

Class Problems, Lecture 1

On occasion I'll start class by writing one or two problems on the board. You're expected to come in, if you like find one or two people to work with, and see if you can answer the problems. Then we'll talk about them a bit. You may be asked to present your solution.

If you've seen a problem before, don't wreck it for others by telling them the solution. Let me know if you want another problem.

Here are problems for today. Find someone to work with and start on them.

Problem 1

After lunch one day, Alice suggests to Bob the following method to determine who pays. Alice pulls three six-sided dice from her pocket. These dice are not the standard dice, but have the following numbers on their faces:

- Die A: 1,1,6,6,8,8
- Die B: 2,2,4,4,9,9
- Die C: 3,3,5,5,7,7

The dice are fair, so each side comes up with equal probability. Alice explains that each of them will pick up one of the dice. Then they will each roll their die, and the one who rolls the lowest number loses and will buy lunch. So as to take no advantage, Alice offers Bob the first choice of the dice. What should Bob choose?

Problem 2

On a different day after lunch, Bob suggests a different game to see who pays. Alice and Bob will each choose a different sequence of three flips. (So they could choose "Heads-Tails-Heads", or "Tails-Tails-Tails" for example.) After they choose, a fair coin will be tossed until one of their sequences appears as a consecutive subsequence of the coin tosses. The player whose sequence appears first wins. For example, if Alice chooses "Heads-Tails-Heads" and Bob chooses "Tails-Tails-Tails" and the flips are Heads-Tails-Tails-Tails then Bob would win.

Bob says Alice can choose first, and after she chooses and tells him her sequence he'll choose a different sequence. What should Alice choose?