

1. Truth-tellers and liars

On Island X there are exactly two types of people; those who always tell the truth, and those who always lie. I mean *always*. One day on Island X you meet Andy, Becky, and Chris. From their statements below, determine who is a truth-teller and who is a liar.

Andy: "At least one of Becky or Chris tells the truth."

Becky: "Andy is a liar!"

Chris: "Oh yeah? Becky is a liar!"

Assignment:

a) Solve the puzzle.

b) Write out a very careful argument/proof for your answer. Your argument should start with a statement of the form "Suppose so-and-so tells the truth; then..." or a statement of the form "Suppose so-and-so is a liar; then...", and should end with a conclusion about who is a truth-teller and who is a liar.

c) Write out another, different argument that proves the same thing. Start with the same type of initial statement, but this time assume that a different person is a truth-teller or liar.

2. Choosing a road

As if it weren't bad enough that everyone on Island X is either a truth-teller or a liar, there is another thing that makes it hard to get around Island X. At each fork of roads on the island, exactly *one* road is safe to take; the other roads lead to dragons and very sharp sticks and what-not. Luckily, there are signs posted for each possible direction you could choose. Unluckily, at each intersection, at least one of these signs is a lie. While walking down the road one day you come to a place where the road splits into three directions, labeled A, B, and C. From the statements on the signs below, determine which road is safe to take.

Road A: "You can believe what is written on signs B and C."

Road B: "You should take road A. Or maybe road C. One of those."

Road C: "Whatever you do, do not take road B!"

Assignment:

a) Solve the puzzle.

b) Write out a very careful argument/proof for your answer. Your argument should start with a statement of the form "Suppose the sign at road such-and-such is true; then..." or a statement of the form "Suppose the sign at road such-and-such is false; then...", and should end with a conclusion about which signs are true and false, and which road is consequently safe to take.

c) Write out another, different argument that proves the same thing. Start with the same type of initial statement, but this time assume that a different person is a truth-teller or liar.