# 2.2 Biconditionals - Notes Date: \_\_\_\_\_\_

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| **Learning Targets** | **Help!** | **I’m getting there…** | **I’m almost there…** | **Yes! I totally got this! ☺** |
| 1. I can write the converse of a conditional statement. |  |  |  |  |
| 2. I can write a biconditional. |  |  |  |  |

Biconditional:

* When a conditional and its converse are \_\_\_\_\_\_\_\_\_\_\_, then you can combine them as a \_\_\_\_\_\_\_\_\_\_\_\_­ biconditional.



* Symbolic Form:  and as

 “p if and only if q”

Example 1:

Conditional: 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.



Try 1: Consider this true conditional. Write its converse. If the converse is true, combine the statements as a biconditional.



Conditional: If a number is divisible by 3, then the sum of its digits is divisible by 3.



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.



Try 2: Conditional: If you live in Milwaukee, then you live in Wisconsin.



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.



Separating a Biconditional Into Parts:

Example 2: Write two statements that form the biconditional.

1. *A number is divisible by 3 if and only if the sum of its digits is divisible by 3.*



Statement 1 : If a number is divisible by 3, then the sum of its digits is divisible by 3.\_\_\_\_\_\_\_\_\_\_\_



Statement 2 : If a number is divisible by 3, then the sum of its digits is divisible by 3.\_\_\_\_\_\_\_\_\_\_\_



1. *Lines are skew if and only if they are noncoplanar.*

Statement 1 : If a number is divisible by 3, then the sum of its digits is divisible by 3.\_\_\_\_\_\_\_\_\_\_\_



Statement 2 : If a number is divisible by 3, then the sum of its digits is divisible by 3.\_\_\_\_\_\_\_\_\_\_\_



Definitions:

* A “good” definition can be written as a true conditional statement and true converse.
* Definitions can be proven “bad” by finding a counterexample.

Example 3: Is the following statement a good definition?

1. An airplane is a vehicle that flies.

Converse: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ a v



1. A right angle is an angle whose measure is 90.



Converse: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ If: A fish that swims is a gold fish.

