

# Section 2-1: Conditional Statements

# Conditional

- A statement that can be written in *If-then* form
- symbol: If  $p$ , then  $q$   $p \longrightarrow q$
- *If I let go of the pencil then it will fall*

# Converse

- The statement formed by *exchanging* the *hypothesis* and *conclusion* of the conditional statement
- symbol:  $q \longrightarrow p$
- *if the pencil falls then I let go of it*

# Inverse

- The statement formed by *negating* the *hypothesis* and *conclusion* of the conditional statement
- symbol:  $\sim p \longrightarrow \sim q$
- *if I don't let go of the pencil then it won't fall*

# Contrapositive

- The statement formed by *exchanging* AND *negating* the *hypothesis* and *conclusion* of the conditional statement
- symbol:  $\sim q \longrightarrow \sim p$
- *If the pencil does not fall then I didn't let go of it*

*If I let go of the pencil then it will fall.*

1. If the pencil doesn't fall then I did not let go of it. \_\_\_\_\_
2. If the pencil falls then I let go of it. \_\_\_\_\_
3. If I don't let go of the pencil then it will not fall. \_\_\_\_\_

**A) converse**

**B) inverse**

**C) contrapositive**

# Truth Value

1. If Leo is late, he gets detention. \_\_\_\_\_ **T**
2. If Leo is not late, he doesn't get detention \_\_\_\_\_ **F**
3. If Leo gets detention, he was late \_\_\_\_\_ **F**
4. If Leo doesn't get detention, he was not late. \_\_\_\_\_ **T**

**A) converse**

**B) inverse**

**C) contrapositive**

# Biconditional Statements

- can be written in the form “*p* if and only if *q*”, which means “if *p*, then *q*” and “if *q*, then *p*”
- are *reversible*
- contain the *conditional* AND *converse* statements
- “*if and only if*” shorthand: *iff*

# Biconditional Statements

An angle is a right angle if and only if it measures 90 degrees

If an angle is a right angle, it measures 90 degrees

If an angle measures 90 degrees, it is a right angle