

Day 2 – Conditional Statements Notes

A **conditional** is an if-then statement such as "If you arrive late to class, then you get a tardy." The "if" part is considered the hypothesis and the "then" part is considered the conclusion.

Practice: Circle the hypothesis and underline the conclusion in each of the statements:

a. If it is cloudy, then it is going to rain.

b. If you earned a 95% on your test, then you got an A.

A conditional statement is either true or false. A conditional statement can be determined to be false, if you can find a counterexample.

Practice: For the following conditional statements, determine if they are true or false. If they are false, provide a counter example.

a. If a number is divisible by three, then it is an odd number.

False \rightarrow 6 is even and divisible by 3

b. If you live in a state composed entirely of islands, then you live in Hawaii.

True

c. If angle measures 100° , then it is obtuse.

True

d. If you play a sport with a bat and ball, then you play baseball.

False \rightarrow Softball

When writing conditionals from a statement, you want the hypothesis to be the more specific item, whereas the conclusion is the more general item. Essentially, the set of things that satisfy the hypothesis should be included in the "set" of the things that satisfy the conclusion. For example, take the statement "Residents of Key West live in Florida." The city of Key West is a subset of the state of Florida, therefore, the conditional statement would be "If you are a resident of Key West, then you live in Florida."

Practice: Write the given statements as conditional statements.

a. A rectangle has four sides.

If a figure is a rectangle, then it has 4 sides.

b. American citizens have the right to vote.

If someone is an American citizen, then they have the right to vote

c. Pianists are musicians.

If you are a pianist, then you are a musician

Converses

The **converse** of a conditional statement is just the reversal of the hypothesis and conclusion. Not every converse is equivalent to its conditional. For example:

Conditional: If it is cloudy, then it is raining. Converse: If it is raining, then it is cloudy.

The conditional statement is false. Just because it is cloudy, does not mean it is raining. However, the converse is true. If it is raining, it has to be cloudy (even if the sun is shining while it rains, there are clouds that are producing rain).

Practice: Take the following conditional statements from the previous page, write them as converses, and determine if they are true. If false, provide a counterexample.

Conditional	Truth	Converse	Truth
a. If you earned a 95% on your test, then you got an A.	True	If you got an A, then you got a 95.	False
b. If a number is divisible by three, then it is an odd number.	False	If a number is odd, it is divisible by 3	False
c. If you live in a state composed entirely of islands, then you live in Hawaii.	True	If you live in Hawaii, then you live in a state composed entirely of islands.	True
d. If angle measures 100° , then it is obtuse.	True	If an angle is obtuse, then it is 100°	False
e. If you play a sport with a bat and ball, then you play baseball.	False	If you play baseball, then you play a sport with a bat and ball	True

Which statement above had both a true conditional and converse? Hawaii example

Definitions

A good definition is a statement that helps you identify or classify an item. A good definition requires:

- Clearly understood and defined terms
- Precision (avoid words such as very, large/small, sort of, almost, etc)
- Reversibility (converse is true too)

Determine if the following statements are good definitions. Explain why or why not:

- A. A whale is an animal that swims. → what about a dolphin? (lots of animals swim)
- B. Squares have four corners. → what type of corners? (corners are not defined well)
- C. Cheetahs are animals with lots of spots. → what does lots mean? (not precise)
- D. A quarter is a coin worth 25 cents. ✓