Name:	Date:
Topic: Module 3 : LoGiC	Class: Period: ___

Main Ideas/Questions	Notes/Examples
INDUCTIVE Reasoning	
CONJECTURE	

Directions: Find the next five terms of the sequence. Then write a conjecture.

1. 38, 31, 24, 17, _____, _____, _____, _____, _____

Conjecture: _____

2. 2, 5, 11, 23, _____, _____, _____, _____, _____

Conjecture: _____

3. 1, 4, 9, 16, _____, _____, _____, _____, _____

Conjecture: _____

COUNTEREXAMPLE	

Directions: Determine whether the conjecture is true or false. If false, provide a counterexample.

4. Squaring a number and adding one will always result in an even number.

5. Vertical angles are never complementary angles.

6. The product of two numbers is always larger than either number.

7. If $LM = MP$, then M must be the midpoint of $\overline{LP}$.

Main Ideas/Questions	Notes/Examples
STATEMENT	• A statement is a sentence that is either _____ or _____. • This is called the _____ _____. • Represented using letters such as _____ or _____
	EXAMPLE: p: Supplementary angles have a sum of 180°. — **Truth Value:**
NEGATION	• A negation of a statement has the _____ truth value. • Shown by the symbol _____. ← Read as "not p"
	EXAMPLE: $\sim p$: Supplementary angles do not have a sum of 180°. — **Truth Value:**
COMPOUND *Statements*	
CONJUNCTION	• Statements joined by the word _____. • Written as p _____ q. • True when _____ statements are _____.
DISJUNCTION	• Statements joined by the word _____. • Written as p _____ q. • True when _____ _____ _____ statement is _____.
CONDITIONAL *Statements*	• A statement that can be written in _____-_____ form. **Symbolic Form:** _____ ← Read as "if p, then q" or, "p _____ q". • The _____ is the phrase that immediately follows _____. • The _____ is the phrase that immediately follows _____.
EXAMPLES	**Identify the hypothesis and conclusion of the following conditional statements:**
	1. If you live in Nashville, then you live in Tennessee. **Hypothesis:** _____ **Conclusion:** _____
	2. If the sum of the measures of two angles is 90°, then they are complementary angles. **Hypothesis:** _____ **Conclusion:** _____
	3. If a quadrilateral is a square, then it has four right angles. **Hypothesis:** _____ **Conclusion:** _____

RELATED CONDITIONAL	DEFINITION	SYMBOLIC FORM
INVERSE	Formed by _____ the hypothesis and conclusion.	
CONVERSE	Formed by _____ the hypothesis and conclusion.	
CONTRAPOSITIVE	Formed by _____ and _____ the hypothesis and conclusion.	

Directions: Write the inverse, converse, and contrapositive of the following conditional statements. Determine the truth value. If false, provide a counterexample.

1. If it is Saturday, then there is no school.

- **Inverse:** _____

  Truth Value: _____

- **Converse:** _____

  Truth Value: _____

- **Contrapositive:** _____

  Truth Value: _____

Main Ideas/Questions	Notes/Examples
BICONDITIONAL *Statements*	• **Definition:** _____ _____ • **Symbolic Form:** $(p \rightarrow q) \wedge (q \rightarrow p)$: _____ • **Read as "** _____ **"** • **Truth Value:** Biconditional statements are true when _____ _____ and _____ are _____!

Directions: Given the biconditional statement below, write both the conditional and converse. Determine the truth value of the biconditional. Explain why it is true or false.

1. Two angles are supplementary if and only if the sum of their measures is 180°.

Conditional: _____

_____

Converse: _____

_____

Truth Value? _____

Main Ideas/Questions	Notes/Examples
DEDUCTIVE *Reasoning*	
LAW OF DETACHMENT	**Given a conditional statement, if the _____ is _____, then the _____ is _____.** **LAW OF DETACHMENT** **Symbolic Map:** $p \to q$ p $\therefore q$

Directions: Use the Law of Detachment to give a valid conclusion. If not possible, write *no valid conclusion.*

Given: If a quadrilateral is a rhombus, then it is also a parallelogram.
Quadrilateral *ABCD* is a rhombus.

Conclusion: _____

Given: If the sum of the measures of two angles is 90°, then they are complementary.
$m\angle J = 58°$ and $m\angle K = 32°$

Conclusion: _____

LAW OF SYLLOGISM	**Allows you to draw a conclusion from _____ conditional statements in which the _____ of the first statement is the _____ of the second statement.** **LAW OF SYLLOGISM** **Symbolic Map:** $p \to q$ $q \to r$ $\therefore p \to r$

Directions: Use the Law of Syllogism to give a valid conclusion. If not possible, write *no valid conclusion.*

Given: If a quadrilateral is a square, then it is a rectangle.
If a quadrilateral is a rectangle, then it has four right angles.

Conclusion: _____

Given: If a number is divisible by 12, then it is divisible by 6.
If a number is divisible by 6, then it is divisible by 3.

Conclusion: _____