Geometry B Live Lesson Class

U1L3 – Review of Reasoning and Proof

Agenda

1. Review topics and problems from Unit 1, Lesson 3.

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

California Common Core State Standards

- HSG-CO.A.1: Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.
- HSG-CO.C.9: Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.
- HSG-CO.D.12: Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.
- HSG-GPE.B.4: Use coordinates to prove simple geometric theorems algebraically.
- HSG-GPE.B.7: Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.
- HSN-Q.A.1: Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

U1L3 – Objectives

- Recognize conditional statements and their parts
- Write converses, inverses, and contrapositives of conditionals
- Write biconditionals and recognize good definitions
- Connecting reasoning in algebra and geometry
- Prove and apply theorems about angles.

U1L3 – Key Words – Conditional Statements

take note

Key Concept Conditional Statements

Definition

A **conditional** is an *if-then* statement.

The **hypothesis** is the part p following *if*.

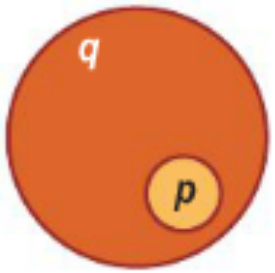
The **conclusion** is the part q following *then*.

Symbols

$p \rightarrow q$

Read as "if p then q" or "p implies q."

Diagram



U1L3 - Conditional Statements

take note

Key Concept Related Conditional Statements

Statement	How to Write It	Example	Symbols	How to Read It
Conditional	Use the given hypothesis and conclusion.	If $m\angle A = 15$, then $\angle A$ is acute.	$p \rightarrow q$	If p, then q.
Converse	Exchange the hypothesis and the conclusion.	If $\angle A$ is acute, then $m\angle A = 15$.	$q \rightarrow p$	If q, then p.
Inverse	Negate both the hypothesis and the conclusion of the conditional.	If $m\angle A \neq 15$, then $\angle A$ is not acute.	$\sim p \rightarrow \sim q$	If not p, then not q.
Contrapositive	Negate both the hypothesis and the conclusion of the converse.	If $\angle A$ is not acute, then $m\angle A \neq 15$.	$\sim q \rightarrow \sim p$	If not q, then not p.

U1L3 - Biconditional Statements

A **biconditional** is a single true statement that combines a true conditional and its true converse.

take note

Key Concept Biconditional Statements

A biconditional combines $p \rightarrow q$ and $q \rightarrow p$ as $p \leftrightarrow q$.

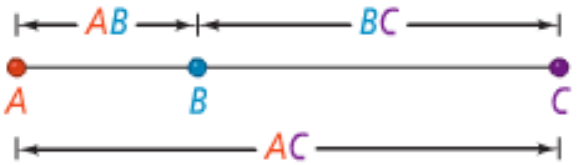
Example	Symbols	How to Read It
A point is a midpoint if and only if it divides a segment into two congruent segments.	$p \leftrightarrow q$	"p if and only if q"

U1L3 – Review of Postulates

take note

Postulate 1-6 Segment Addition Postulate

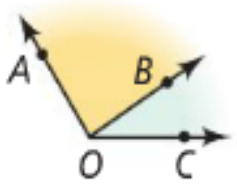
If three points A, B, and C are collinear and B is between A and C, then $AB + BC = AC$.



take note

Postulate 1-8 Angle Addition Postulate

If point B is in the interior of $\angle AOC$, then $m\angle AOB + m\angle BOC = m\angle AOC$.



U1L3 – Key Words, Properties of Equality

take note

Key Concept Properties of Equality

Let a, b, and c be any real numbers.

Addition Property	If $a = b$, then $a + c = b + c$.
Subtraction Property	If $a = b$, then $a - c = b - c$.
Multiplication Property	If $a = b$, then $a \cdot c = b \cdot c$.
Division Property	If $a = b$ and $c \neq 0$, then $\frac{a}{c} = \frac{b}{c}$.

U1L3 – Key Words, Properties of Congruence

take note

Key Concept Properties of Congruence

Reflexive Property	$\overline{AB} \cong \overline{AB}$ $\quad \angle A \cong \angle A$
Symmetric Property	If $\overline{AB} \cong \overline{CD}$, then $\overline{CD} \cong \overline{AB}$.
	If $\angle A \cong \angle B$, then $\angle B \cong \angle A$.
Transitive Property	If $\overline{AB} \cong \overline{CD}$ and $\overline{CD} \cong \overline{EF}$, then $\overline{AB} \cong \overline{EF}$.
	If $\angle A \cong \angle B$ and $\angle B \cong \angle C$, then $\angle A \cong \angle C$.
	If $\angle B \cong \angle A$ and $\angle B \cong \angle C$, then $\angle A \cong \angle C$.

