered. Make an appointment at: https://elizondo.youcanbook.me Send a WebMail

U1L5 – Objectives

- Recognize congruent figures and their corresponding parts
- Prove two triangles congruent using the SSS and SAS Postulates
- Prove two triangles congruent using the SSS and SAS Postulates
- Prove two triangles congruent using the ASA Postulate and the AAS Theorem
- Use triangle congruence and corresponding parts of congruent triangles to prove that parts of two triangles are congruent
- Use and apply properties of isosceles and equilateral triangles
- Prove right triangles congruent using the Hypotenuse-Leg Theorem
- Identify congruent overlapping triangles
- Prove two triangles congruent using other congruent triangles

U1L5 – Key Words

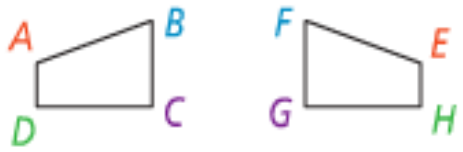
take note

Key Concept Congruent Figures

Definition

Congruent polygons have congruent corresponding parts—their matching sides and angles. When you name congruent polygons, you must list corresponding vertices in the same order.

Example



$ABCD \cong EFGH$

$\overline{AB} \cong \overline{EF}$ $\quad \overline{BC} \cong \overline{FG}$

$\overline{CD} \cong \overline{GH}$ $\quad \overline{DA} \cong \overline{HE}$

$\angle A \cong \angle E$ $\quad \angle B \cong \angle F$

$\angle C \cong \angle G$ $\quad \angle D \cong \angle H$

U1L5 – Concept Corner, Third Angles Theorem

take note

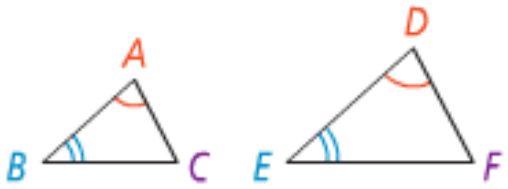
Theorem 4-1 Third Angles Theorem

Theorem

If two angles of one triangle are congruent to two angles of another triangle, then the third angles are congruent.

If . . .

$\angle A \cong \angle D$ and $\angle B \cong \angle E$



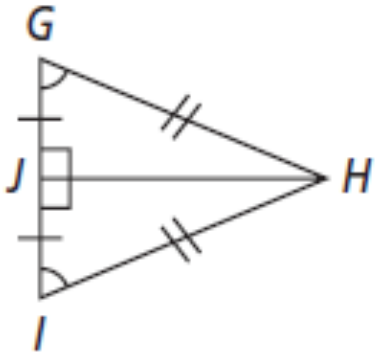
Then . . .

$\angle C \cong \angle F$

U1L5 – Practice Problems, Congruent Figures

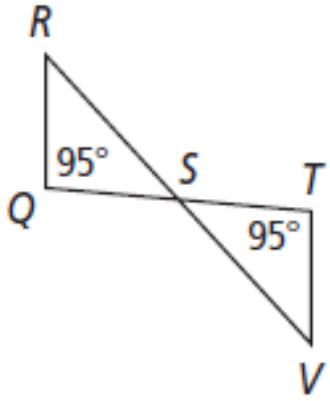
Can you conclude that the figures are congruent? How?

$\triangle GHJ$ and $\triangle IHJ$



HL – $Hypotenuse\ Leg$

$\triangle QRS$ and $\triangle GHJ$



Not enough info for congruency

U1L5 – Concept Corner, Side-Side-Side Postulate

take note

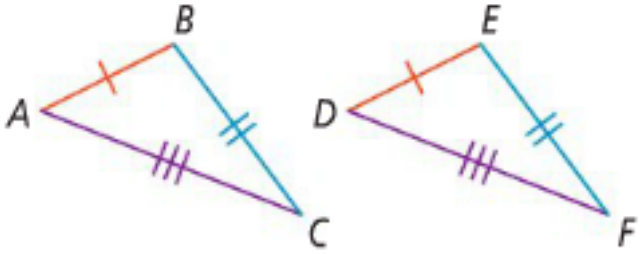
Postulate 4-1 Side-Side-Side (SSS) Postulate

Postulate

If the three sides of one triangle are congruent to the three sides of another triangle, then the two triangles are congruent.

