

Geometry

Inductive and Deductive Reasoning



Vocabulary

Inductive Reasoning:

The practice of observation and identifying patterns to form a conclusion about the rules being applied.

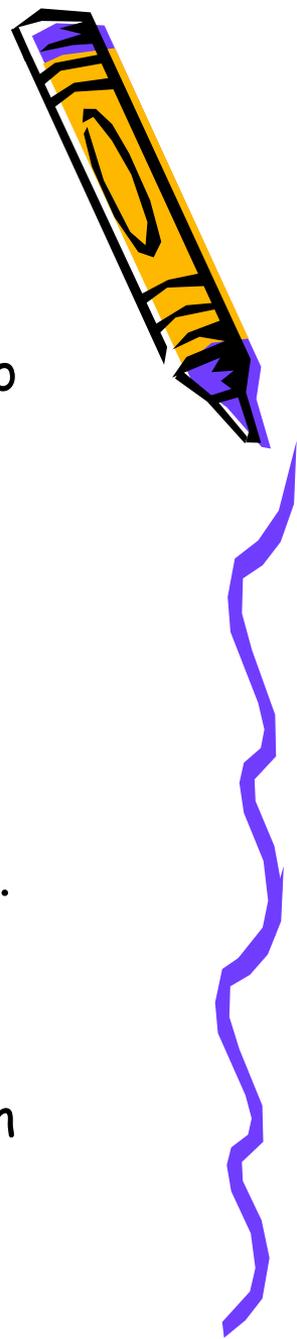
Conjecture:

A logic/reasoning based conclusion, formed by using Inductive Reasoning, that is still unproven.

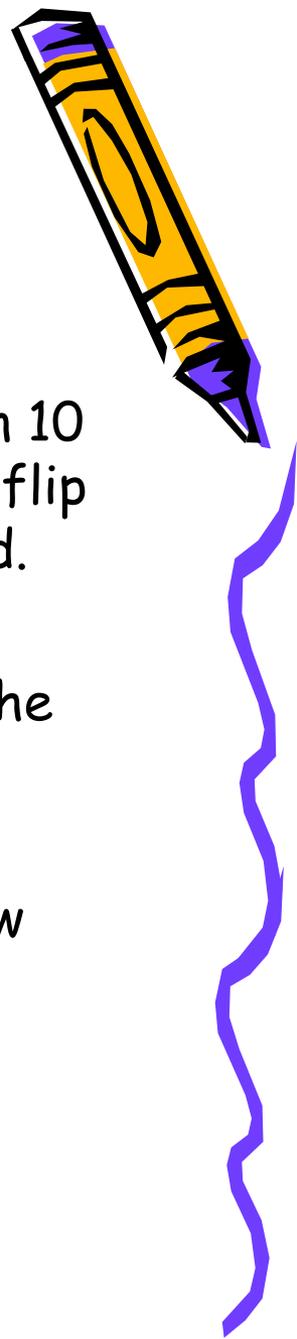
A conjecture may be proven false by a counterexample.

Counterexample:

An example that supports the given information or facts, but that proves the conjecture incorrect (or shows that there is a possible alternate result).



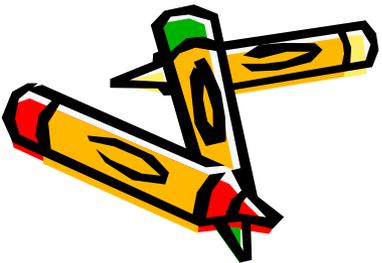
Inductive Reasoning



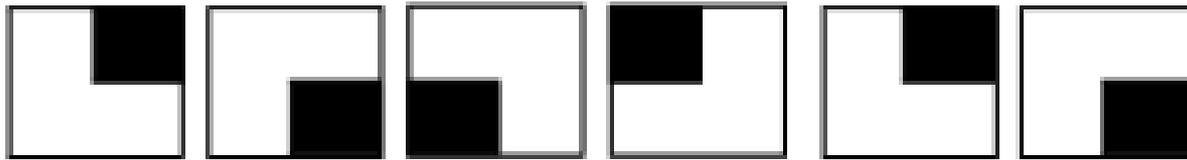
Inductive Reasoning would suggest that if I flip a coin 10 times and get heads every time, that on the eleventh flip I should expect heads, based on the pattern observed.

In this case, we know Inductive Reasoning provides the wrong conclusion.

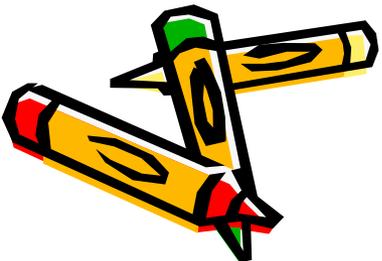
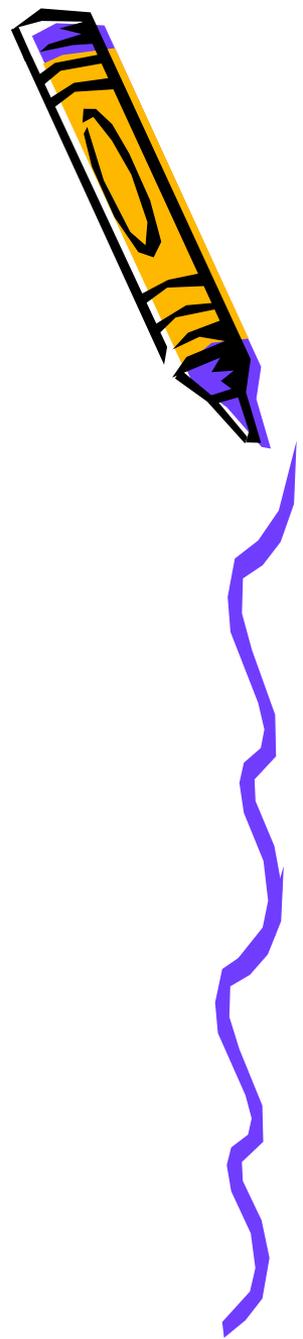
Inductive reasoning is often a means to figure out how we got from the beginning stage to the end result, though observation.



