Deductive vs Inductive Reasoning

Programming and Web Development Minuteman High School Mr. Lambert

Inductive Reasoning Definition

Inductive reasoning (as opposed to deductive reasoning) is reasoning in which the premises seek to supply strong evidence for (not absolute proof of) the truth of the conclusion. While the conclusion of a deductive argument is supposed to be certain, the truth of the conclusion of an inductive argument is supposed to be probable, based upon the evidence given.

Inductive Reasoning Puzzle 1

Inductive Reasoning Puzzle 1 (Solution)



All triangles "move" slightly counter-clockwise.

A good solving tip would be to try and disassemble the complete figure to its elements (triangles) and to focus each time on one of the elements.

Inductive Reasoning Puzzle 2



Inductive Reasoning Puzzle 2 – (Solution)



The logic: An X shape is dotted with black and white dots. Both sets of dots are independent and follow a similar pattern. In each frame, a black dot is added counter-clockwise in the angles of the X shape, until all the angles are occupied. Then a dot is reduced, also counter-clockwise. The same pattern occurs with the white dots, only in a clockwise manner.

Inductive Reasoning Puzzle 3



Inductive Reasoning Puzzle 3 – (Solution)



The correct answer is: ∟

The logic: The next frame after each step portrays a mirror image of the previous frame. In addition, every two steps a shape is added to the frame.

Deductive Reasoning Definition

Deductive reasoning (top-down logic) contrasts with inductive reasoning (bottom-up logic) in the following way: In deductive reasoning, a conclusion is reached reductively by applying general rules that hold over the entirety of a closed domain of discourse, narrowing the range under consideration until only the conclusion is left. In inductive reasoning, the conclusion is reached by generalizing or extrapolating from initial information.

Deductive Reasoning Puzzle 1



Light Switch

Three light switches are turned off. You know one of the switches controls a light upstairs in a room that you cannot see. You are allowed only one trip upstairs to the room. How can you determine which switch controls the light?

Deductive Reasoning Puzzle 1 - Solution

Turn two of the switches on, say switch A and switch B. Leave them on for a few minutes. Then turn switch B off. Run upstairs into the room. If the light is on, switch A controls the light. If it is off, feel the bulb. If it is still warm, then switch B controls the light; if it is not warm, then switch C controls the light.

Deductive Reasoning

Puzzle 2

Ball-Bearings

There are three machines designed to each produce one ounce ball-bearings. One machine is defective and produces 1.1 ounce ball-bearings. You are allowed to only make one weighing of any combination of ball bearings in any number from any machine. How can you determine which machine is defective?

Deductive Reasoning Puzzle 2 - Solution

Weigh two ball-bearings from A and one from B. If the combined weight is three ounces, then you know that C is defective. If the combined weight is 3.2 ounces, you know that A is defective. If the combined weight is 3.1 ounces, you know that B is defective.

Deductive Reasoning

Puzzle 3



Four men are buried up to their necks by a firing squad and are told they have two minutes for someone to yell out the color of their own hat. If they say nothing, they will all be shot. If anyone yells the wrong color hat, they will all be shot. The men know that there are two black hats and two white hats. Man 1 and Man 2 can only see the the brick wall. Man 3 can see Man 2 and the brick wall. Man 4 can see Man 2, Man 3 and the brick wall. They are not allowed to talk to each other. Which man after one minute shouts out the color of his hat and is certain that he is right?

Deductive Reasoning Puzzle 3 - Solution

After one minute man 3 yells out that he is wearing a black hat. The firing squad lowers their weapons and releases the men. The others obviously are relieved and thankful, but curious as to how he was so certain. He calmly replies that deduction was the key.

Man 3 deduced the following:

- 1. They all knew that there were two black hats and two white hats.
- 2. Man 4 could see man 2 and man 3.
- 3. If man 4 had seen man 2 and man 3 wearing the same color hats, he would have known for certain that he was wearing the other color and called out.
- 4. Since he did not yell out, it was obvious that man 2 and man 3 were wearing different color hats.
- 5. Since man 3 could see that man 2 wore a white hat, he knew that he was wearing a black hat.

Video



https://www.youtube.com/watch?v=X8xxtygm_xM&list=PLA7FAB69BFCECDB9A