

HW1

Deadline: 2016/3/23 (Wed.) 5:20 pm

1. Suppose you're on a game show, and you're given the choice of two doors:
Behind one door is X dollars, and the other is $2X$ dollars. After you choose one of these two doors, you are given a chance to swap. Assuming the current choice has Y dollar. If you swap, there is $1/2$ chance you would obtain $2Y$ and $1/2$ chance of $0.5Y$, therefore the expectation value of swapping is $(1/2)(2Y+0.5Y) = 1.25Y$. If you don't swap, the expectation value is Y . So you HAVE to swap to get more money anyway. Is above statement correct? Please explain your answer.

2.
 - (a) There are three boxes: the first box containing two red balls, the second box containing two blue balls, and the last one containing a red ball and a blue ball. After randomly choosing a box and randomly picking up one ball, you find that the chosen ball is a blue ball. What is the probability that the remaining ball is also blue?
 - (b) For the same three boxes: After randomly choosing a box, you are told that there is one blue ball in the box. Now, what is the probability that the remaining ball is also blue?

3. (lecture 1, page 51)
 $Y = X_1 + X_2 + \dots + X_{\tilde{N}}$
 X_i are i.i.d exponentially distributed,
 \tilde{N} is geometrically distributed.
 - (1) Find $E[Y]$
 - (2) What is $\text{var}[Y]$

ANSWERING RULES:

1. You can answer the problems in English or Chinese.
2. Please submit a hard copy of your homework in class.
3. Remember to write down your name and student ID, if not you will get 10% penalty.
4. We allow you to hand over the homework after the deadline, but 10% penalty per day.
5. Please write the process of the calculation or some explanations of the answers. Do not just write the answers.
6. Do not cheat, or you will get 0%.