U1L3 – Concept Corner, Distributive Property

take note

Key Concept The Distributive Property

Use multiplication to distribute a to each term of the sum or difference within the parentheses.

Sum:

$$a(b + c) = a(b + c) = ab + ac$$

Difference:

$$a(b - c) = a(b - c) = ab - ac$$

U1L3 – Concept Corner – Vertical Angles Theorem

take note

Theorem 2-1 Vertical Angles Theorem

Vertical angles are congruent.

$\angle 1 \cong \angle 3$ and $\angle 2 \cong \angle 4$

- You can write a theorem as a conditional statement.

U1L3 – Concept Corner, Congruent Supplements Theorem

take note

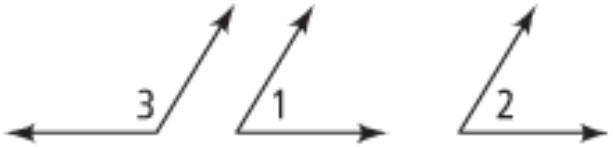
Theorem 2-2 Congruent Supplements Theorem

Theorem

If two angles are supplements of the same angle (or of congruent angles), then the two angles are congruent.

If . . .

$\angle 1$ and $\angle 3$ are supplements and $\angle 2$ and $\angle 3$ are supplements



Then . . .

$\angle 1 \cong \angle 2$

You will prove Theorem 2-2 in Problem 3.

U1L3 – Concept Corner, Congruent Complements Theorem

take note

Theorem 2-3 Congruent Complements Theorem

Theorem

If two angles are complements of the same angle (or of congruent angles), then the two angles are congruent.

If . . .

$\angle 1$ and $\angle 2$ are complements and $\angle 3$ and $\angle 2$ are complements

Then . . .

$\angle 1 \cong \angle 3$

You will prove Theorem 2-3 in Exercise 13.

U1L3 – Concept Corner, More Theorems

Theorem 2-4

Theorem
All right angles are congruent.

If . . .
$\angle 1$ and $\angle 2$ are right angles

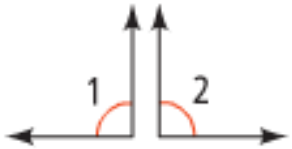
Then . . .
$\angle 1 \cong \angle 2$

You will prove Theorem 2-4 in Exercise 18.

Theorem 2-5

Theorem
If two angles are congruent and supplementary, then each is a right angle.

If . . .
$\angle 1 \cong \angle 2$, and $\angle 1$ and $\angle 2$ are supplements



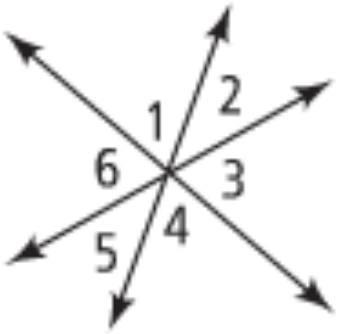
Then . . .
$m\angle 1 = m\angle 2 = 90$

You will prove Theorem 2-5 in Exercise 23.

U1L3 – Practice Problems, Proof

Given: $\angle 1 \cong \angle 3$

Prove: $\angle 6 \cong \angle 4$



Statements	Reasons
1) $\angle 1 \cong \angle 3$	1) Given
2) $\angle 3 \cong \angle 6$	2) a. ? Vertical angles are congruent
3) b. ? $\angle 1 \cong \angle 6$	3) Transitive Property of Congruence
4) $\angle 1 \cong \angle 4$	4) c. ? Vertical angles are congruent
5) $\angle 6 \cong \angle 4$	5) d. ? Transitive Property of Congruence

U1L3 – Practice Problems, Conditional Statements

Write the converse, inverse, and contrapositive of the true conditional statement. Write the truth value of each.

If it is Monday, then I have Geometry LiveLesson class. True

- Converse:

If I have a Geometry LiveLesson class, then it is Monday. False

- Inverse:

If it is not Monday, then I do not have a Geometry LL class. False

- Contrapositive:

If I have a do not have a Geometry LiveLesson class, then it is not Monday. True

U1L3 – Practice Problems, Vertical Angles

Find the value of x.

$$3x = 2x + 40$$

$$3x - 2x = 2x - 2x + 40$$

$$\boldsymbol{x = 40}$$

U1L3 – Practice Problems, Proof Practice

Given: $QS = 42$

Prove: $x = 13$

Statements	Reasons
1) $QS = 42$	1) a. ? Given
2) $QR + RS = QS$	2) b. ? Segment Add. Postulate
3) $(x + 3) + 2x = 42$	3) c. ? Substitution
4) $3x + 3 = 42$	4) d. ? Combine like terms
5) $3x = 39$	5) e. ? Subtraction Prop. of Equality
6) $x = 13$	6) f. ? Division Prop. of Equality

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.