

PG. 7 – DEDUCTIVE REASONING

- Process of using _____ to draw conclusions from given _____, _____, and _____.
- We use in proofs. Lawyers use in court cases.
- Example: Tell whether the following is inductive or deductive.
At Reagan High School, students must pass Geometry before they take Algebra 2. Emily is in Algebra 2, so she must have passed Geometry.
- Example: Tell whether the following is inductive or deductive.
So far, at the beginning of every Latin class, the teacher has had students review vocabulary. Latin class is about to start, and Jamilla assumes that they will first review vocabulary
- Law of Syllogism:
If $p \rightarrow q$ and $q \rightarrow r$ are true, then $p \rightarrow r$ is true
- Law of detachment:
If $p \rightarrow q$ is true and p is true, then q is true

THE LOGIC BOOK

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PG. 7 – DEDUCTIVE REASONING

NAME _____

PERIOD _____

PG. 1 – INDUCTIVE REASONING

- the process of _____ that a _____ or statement is _____ because _____ are true
- Used to form _____ and to continue patterns, or test hypotheses
- Conjecture -

Example 1 – Make a conjecture about the next 2 terms.

7, 14, 21, 28, ...

Example 2 – The product of an even number and an odd number is _____.

| Inductive Reasoning |
|--|
| 1. Look for a pattern. |
| 2. Make a conjecture. |
| 3. Prove the conjecture or find a counterexample. |

PG. 6 – BICONDITIONALS

- Written as $p \iff q$.
This means if p , then q *and* if q , then p .
- Used to write precise _____ it because can be used forward and backward
- Truth Value – True ONLY if _____ and _____ are both true.
- You MUST check BOTH statements to determine the truth value of the biconditional!!

PG. 5 – LOGICALLY EQUIVALENT

- Related conditional statements that have the same _____ are logically equivalent.
- Do table (can all be T or all F)
 - Conditional T
 - Converse F
 - Inverse F
 - Contrapositive T
- Conditional and Contrapositive always the same
- Converse and Inverse always the same

Example:

| Statement | Example | Truth Value |
|----------------|---|-------------|
| Conditional | If $m\angle A = 95^\circ$, then $\angle A$ is obtuse. | |
| Converse | If $\angle A$ is obtuse, then $m\angle A = 95^\circ$. | |
| Inverse | If $m\angle A \neq 95^\circ$, then $\angle A$ is not obtuse. | |
| Contrapositive | If $\angle A$ is not obtuse, then $m\angle A \neq 95^\circ$. | |

PG. 2 – CONDITIONALS

- If p , then q .
- *Notation:* \rightarrow
- _____ – all words after “If” and before comma
- _____ – all words after “then”

PG. 3 – CONVERSE, INVERSE, CONTRAPOSITIVE

The _____ is formed by _____ the hypotheses and conclusion.

- *Notation:* \rightarrow

The _____ is formed by _____ the hypotheses and conclusion.

- *Notation:* \rightarrow

The _____ is formed by _____ and _____ the hypotheses and conclusion.

- *Notation:* \rightarrow

PG. 4 – TRUTH VALUES

- Determining whether a statement is _____ or _____.
- A conditional is _____ ONLY when hypothesis is true and conclusion is false.
- To show false you need a _____.
- Counterexample – example that proves a statement is false.

