

Section 2.3

Apply Deductive Reasoning

REMEMBER:

*Inductive reasoning uses
patterns & observations.*

**Deductive reasoning
uses facts, definitions,
rules, or properties
to reach a conclusion.**

LAW OF DETACHMENT

If p , then q .

p is true.

Conclusion: q is true.

Example 1

Use the **Law of Detachment** to reach a logical conclusion.

If two numbers ^{p} are odd, then their sum ^{q} is even.

Three & five are odd numbers. p is true

Conclusion: The sum of three & five is even.

q is true

LAW OF SYLLOGISM

If p, then q.

If q, then r.

Conclusion: If p, then r.

Example 2

Use the Law of Syllogism to reach a logical conclusion.

If Elena takes the car to the store,
then she will stop at the post office.

p
q
~~If p,
then q.~~

If Elena stops at the post office,
then she will buy stamps.

a
r
~~If a,
then r.~~

If Elena takes the car to the store,
then she will buy stamps.

If p,
then r.

Example 3

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.**

If Jay is from Quebec^p, then he is Canadian^q.

Jay is from Quebec. p is true

Jay is Canadian. Law of Detachment

Example 4

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.**

If grandma drives a car^p,
then she is going to the store^q.

If p, then q.

Grandma is going to the store.

q is true.

No conclusion

Example 5

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.

If Henry runs everyday^p,
he gets better at running track^q.

If Henry gets better at running track^q,
then he can race on Saturday^r.

If Henry runs everyday, then he can race on Saturday.
Law of Syllogism

Example 6

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.

If Amy earns an A^p, then she feels good about her grades^q.

If Amy earns an A^p, then she has studied^r.

No conclusion

Example 7

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.

If it does not, write invalid.

(1) If Holly is writing^p, then she is writing an essay for English^q.

(2) If Holly is writing an essay for English^a, then she is having fun^r.

(3) If Holly is writing, then she is having fun.

Law of Syllogism

Example 8

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.

If it does not, write invalid.

(1) If it is Saturday^p, then Mary is at her dad's^q.

(2) Mary is at her dad's. ^q is true

(3) It is Saturday. INVALID

Example 9

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.

If it does not, write invalid.

(1) If Georgia beats Clemson,
then Mrs. Wingard is happy.

(2) Georgia beat Clemson. p is true

(3) Mrs. Wingard is happy. q is true

Law of Detachment