Geometry – Mr. Bo
Unit 2 – Day 1 Notes

Name: _____
Date: _____

Logical Statements

Negation: Switch the truth value (Adding or Removing "NOT")

Ex: ∠B is a right angle. **Negation:** ∠B is not a right angle.

Ex: $\overline{AB}$ *and* $\overline{CD}$ are not perpendicular. **Negation:** $\overline{AB}$ and $\overline{CD}$ are perpendicular.

Disjunction: "OR" True when either parts is true.

Ex: *A right angle is 90°* **or** *a midpoint divides a segment in half.* ← this statement must then be true.

True + True

Ex: *An acute angle is more than 90°* **or** *supplementary angles add to 180°.*

False + True = False.

Conjunction: "And" True when Both parts are true

Ex: *A straight angle is not 180°* **and** *parallel lines are always coplanar.*

False + True = False

Ex: *Skew lines never intersect* **and** *parallel planes never intersect.*

True + True = True

Conditional: "If... then"

Ex: If *2 angles are right*, **then** *they are congruent.* ← Right ∠ theorem

hypothesis (Given) conclusion (Result)

Ex. If *2 angles are vertical*, **then** *they are congruent.* ← Vertical ∠ theorem.

hypothesis (Given) conclusion. (Result)

Right Angle Theorem: If [condition: 2 <'s are Right,] then [conclusion: they are congruent.]

Switch **Converse:** If 2 <'s are ~~congruent~~ then the angles are Right.

negate **Inverse:** If 2 <'s are not Right then they are not congruent.

Both. **Contrapositive:** If 2 <'s are not congruent then they are not right.

Ex: Write a conditional that is logically equivalent to: (the contra-positive.)

"If a segment [condition: is a segment bisector,] then it [conclusion: passes through the midpoint of another segment.]"

If a segment does not pass through the midpoint of a segment, then it is not a segment bisector.

Bi-conditional: "If and only if" ← 2 conditionals put together.

Ex: *An angle* [is acute,] **if and only if** *it* [is less than 90°]

Conditional #1: If an angle is acute, then it is less than 90°

Conditional #2: If an angle is less than 90°, then it is acute.

Ex: Write the converse of the statement. If the converse is true, combine both statements into a single bi-conditional.

True 1. "*If two segments* [have the same measure,] *then* [they are congruent.]"

True **Converse:** If 2 segments are $\cong$, then they have the same measure.

Bi-conditional: 2 segments have the same measure if and only if they are congruent.

True 2. "If 2 angles [are vertical,] then they [are congruent.]"

False **Converse:** If 2 angles are $\cong$, then they are vertical.

Bi-conditional: Can't do a Bi-conditional because the converse is false.