

Deductive Reasoning**Lesson Objective**

INBAT use deductive reasoning to form conclusions from given facts and other true statements.

Deductive Reasoning: uses facts, definitions, accepted properties, and the laws of logic to form a logical argument. This is different from *inductive reasoning*, which uses specific examples and patterns to form a conjecture.

Law of Detachment: If the specific hypothesis of a conditional statement is true, then the conclusion is also true. *general*

Example:

1. If two segments have the same length, then they are congruent. You know that $BC = XY$. Using the Law of Detachment, what statement can you make? *general*

$$\overline{BC} \cong \overline{XY}$$

$\uparrow$
same length.

2. If a figure is a square, then it is a rectangle. You know that quadrilateral ABCD is a square. Using the Law of Detachment, what statement can you make? *general*

ABCD is a rectangle.

Law of Syllogism: If hypothesis p , then conclusion q .

If hypothesis q , then conclusion r .

If hypothesis p , then conclusion r .

} if both are $\textcircled{T}$

Example: If possible, use the Law of Syllogism to write a new conditional statement that follows from the pair of statements.

3. If $x^2 > 25$, then $x^2 > 20$
If $x > 5$, then $x^2 > 25$

If $x > 5$, then $x^2 > 20$.

4. If a polygon is regular, then all angles in the interior of the polygon are congruent.
If a polygon is regular, then all its sides are congruent.

we cannot use Law of Syllogism b/c one statement's conclusion does NOT match the other's hypothesis.

Comparing Inductive and Deductive Reasoning

Example: Decide whether inductive reasoning or deductive reasoning is used to reach the conclusion. Explain your reasoning.

5. Each time Monica kicks a ball up in the air, it returns to the ground. So, the next time Monica kicks a ball up in the air, it will return to the ground.

inductive

6. All reptiles are cold-blooded. Parrots are not cold-blooded. Sue's pet parrot is not a reptile.

deductive

7. All multiples of 8 are divisible by 4. 64 is a multiple of 8. So, 64 is divisible by 4.

deductive