If . . .

$\overline{AB} \cong \overline{DE}$, $\overline{BC} \cong \overline{EF}$, $\overline{AC} \cong \overline{DF}$



Then . . .

$\triangle ABC \cong \triangle DEF$

SSS

U1L5 – Concept Corner, Side-Angle-Side Postulate

take note

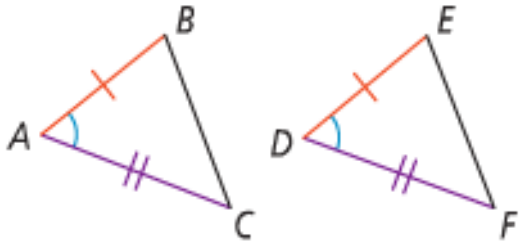
Postulate 4-2 Side-Angle-Side (SAS) Postulate

Postulate

If two sides and the included angle of one triangle are congruent to two sides and the included angle of another triangle, then the two triangles are congruent.

If . . .

$\overline{AB} \cong \overline{DE}$, $\angle A \cong \angle D$, $\overline{AC} \cong \overline{DF}$



Then . . .

$\triangle ABC \cong \triangle DEF$

SAS

U1L5 – Concept Corner, Angle-Side-Angle Postulate

take note

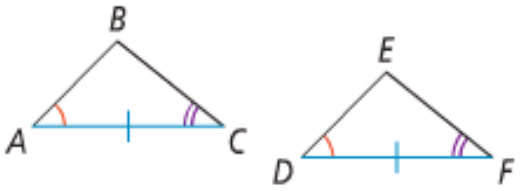
Postulate 4-3 Angle-Side-Angle (ASA) Postulate

Postulate

If two angles and the included side of one triangle are congruent to two angles and the included side of another triangle, then the two triangles are congruent.

If . . .

$\angle A \cong \angle D$, $\overline{AC} \cong \overline{DF}$, $\angle C \cong \angle F$



Then . . .

$\triangle ABC \cong \triangle DEF$

U1L5 – Concept Corner, Angle-Angle-Side Theorem

take note

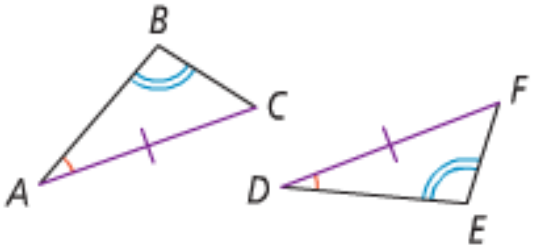
Theorem 4-2 Angle-Angle-Side (AAS) Theorem

Theorem

If two angles and a nonincluded side of one triangle are congruent to two angles and the corresponding nonincluded side of another triangle, then the triangles are congruent.

If . . .

$\angle A \cong \angle D$, $\angle B \cong \angle E$, $\overline{AC} \cong \overline{DF}$



Then . . .

$\triangle ABC \cong \triangle DEF$

U1L5 – Concept Corner, Reasons for Proofs

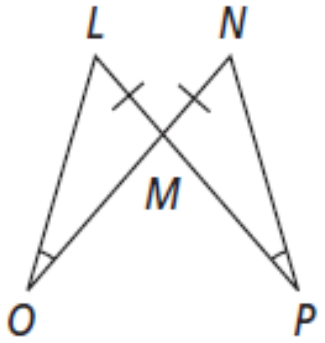
Here are some definitions, properties, and theorems that are useful to remember for triangle congruence.

