

Ch 1.7 - Deductive Structure

Objectives:

- Recognize geometry is based on a **deductive structure**
- Identify undefined **terms, postulates**, and **definitions**
- understand the characteristics of **theorems** and the ways they can be **used** in proofs

Agenda:

- 1) DO NOW:
- 2) Check HW - Questions?
- 3) Explain Deductive Structure
- 4) Diagram Conditional Statements
- 5) Worksheet 1-24 (Groups)
 - present solutions

HW: p.42 #3-5,8-12,14

Definitions/Theorems for Section 8 (1.8)

DO NOW

Determine the validity of the following statements by circling true or false.

1) If you live in Massachusetts, then you live in the USA. **true false**

2) If you live in the USA, then you live in Massachusetts. **true false**

3) If it is raining, then the sky has clouds. **true false**

4) If the sky has clouds , then it is raining. **true false**

5) If the day is Saturday or Sunday, then it is a weekend. **true false**

6) If it is a weekend, then the day is Saturday or Sunday. **true false**

8) If a point is the midpoint of a segment, then the point divides the segment into two congruent segments. **true false**

9) If a point divides a segment into two congruent segments, then the point is a mid point. **true false**

10) If two angles are right angles, then they are congruent. **true false**

11) If two angles are congruent, then they are right angles. **true false**

Deductive Structure

Geometry is based on Deductive Structure.

Deductive structure = "A system of thought in which conclusions are justified by previously assumed or proved statements."

A deductive structure is made up of:

1) _____

- terms we describe rather than define to give you a better idea

ex. lines and point

2) _____

- unproved assumptions

ex. (we haven't encountered any yet...)

3*) _____

- states the meaning of a term or idea

ex. "If a point is the midpoint of a segment, then the point divides the segment into two congruent segments."

4*) _____

- a mathematical statement that can be proved

ex. "If two angles are right angles, then they are congruent."

*** Definitions are always**

_____:

ex. "If a point is the midpoint of a segment, then the point divides the segment into two congruent segments."

ex. If a point divides a segment into two congruent segments, then the point is a mid point.

*** Theorems (and Postulates) are NOT always**

_____:

ex. "If two angles are right angles, then they are congruent."

ex. "If two angles are congruent, then they are right angles." ← **FALSE**

Many **definitions** are **Conditional Statements: "If ... then... "**

Notation: $p \Rightarrow q$

Hypothesis		
Conclusion		
Conditional Statement		

Converse Statements: "If q , then p ."

Notation: $q \Rightarrow p$

Ex. _____

Is the converse always true? _____ Can it be true? _____

"Worksheet 1-24 If- Then Statements"

Write each statement below in "if-then" form. Then write the converse. If the converse is false, provide a counter example.

- 1) All dogs are mammals.
- 2) All members of the basketball team are over 5'10" tall.
- 3) All students who earn A's on the quarterly report card are on the honor roll.
- 4) In New Jersey, all licensed drivers are at least 17 years old.
- 5) George Washington's birthday is February 22.
- 6) A person is a Scorpio if he or she is born between October 22 and November 21.
- 7) All right angles are 90 degrees.
- 8) All vertical angles are congruent.
- 9) A ray is part of a line.
- 10) Two lines intersect in a point.

Create two "if- then" statements of your own. Write one in which both the **conditional** and its **converse are true**. Write the other in which the **conditional is true** , but the **converse is false**.

- 1.
- 2.

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Definitions/Theorems for Section 8 (1.8)