

Learning Target(s): I can compare and contrast inductive and deductive reasoning.

I can use the laws of logic to create new conditional statements or make valid conclusions.

Notes: 2.3 Apply Deductive Reasoning

deductive reasoning: using facts, definitions, accepted properties
and the laws of logic to form a logical argument

Law of Logic

Law of Detachment:

If the hypothesis of a true statement is true,
then the conclusion is also true.

Ex. 1

Use the Law of Detachment to make a valid conclusion in the true situation.

- a. ^{hyp.} If two angles have the same measure, then they are ^{conc.} congruent. You know that $m\angle A = m\angle B$.

$$\angle A \cong \angle B$$

- b. Jesse goes to the gym every weekday. Today is Monday.

Jesse's going to the gym

Law of Logic

Law of Syllogism

If hypothesis p, then conclusion q.

If hypothesis q, then conclusion r.

If hypothesis p, then conclusion r.

↙ ↘ If these statements
are true,

← then this statement
is true

Ex. 2

If possible, use the Law of Syllogism to write the conditional statement that follows from the pair of true statements.

- a. If Ron eats lunch today, then he will eat a sandwich. If Ron eats a sandwich, then he will drink a glass of milk.

conc. hyp.
 If Ron eats lunch today, then he will drink a glass of milk

- b. If $x^2 > 36$, then $x^2 > 30$. If $x > 6$, then $x^2 > 36$.

hyp. conc. If $x > 6$, then $x^2 > 30$.

- c. If a triangle is equilateral, then all of its sides are congruent. If a triangle is equilateral, then all angles in the interior of the triangle are congruent.

hyp. conc.

No valid statement can be made.

deductive reasoning vs. inductive reasoning:

facts ↓

"gut" ↓ → patterns, observations

Ex. 3

What conclusion can you make about the sum of an odd integer and an odd integer?

odd + odd = even
 $5 + 3 = 8$
 $7 + 7 = 14$
 $9 + 9 = 18$

odd
 $-15 + 5 = -10$

odd + odd = even
 inductive reasoning

Ex. 4

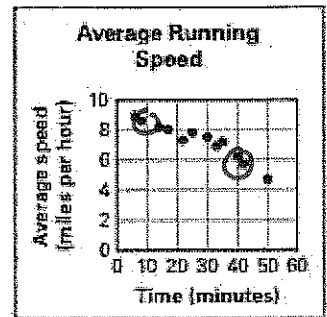
Tell whether the statement is the result of inductive reasoning or deductive reasoning. Explain.

- a. The runner's average speed decreases as time spent running increases.

inductive - based on pattern

- b. The runner's average speed is slower when running for 40 minutes than when running for 10 minutes.

Fact - deductive



Summary: Write what you learned today, and what you think you still need practice/help on.