- Reflexive Property
- Definition of bisector/midpoint
- Parallel lines and special angle pairs
- All right angles are congruent
- Vertical angles theorem

U1L5 – Practice Problems, Proofs

Given: $\angle LOM \cong \angle NPM$, $\overline{LM} \cong \overline{NM}$

Prove: $\triangle LOM \cong \triangle NPM$



Statements	Reasons
$\angle LOM \cong \angle NPM$	Given
$\overline{LM} \cong \overline{NM}$	Given
$\angle LMO \cong \angle NMP$	Vertical Angles are congruent
$\Delta LOM \cong \Delta NPM$	AAS

U1L5 – Concept Corner, CPCTC

Once you know that two triangles are congruent, you can conclude that all

Corresponding **P**arts of **C**ongruent **T**riangles are **C**ongruent (CPCTC)

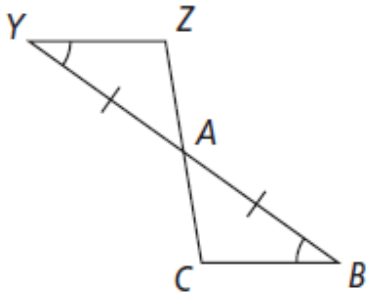
This is the definition of congruent figures

When completing a proof, first prove that triangles are congruent. Then you can prove that corresponding parts are congruent by using the reason 'CPCTC.'

U1L5 – Practice Problems, Proofs

Given: $\overline{YA} \cong \overline{BA}$, $\angle B \cong \angle Y$

Prove: $\overline{AZ} \cong \overline{AC}$



Statements	Reasons
1) $\overline{YA} \cong \overline{BA}$, $\angle B \cong \angle Y$	1) ? Given
2) $\angle YAZ$ and $\angle BAC$ are vertical angles.	2) Definition of vertical angles
3) $\angle YAZ \cong \angle BAC$	3) ? Vertical Angles are congruent
4) ? $\Delta YAZ \cong \Delta BAC$	4) ? ASA
5) ? $AZ \cong AC$	5) ? CPCTC

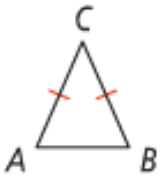
U1L5 – Concept Corner, Isosceles Triangle Theorems

take note

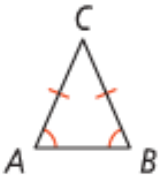
Theorem 4-3 Isosceles Triangle Theorem

Theorem
If two sides of a triangle are congruent, then the angles opposite those sides are congruent.

If . . .
$\overline{AC} \cong \overline{BC}$



Then . . .
$\angle A \cong \angle B$

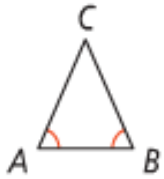


take note

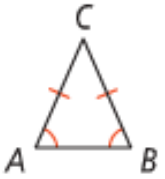
Theorem 4-4 Converse of the Isosceles Triangle Theorem

Theorem
If two angles of a triangle are congruent, then the sides opposite those angles are congruent.

If . . .
$\angle A \cong \angle B$



Then . . .
$\overline{AC} \cong \overline{BC}$



U1L5 – Concept Corner, Isosceles Triangle Theorems

take note

Theorem 4-5

Theorem

If a line bisects the vertex angle of an isosceles triangle, then the line is also the perpendicular bisector of the base.

If . . .

$\overline{AC} \cong \overline{BC}$ and

$\angle ACD \cong \angle BCD$

Then . . .

$\overline{CD} \perp \overline{AB}$ and

$\overline{AD} \cong \overline{BD}$

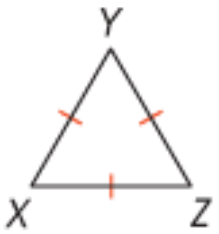
U1L5 – Concept Corner, Equilateral Triangle Theorems

take note

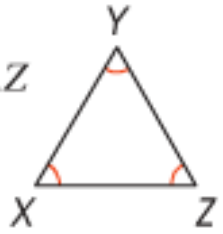
Corollary to Theorem 4-3

Corollary
If a triangle is equilateral, then the triangle is equiangular.

