Goat-and-switch: An Explanation for Monty Hall

Words. And some formulas. • 24 Jan 2025

Much has been written about the goats, the car, and the quiz show host. You all know the problem. Here is a short solution that I have not seen elsewhere.

Let us restate the question: You are in a quiz show, in front of three doors. Behind two of them is a valuable angora goat, behind the third, an even more valuable car. You may request one door to be opened, and what is behind it will be yours. But after you name the door, the host instead opens another door – with a grazing goat behind – and ask you to reconsider your choice. Should you now choose another door or stay with your choice?

To answer the question, think first of another situation. What if even before you had chosen your door, the host had offered you the following deal: If you chose a door and behind it was a goat, you would get a car instead, but if it was a car, you would lose it and get instead only a goat.

Clearly you would accept the deal because with it, a car is suddenly more probable than a goat.

Now we return to the original question and notice that in it, choosing another door has exactly the same effect as the hypthetical deal before: If originally there was a car behind your chosen door, you will now get a goat, but the possible win of a goat would turn into the win of a car. Therefore it is reasonable to choose the other door.