

## Exercises for November 21, 2009

### LOGIC PROBLEMS

An island of Vaal is inhabited by humans and apes. Apes can speak human language, and quite well. Every ape and every human is either a knight (and, in particular, always tells the truth), or a liar (always lies)

1. For each of the items below, explain who could make such a statement:
  - a) I am a liar and an ape.
  - b) I am either a liar or an ape
  - c) It is not true that I am an ape and a knight.
2. Now you need to identify who is A and who is B
  - a) A: At least one of us is an ape. B: At least one of us is a liar.
  - b) A: We are both apes. B: We are both liars.
  - c) A: B is a liar and an ape. I am human. B: A is a knight

### IMPLICATIONS and EQUIVALENCE

3. It is known that each of the two people A and B is either a knight or a liar. Suppose that A makes the following statement: "If I am a knight then B is also a knight". Can you tell who are A and B: who is a knight and who is a liar?
4. Those who get A on the test, study a lot. Johnny has studied a lot. Does it mean that he will get an A on the test?
5. A certain country is inhabited by magicians, sorcerers and wizards. The following facts are known: firstly, not all magicians are sorcerers and, secondly, if a wizard is not a sorcerer then he is also not a magician. Is it true that not all magicians are wizards?
6. Each of the two people A and B is either a knight or a liar. A says: "If B is a knight then I am a liar." Who is A and who is B?
7. The person A says: "The treasure on this island can be found if and only if I am a knight".
  - a) Can you tell who A is: a knight or a liar?
  - b) Can you tell whether the treasure can be found on this island?
8. If the room 1 has a princess in it, then the statement on its door is true, if the room has a tiger then the statement is false. If the room 2 has a princess then the statement is false, while if it has a tiger then its is true. The doors have the following signs on them:
  - a) Room 1: both rooms have princesses.
  - b) Room 2: both rooms have princesses.

Which of the rooms has a princess?