

Problem set 5 (Assigned on October 17th)

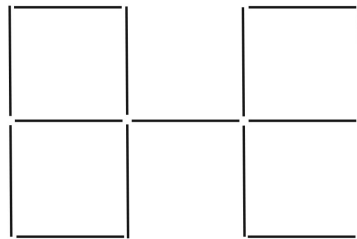
1. Several inhabitants of the Knights and Liars Island are spending an evening at the beach. At various points during a conversation, each person says to all the others “You are all liars!” How many knights are there at the beach?

2. You have 4 coins. One of them is counterfeit; however, you don’t know if it is lighter or heavier than the real one. How can you find the counterfeit coin using just two weighings on a balance scale with two pans?

3. You have 9 coins. One of them is counterfeit, and you know it is lighter than the real ones. What is the smallest number of weighings (on a balance scale with two pans) you need to find the counterfeit coin?

What is the smallest number of weighings if you don’t know whether the counterfeit coin is lighter or heavier than the real one?

4. Move two toothpicks to make five squares of equal size:



Two models of the hypercube (projections of the 4D cube onto 3-dimensional space) you built in class:

