BACCALAURÉAT - Session 2014

Epreuve de Discipline Non Linguistique

Mathématiques/Anglais

To switch or not to switch?

Marilyn vos Savant, a columnist with *Parade* magazine decided to write a reply to this letter in the September 9th 1900 issue of the magazine:

"Suppose you're on a game show, and you're given the choice of three doors. Behind one door is a car, behind the others, goats. You pick a door, say number 1, and the host, who knows what's behind the doors, opens another door, say number 3, which has a goat. He says to you, "Do you want to pick door number 2? "Is it to your advantage to switch your choice of doors?"

Craig. F.Whitaker   Columbia, MD

Questions:

1) Explain the game and the dilemma in your own words.
2) The host chooses his door in accordance with the following rules :
   1. He always opens a door that conceals a goat.
   2. He never opens the door you initially chose.
   3. If he can open more than one door without violating rules one or two, then he chooses his door randomly.

   We also assume the player initially chooses door one.

   a) Complete the following tree diagram

Car location   Host opens

Door 1 — Door 2
Door 1 — Door 3
Door 2 — Door 3
Door 3 — Door 2
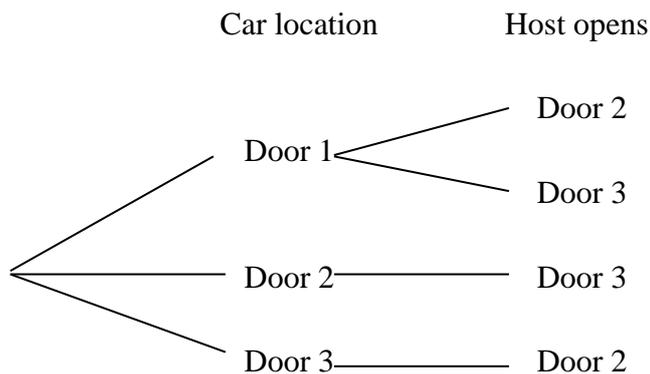
   b) We denote by C_1 the event that the car is behind door 1, C_2 the event that the car is behind door 2 and by H_3 the event that the host opens door 3 to reveal a goat.

   - Compute $P(H_3)$
   - We assume the host opens door 3. Compute $P_{H_3}(C_1)$ and $P_{H_3}(C_2)$.

3) If you had to answer the letter, would you recommend switching or not?
4) Is it better to use mathematics instead of your emotions or your intuition in order to make a decision?