

Geometry
Notes 2-2 Biconditionals and Definitions

Name KEY
Date _____ Period _____

Biconditional Statement	<p>When a conditional and its converse are true you can combine them as a true biconditional.</p> <p>You can write a biconditional by joining the two parts of each conditional with the phrase <i>if and only if</i>.</p>
<p>Writing a Biconditional:</p> <p>Consider this true statement. Write its converse. If the converse is also true, combine the statements as a biconditional.</p> <p><u>Conditional:</u> If two angles have the same measure, then the angles are congruent. (<i>true statement</i>)</p> <p><u>Converse:</u> If two angles are congruent, then the angles have the same measure. (<i>also a true statement</i>)</p> <p>Since both the conditional and its converse are true, you can combine them in a true biconditional by using the phrase <i>if and only if</i>.</p> <p><u>Biconditional:</u> ← Created from conditional statement (use if and only if, do not use if or then) Two angles have the same measure if and only if the angles are congruent.</p>	
<p>You try!</p> <p>Consider the true conditional statement. Write its converse. If the converse is also true, combine the statements as a biconditional.</p> <p><u>Conditional:</u> If three points are collinear, then they lie on the same line. (<i>true or false</i>)</p> <p>Converse: <u>If three points lie on the same line, then they are collinear</u> (<u>true</u> or false)</p> <p>If both are true: (use conditional)</p> <p>Biconditional: <u>Three points are collinear if and only if they lie on the same line</u></p>	

Separating a Biconditional into Parts:

You can write a biconditional as two separate conditionals that are the converse of each other.

Example: A number is divisible by 3 if and only if the sum of the digits is divisible by 3.

Here are the two statements. They are the converse of each other.

If a number is divisible by 3, then the sum of its digits is divisible by 3. (conditional)

If the sum of a number's digits is divisible by 3, then the number is divisible by 3.
(converse)

You Try!

Write two statements that form this biconditional about integers greater than 1:

A number is prime if and only if it has only two distinct factors, 1 and itself.

(conditional)

If a number is prime, then it has only two distinct factors, 1 and itself

If a number has only two distinct factors, 1 and itself, then the number is prime (converse)

You Try!

Show that this definition of perpendicular lines is reversible. Then write it as a true biconditional.

Definition: Perpendicular lines are two lines that intersect to form right angles.

(truth value) True

Conditional: If two lines are perpendicular, then they intersect to form right angles

(truth value) True

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 (True)

Show that this definition of right angle is reversible. Then write it as a true biconditional.

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

(truth value)

Conditional: If an angle is right, then it measures 90°

(truth value) True

Converse: If an angle measures 90° , then the angle is right

True

Biconditional: An angle is right if and only if it measures 90°

True