Week 4 (7 March, 2005): Logic and Probabilities

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Caution: The obvious answers are usually wrong!

1 Three chests

A jeweler has three chests, each containing two drawers. In one of the chests, each drawer contains a ruby. In another one, each drawer contains an emerald. In the third chest, one drawer contains a ruby and the other drawer contains an emerald.

Suppose you pick one of the three chests at random and open one of the drawers and find a ruby. What is the probability that the other drawer in the same chest also contains a ruby?

2 Cats I

Suppose that the probability of a randomly chosen cat being male is $\frac{1}{2}$ and the same for being female. Suppose your neighbor has two cats. One day he tells you, "at least one of my cats is male." What is the probability that both are male?

3 Cats II

Suppose that the probability of a randomly chosen cat being male is $\frac{1}{2}$ and the same for being female. Suppose your neighbor has two cats. One day he tells you, "one of my cats is white and the other is black and the white one is male." What is the probability that both are male?

4 Prizes

Suppose I show you three boxes, labeled A, B and C, respectively. Suppose that one of them contains a prize and the other two are empty. I know which box contains the prize and you don't. I let you pick one box at random and, before you open it, I open one of the other two boxes that I know to be empty. Then I offer you the option of trading the box you originally chose with the other unopened box. Should you trade?

Source:
Raymond Smullyan. "The riddle of Scheherazade". Alfred A. Knopf, Inc., New York, 1997.