1.7/1.8. Honors Geometry

DATE: 9/20

Target 1D. Use deductive reasoning and logic.

- **Deductive Structure**: a system of thought in which conclusions are justified by means of previously assumed or proved statements.

1. Undefined Terms: are not defined, but we have a clear idea of what they are.

   Examples: points, lines, planes, etc.

2. Definition: states the meaning of a term or idea. Definitions are always reversible!

   Reverse the definition of a straight angle:
   "If an angle is a straight angle, then it has a measure of 180 degrees."
   If an ∠ has a measure of 180°, then it's a straight ∠.

3. Postulate: is an unproved assumption (can be proved).

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4. Theorem: a mathematical statement that can be proved.

VERY IMPORTANT NOTE: Postulates and Theorems are not always reversible! Definitions, as stated above, are always reversible! Try to reverse our first theorem about right angles.

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

If 2 ∠s are ≅, then they are rt. ∠s.

This is FALSE; ex: $\angle A \cong \angle B = 30°$, not rt.

Declarative Statement: **"People who live in Chicago live in Illinois."**

- Conditional Statement: (p→q) a statement written in "if-then" form. The "if" part is called the hypothesis. The "then" part is called the conclusion.

  (→ implies)

  Example &Truth Value:

  Truth Value: T

  If people live in Chi, then they live in IL.

  hypothesis: no "if" (given)

  conclusion: no "then" (prove)

- Converse: (q→p) a conditional statement that is reversed; the hypothesis and conclusion switch places.

  Example & Truth Value:

  Truth Value: F

  If people live in IL, then they live in Chi.

- Inverse: (~p→~q) a conditional statement where the hypothesis and conclusion are negated (~). ~p means "not p". ~~p means "not, not p", which is just p.

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Example & Truth Value:

If people don't live in Chi, then they don't live in IL.

Truth value (F)

- Contrapositive: (~q→~p) a conditional statement that is reversed and negated.

Example & Truth Value:

If people don't live in IL, then they don't live in Chi.

Truth value (T)

∴ Since conditional & contrapositive are (T), this suggests:

$p \rightarrow q \iff \sim q \rightarrow \sim p$