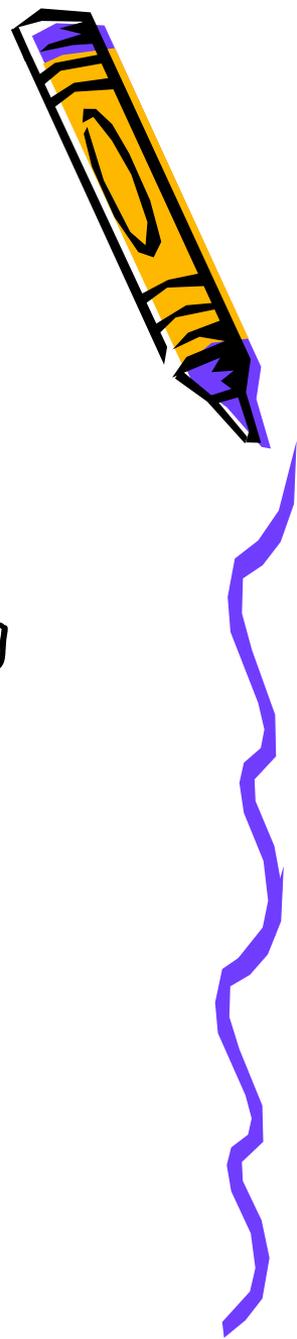
Use Inductive Reasoning to form a conjecture about the next 3 items in each sequence.



A, 26, B, 25, C, 24, D,



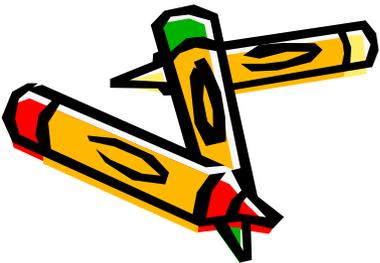
Determine if each conjecture is true or false.
If false, provide a counterexample.



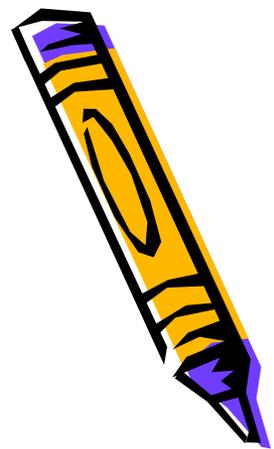
Conjecture: The sum of two numbers is always greater than each of numbers being added.

False.

Counterexample: $-3 + -2 = -5$



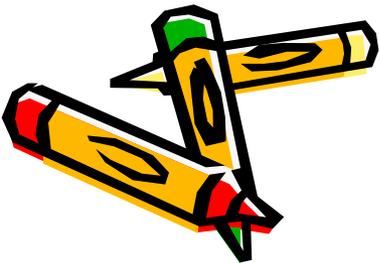
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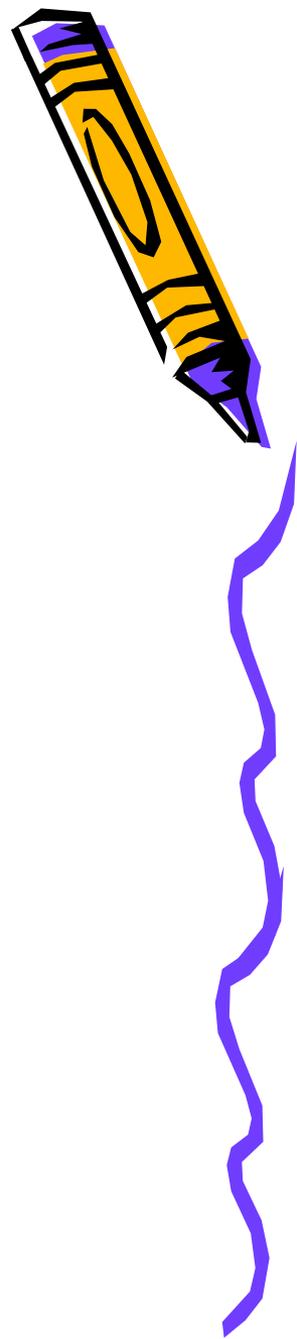
Conjecture: If the product of two numbers is positive, then the two numbers being multiplied must both be positive.

False.

Counterexample: $-3 * -2 = 6$



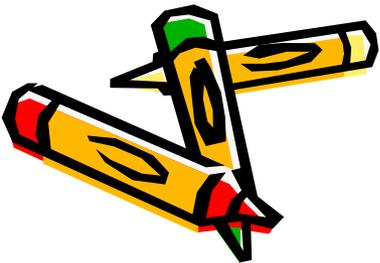
Determine if each conjecture is true or false.
If false, provide a counterexample.



Conjecture: If the water is boiling, then its temperature is at least 212° F

True.

There is no counterexample
(under normal conditions).



Vocabulary

Deductive Reasoning:

The practice of applying facts, definitions, and rules to form a conjecture (conclusion).

Deductive reasoning avoids assumptions by relying on rules and the laws of logic.

For example: Mathematical rules tell us each coin flip (given a fair coin), has a 50/50 chance of heads or tails. The previous 10 flips have no bearing on the 11th flip.

