Geometry Info Sheet #9

Biconditional Statements; New Theorems

Definitions

Biconditional: The combination of a conditional statement and its converse; a Biconditional statement contains the phrase "if and only if" (sometimes written as "iff"); when a conditional statement and its converse are both true, their biconditional is also true; definitions written as conditional statements can always be written as biconditionals

Conjunction: A compound statement that uses the word *and* to connect simple statements

Disjunction: A compound statement that uses the word *or* to connect simple statements

Exclusive *or*: Generally used in everyday language, meaning "one or the other, but not both"

Inclusive *or*: Generally used in mathematics, meaning "one or the other, or both"

Examples of Biconditional Statements

Definition: Perpendicular lines are two lines that intersect to form right angles.
Conditional: If two lines are perpendicular, then they intersect to form right angles.
Converse: If two lines intersect to form right angles, then they are perpendicular.
Biconditional: Two lines are perpendicular if and only if they intersect to form right angles.

Postulate: If two angles have the same measure, then the angles are congruent.
Converse: If two angles are congruent, then the angles have the same measure.
Biconditional: Two angles have the same measure if and only if the angles are congruent.

Theorems

Overlapping Segments Theorem: Given points *A*, *B*, *C*, and *D* arranged on a line as shown, the following statements are true:

1) If $AB = CD$, then $AC = BD$.
2) If $AC = BD$, then $AB = CD$.

Overlapping Angles Theorem: Given $\angle AOD$ with points *B* and *C* in its interior as shown, the following statements are true:

1) If $m\measuredangle AOB = m\measuredangle COD$, then $m\measuredangle AOC = m\measuredangle BOD$.
2) If $m\measuredangle AOC = m\measuredangle BOD$, then $m\measuredangle AOB = m\measuredangle COD$.