

Logic Puzzles

Question 1. A mean old man is preparing for Halloween, and decides that he should hide his candy from his nieces and nephews. He has three boxes of different colors, and he puts the all his candy in one of the boxes. He labels the boxes as follows:

1. Red Box: There is no candy in here.
2. Blue Box: The candy is in here.
3. Green Box: The candy is in the blue box.

Of course, the old man is mean, so only one of the labels on the boxes is true. Where can his nieces and nephews find the candy?

Question 2. A drawer contains 7 red socks, 8 blue socks, and 10 black socks. It is dark, and you can't tell what color any of the socks is. What is the smallest number of socks you can pull out of the drawer to guarantee that you get a pair of matching socks?

Question 3. The good people of Transylvania have enlisted your help in a very important trial. Two high-ranking officials were involved in a crime, but before the trial can take place, the court must figure out whether or not these two are humans or vampires and sane or insane. You see, in Transylvania, everyone is either a human or a vampire, and sane or insane.

The sane humans tell only the truth, while the insane humans tell only lies out of delusion.

The sane vampires, on the other hand, tell lies out of malice, while the insane vampires tell only the truth (for they believe it to be a lie).

These officials are being very uncooperative. They have each agreed to answer two yes or no questions, and nothing more. Can you come up with two questions to ask that will allow you to pin down the species and mental health of both officials without a doubt?

Question 4. There are three boxes on a table. One of them is labeled APPLES, one is labeled ORANGES, and one is labeled APPLES AND ORANGES. Unfortunately, each of the boxes is mislabeled. You can reach into each of the boxes, but you cannot see what is inside any of them. Is it possible to pick ONE piece of fruit from ONE of the boxes and then correctly relabel all of the boxes?

Question 5. This puzzle also takes place in Transylvania. I will give you a dialogue between some logicians in Transylvania, but I will leave out some of what they said. It is your job to solve the puzzle with the missing information.

Three logicians were once discussing their separate trips to Transylvania.

“When I was there,” said the first logician, “I met a Transylvanian named Igor. I asked him whether he was a sane human. Igor answered me [yes or no], but I couldn’t tell from his answer what he was.”

“That’s a surprising coincidence,” said the second logician, “I met that same Igor on my visit. I asked him whether he was a sane vampire and he answered me [yes or no], and I couldn’t figure out what he was!”

“This is a double coincidence!” exclaimed the third logician. “I also met Igor and asked him whether he was an insane vampire and he answered me [yes or no], but I couldn’t deduce what he was either.”

Is Igor sane or insane? Is he human or vampire?

Question 6. A farmer is out on a walk with his pets: a dog, a cat, and a bird. He comes to a river, and there is a raft that he can use to get across the river. Unfortunately, there is only enough in the raft for the farmer and one of his pets. He cannot leave his dog and cat alone because they will fight, and he cannot leave the cat alone with the bird because the cat will eat the bird. If the farmer can take the raft back and forth across the river as many times as he wants, can he safely bring all three of his pets across the river?

Question 7 (For next week). Three women are sitting in a circle, all facing one another. Once again, the Mad Hatter has three blue hats and two red hats. The Mad Hatter shows the women the hats and then blindfolds them. He randomly puts one hat on each woman's head, and takes the last two hats out of the room. Then women are told that the first one who can identify the color of her own hat will win one million dollars, but if a woman guesses the wrong color hat, she will have to pay one million dollars. The blindfolds are then removed, and the women sit, staring at one another. Finally, after a bit, one of the women exclaims "I know what color my hat is!" What color was it, and how did she know?

Question 8 (For next week). Using a scissors, cut a hole in an ordinary piece of paper ($8.5'' \times 11''$) through which any one of your classmates could walk through.