If . . .
$\overline{XY} \cong \overline{YZ} \cong \overline{ZX}$



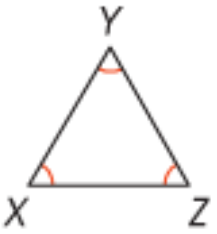
Then . . .
$\angle X \cong \angle Y \cong \angle Z$



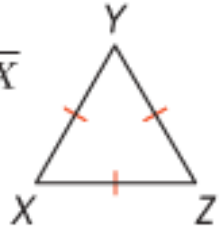
Corollary to Theorem 4-4

Corollary
If a triangle is equiangular, then the triangle is equilateral.

If . . .
$\angle X \cong \angle Y \cong \angle Z$



Then . . .
$\overline{XY} \cong \overline{YZ} \cong \overline{ZX}$

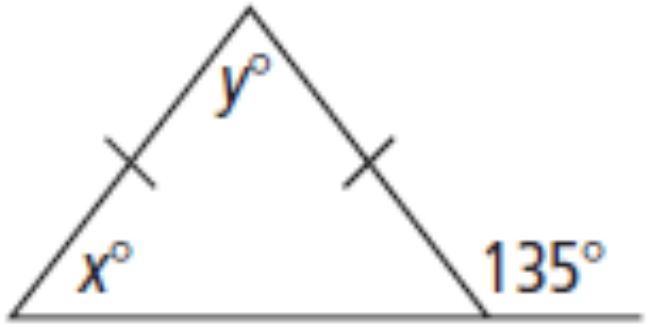


U1L5 – Practice Problems, Missing Angles

Find the values of x and y.

$$x = 45°$$

$$y = 90°$$



U1L5 – Concept Corner, Right Triangle Theorems

take note

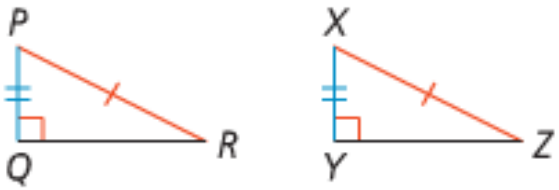
Theorem 4-6 Hypotenuse-Leg (HL) Theorem

Theorem

If the hypotenuse and a leg of one right triangle are congruent to the hypotenuse and a leg of another right triangle, then the triangles are congruent.

If . . .

$\triangle PQR$ and $\triangle XYZ$ are right $\triangle$s, $\overline{PR} \cong \overline{XZ}$, and $\overline{PQ} \cong \overline{XY}$



Then . . .

$\triangle PQR \cong \triangle XYZ$

U1L5 – Concept Corner, HL Theorem

take note

Key Concept Conditions for HL Theorem

To use the HL Theorem, the triangles must meet three conditions.

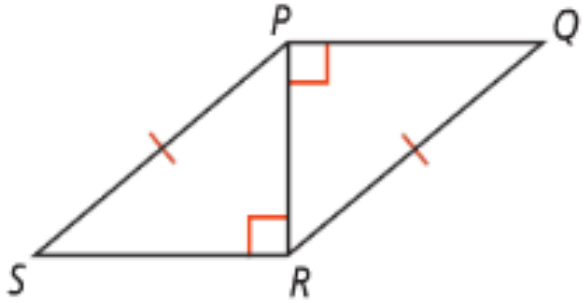
Conditions

- There are two right triangles.
- The triangles have congruent hypotenuses.
- There is one pair of congruent legs.

U1L5 – Practice Problems, Proofs

Given: $\angle PRS$ and $\angle RPQ$ are right angles, $\overline{SP} \cong \overline{QR}$

Prove: $\triangle PRS \cong \triangle RPQ$



Statements	Reasons
1. $\angle PRS$ *and* $\angle RPQ$ are right angles, $\overline{SP} \cong \overline{QR}$	1. Given
2. ΔPRS *and* ΔRPQ are right triangles	2. Defn. of right triangle
3. $\overline{PR} \cong \overline{RP}$	3. Reflexive Prop.
4. $\Delta PRS \cong \Delta RPQ$	4. HL

Questions?

- Check the Message Board first
- Send a WebMail
- You can also make an appointment at https://elizondo.youcanbook.me
- You can also call me at (559) 549-3244. If I'm not available to answer your call, please leave a voicemail with your full name and phone number.