Section 2-3: Biconditionals and Definitions

A biconditional statement is a single true statement that combines a true conditional and its true converse.

We connect the *hypothesis* and *conclusion* with the phrase...

if and only if

For example:

Conditional: If two angles are congruent, then they have the same measure.

Converse: If two angles have the same measure, then they are congruent.

Biconditional:

Two angles are congruent **if and only if** they have the same measure.

Example 1: Each statement below is true. Write its converse and say whether it is true or not. If it is true, combine the statements into a biconditional.

a. If a closed figure is a pentagon, then it has exactly five sides.

Conv: If a closed figure has exactly 5 sides, then it is a pentagon (TRUE)

A CLOSED FIGURE IS A PENTAGON IFF it has exactly five SIDES

b. If two angles are right angles, then they are congruent.

Conv: if two $\angle$s are $\cong$, then they are right $\angle$s (FALSE)

Example 2: Write the two statements that make up each biconditional.

a. Two lines are perpendicular if and only if they intersect to form four right angles.

1.) IF 2 lines are $\perp$, then they intersect to form 4 rt $\angle$s

2.) iF 2 lines intersect to form 4 rt $\angle$s, then they are $\perp$

b. A figure is three dimensional if and only if it has length, width, and height.

1.) if a figure is 3-dimensional, then it has length, width + height.

2.) if a figure has length, width, + height, then it is 3-dimensional

Example 3: Test each statement below to see if it is reversible. If so write it as a biconditional. If not, write *not reversible*.

a. If a triangle is isosceles, then it has exactly two congruent angles.

A Δ is isoc. <u>iff</u> it has exactly 2 $\cong$ $\angle$s

b. If you have a golden retriever, you own a big dog.

not reversible