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Deductive Reasoning

Definition

Deductive Reasoning

- *Uses rules, postulates, theorems or definitions to reach a logical conclusion*
- *Can be used to prove statements*

Two Forms of Deductive Reasoning

These forms are used to draw conclusions from true conditional statements.

These laws help you determine if a set of statements (argument) are considered valid. If the organization of the argument matches the layout of the laws, then the argument is considered valid.

LAW OF DETACHMENT

- 1) If "p" then "q"
- 2) Restate "p"
- 3) Restate "q"

LAW OF SYLLOGISM

- 1) If "p" then "q"
- 2) If "q" then "r"
- 3) If "p" then "r"

LAW OF DETACHMENT

VALID EXAMPLE

- 1) If two angles are vertical, then they are congruent
- 2) $\angle 1$ and $\angle 2$ are vertical
- 3) $\angle 1$ and $\angle 2$ are congruent

INVALID EXAMPLE

- 1) If you are 16 years old, then you can drive.
- 2) Bob can drive
- 3) Therefore Bob is 16 years old.

(not necessarily true, Bob could be 21, which is why this is invalid)

LAW OF SYLLOGISM

VALID EXAMPLE

- 1) If two angles form a linear pair, then the angles are supplementary.
- 2) If two angles are supplementary, then their sum is 180 degrees.
- 3) If two angles form a linear pair, then their sum is 180 degrees.

INVALID EXAMPLE

- 1) If two angles are complementary, then their sum is 90 degrees.
- 2) If two angles form a right angle, then their sum is 90 degrees.
- 3) If two angles are complementary, then they form a right angle.
(not necessarily, these angles don't have to be adjacent.)