

<name>

Class: Honors Geometry

Date: 9/14/06

Topic: Lesson 2-2 (Biconditionals and Definitions)

Biconditional

Combine a true conditional and its **true** converse into 1

*** Converse **must** be true!!!

Combine with “if and only if”

If $p \rightarrow q$ is true and $q \rightarrow p$ is true then p if and only if q



Biconditional

Example

Pg 75, Check Understanding #1

Biconditional: Three points are collinear if and only if they lie on the same line.

Short hand

“if and only if” \rightarrow “iff”

Three points are collinear iff they lie on the same line

Symbol form

$p \leftrightarrow q$

A biconditional combines $p \rightarrow q$ and $q \rightarrow p$ as $p \leftrightarrow q$

Taking biconditional apart

Left side of **iff** is hypothesis of conditional

Right side is conclusion of conditional

Create converse from this conditional

Example

Pg 78, #8

Biconditional: An integer is divisible by 100 if and only if its last two digits are zeros.

Conditional: If an integer is divisible by 100, then its last two digits are zeros.

Converse: If an integer’s last two digits are zeros, then it is divisible by 100.

What makes a good definition

1. Uses only clearly understood terms (or already defined)
2. Is precise (no words like large, sort of, some, part, etc)
3. Is reversible (is a biconditional)

Find counter-example to show a definition isn’t a good one

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Example

Pg 77, Check Understanding #3

Definition: A right angle is an angle whose measure is 90.

Conditional: If an angle is a right angle then its measure is 90 (True)

Converse: If the measure of an angle is 90 then it is a right angle (True)

Both conditional and converse are true so it is reversible.

Biconditional: An angle is a right angle iff its measure is 90.

Example

Pg 77, Check Understanding #4

Proposed definition: A square is a figure w/4 right angles. Both clear and precise.

Conditional: If a figure is a square then it has 4 right angles (true)

Converse: If a figure has 4 right angles then it is a square (false)

Counter-example: A rectangle has four right angles
Not a good definition: it isn't reversible.

Example

Pg 78, #18

Proposed definition: A cat is an animal with whiskers. Both clear and precise.

Conditional: If an animal is a cat then it has whiskers (true)

Converse: If an animal has whiskers then its a cat (false)

Counter-example: A mouse

Not a good definition: it isn't reversible.

Example

Pg 78, #20

Proposed definition: A segment is a part of a line.

It is clear but...

Not a precise statement ... "part of a line" is ambiguous ... both a ray and a point are parts of a line too.

Not a good definition