

<p>Deductive Reasoning (or logical reasoning)</p>	<p>It is the process of reasoning logically from given statements (or facts) to a conclusion.</p> <p>If the given statements are true, then deductive reasoning produces a true conclusion.</p> <p>Example:</p> <ul style="list-style-type: none"> • An auto mechanic knows that if a car has a dead battery, the car will not start. • A mechanic begins work on a car and finds the battery is dead. • What conclusion can he/she make? <p><u>The car will not start</u></p>
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2 Types of Deductive Reasoning

<p>Law of Detachment</p> <p>$p \rightarrow q$ p is true</p>	<p>If a conditional is true and its hypothesis is true, then its conclusion is true.</p> <p>Symbolic Form: If $p \rightarrow q$ is a true statement and p is true, then q is true.</p> <p>Example:</p> <p>p q</p> <ul style="list-style-type: none"> • If a <u>baseball player is a pitcher</u>, then <u>that player should not pitch a complete game 2 days in a row</u>. • Vladimir Nuñez is a pitcher. On Monday, he pitches a complete game. <p>What can you conclude?</p> <p><u>He will not pitch Tuesday</u></p> <p>Example:</p> <p>p q</p> <ul style="list-style-type: none"> • If M is the midpoint of a segment, then it divides the segment into 2 congruent segments. • M is the midpoint of \overline{AB}. p is true <p>What is the conclusion?</p> <p><u>M divides \overline{AB} into two congruent segments</u></p>
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Law of Syllogism

This law allows you to state a conclusion from 2 true conditional statements when the conclusion of one statement is the hypothesis of the other statement.

Symbolic Form:

If $p \rightarrow q$ and $q \rightarrow r$ are true statements, then $p \rightarrow r$ is a true statement.

Example:

- If a number is prime, then it does not have repeated factors. ^P
- If a number does not have repeated factors, then it is not a perfect square. ^q

Using Law of Syllogism, you can conclude that:

If a number is prime, then it is not a perfect square

Using Law of Detachment and Law of Syllogism

Example:

- If a river is more than 4000 miles long, then it is longer than the Amazon. ^P
- If a river is longer than the Amazon, then it is the longest river in the world. ^q

Using Law of Syllogism, you can conclude that:

If a river is more than 4000 miles long, then it is the longest river in the world.

- The Nile is 4132 miles long.

Using Law of Detachment, you can conclude that:

It is the longest river in the world