

Making Notes | Lesson 2.2a — Deductive Reasoning and Conditional Statements

Inductive Reasoning	Deductive Reasoning
Definition (from Lesson 2.1):	Definition:
Strength:	Strength:
Fundamental weakness:	Example from the skyscraper puzzle:
Conclusion may be true	Conclusion must be true

In your own words: what is the difference between probably true and must be true?

A conditional statement has the form: **If p, then q** written symbolically as **$p \rightarrow q$**

Label the hypothesis and conclusion in this geometric example:

"If two angles form a linear pair, then they are supplementary."

p — the hypothesis	q — the conclusion

Write your own conditional statement. Label p and q.

If _____, then _____.

p: _____ q: _____

Symbol	Formal name	Latin root and meaning
p	Hypothesis or Antecedent	<i>ante</i> = before Same root as: <i>anterior, antebellum</i>
q	Conclusion or Consequent	<i>con + sequi</i> = to follow Same root as: <i>consequence, sequential</i>

In everyday conversation	In formal logic
If someone says: "If it is raining, I will bring an umbrella." ...and it is NOT raining, most people infer: "They will NOT bring an umbrella." <i>This is a natural and reasonable inference in conversation.</i>	This inference is NOT valid. $p \rightarrow q$ does NOT mean: not $p \rightarrow$ not q The conditional only tells you what happens when p is true. It says nothing about what happens when p is false. <i>This error has a name — we will learn it in Lesson 2.2b.</i>

Complete this table to see why the inference fails:

Conditional: $p \rightarrow q$	What $p \rightarrow q$ tells you	What $p \rightarrow q$ does NOT tell you
If it is a square, then it has 4 sides.		
If a polygon is equilateral, then all its sides are equal.		