

Study Guide

Deductive Reasoning

Two important laws used frequently in deductive reasoning are the **Law of Detachment** and the **Law of Syllogism**. In both cases you reach conclusions based on if-then statements.

Law of Detachment	Law of Syllogism
If $p \rightarrow q$ is a true conditional and p is true, then q is true.	If $p \rightarrow q$ and $q \rightarrow r$ are true conditionals, then $p \rightarrow r$ is also true.

Example: Determine if statement (3) follows from statements (1) and (2) by the Law of Detachment or the Law of Syllogism. If it does, state which law was used.

- (1) If you break an item in a store, you must pay for it.
- (2) Jill broke a vase in Potter's Gift Shop.
- (3) Jill must pay for the vase.

Yes, statement (3) follows from statements (1) and (2) by the Law of Detachment.

Determine if a valid conclusion can be reached from the two true statements using the Law of Detachment or the Law of Syllogism. If a valid conclusion is possible, state it and the law that is used. If a valid conclusion does not follow, write no conclusion.

1. (1) If a number is a whole number, then it is an integer.
(2) If a number is an integer, then it is a rational number.
2. (1) If a dog eats Dogfood Delights, the dog is happy.
(2) Fido is a happy dog.
3. (1) If people live in Manhattan, then they live in New York.
(2) If people live in New York, then they live in the United States.
4. (1) Angles that are complementary have measures with a sum of 90.
(2) $\angle A$ and $\angle B$ are complementary.
5. (1) All fish can swim.
(2) Fonzo can swim.
6. **Look for a Pattern** Find the next number in the list 83, 77, 71, 65, 59 and make a conjecture about the pattern.