Name _____ Date _____ Period 2

Writing Conditional Statements

Lesson Objective IWBAT identify the hypothesis + conclusion of a conditional statement; negate statements; write the inverse, converse, and contrapositive of a conditional statement.

Conditional Statement: A conditional statement is a logical statement that has two parts, a hypothesis, and a conclusion.

→ When a conditional statement is written, it is written in "if- then" form.
- The "if" part contains the hypothesis
- The "then" part contains the conclusion

Example: Use one color to highlight the hypothesis, and another color to highlight the conclusion. Then, write the statement in "If-Then" form, if it isn't already given in that form.

1. If you are in New York City, then you are in the United States.

2. You are in Texas if you are in Houston.
   If you are in Houston, then you are in Texas
3. All 30° angles are acute angles.
   If an angle is 30°, then it is acute.

Negation: The negation of a statement is the opposite of the original statement.

→ To write the negation of statement p, you write the **symbol for negation** (~) before the letter

Words: not p **Symbol:** ~p

Example: Write the negation of each statement.

4. The ball is red.
   The ball is not red
5. The cat is *not* black.
   The cat is black

Related Conditionals

Consider the conditional statement:

Words: If p, then q. **Symbols**: $p \rightarrow q$

Converse: To write the converse of a conditional statement, exchange the hypothesis and conclusion

Words: If q, then p. **Symbols:** $q \rightarrow p$

Inverse: To write the inverse of a conditional statement, negate the hypothesis and conclusion

Words: If not p, then not q. **Symbols:** $\sim p \rightarrow \sim q$

Contrapositive: To write the contrapositive of a conditional statement, first write the converse. Then, negate the hypothesis and conclusion.

Words: If not q, then not p **Symbols:** $\sim q \rightarrow \sim p$

Example:

6. Let *p* be "you are a guitar player" and let *q* be "you are a musician." Write each statement in words. Then decide whether each is *true* or *false* by circling either T or F.

a. The Conditional Statement (T / F)

If you are a guitar player, then you are a musician

b. The Converse (T / F)

If you are a musician, then you are a guiter player.

c. The Inverse (T / F)

If you are not a guitar player, then you are not a musician.

d. The Contrapositive (T / F)

If you are not a musician, then you are not a guitar player.

Example:

7. Let *p* be "the stars are visible" and let *q* be "it is night." Write each statement in words. Then decide whether each is *true* or *false* by circling either T or F.

a. The Conditional Statement (T / F)

b. The Converse (T / F)

c. The Inverse (T / F)

d. The Contrapositive (T / F)